NORWEGIAN MINISTRY
OF FOREIGN AFFAIRS

Meld. St. 32 (2014–2015) Report to the Storting (white paper)

Norwegian Interests and Policy in the Antarctic

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Translation from Norwegian. For information only.

Contents

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Recommendations of the Ministry of Foreign Affairs of 12 June 2015, approved in the Council of State the same date. (Solberg Government)

1 Introduction

Norwegian Antarctic policy has been centred on the assertion of Norwegian sovereignty claims and on the furtherance of international cooperation to ensure peaceful development of the Antarctic region. This policy has remained consistent for many years. However, no full-scale review of Norway's policy in the Antarctic has previously been undertaken, so no white paper or other comprehensive report has been issued that sets out the policy framework. At a time of growing interest and activity in the Antarctic by actors from Norway and other countries, the Government has concluded that a broad-based presentation of developments in the Antarctic and of Norwegian interests in the region is needed. The aim of this white paper is to explain Norway's key policy considerations in the Antarctic and what the policy should be in the years ahead.

Background

Norway has long traditions as a polar nation, both in the north and the south. Norwegian Antarctic history reflects the country's yearning for discovery, its scientific curiosity, its business interests and its political engagement since the 1890s to the present day. But Norway's Antarctic history is not only the story of Norwegian activity in the Antarctic. It is also the story of Norway as a key player in the development of the international cooperative regime for the Antarctic region.

Norway claims substantial territories in the Antarctic: Dronning Maud Land and Peter I Øy. Pursuant to the Antarctic Treaty, the territorial claims remain fixed for as long as the Treaty is in force. No party to the Treaty can be deemed to have renounced its claims; nor can any new claims be made on the basis of activities taking place while the Treaty is in effect. The Antarctic Treaty has also given rise to several other international agreements, which – in combination with the Treaty itself – are often referred to as the Antarctic Treaty System. Norway plays an active role in international collaboration associated with the Antarctic Treaty, including the Protocol on Environmental Protection to the Antarctic Treaty (the Environment Protocol) and the Convention the Conservation of Antarctic Marine Living Resources (the CAMLR Convention).

The international cooperation that has occurred under the Antarctic Treaty of 1 December 1959 has largely been successful. It has kept an entire continent outside the fluctuations of world politics, and has made possible an unprecedented level of international scientific cooperation while laying the groundwork for a joint commitment by the treaty parties to extensive environmental protection. The cooperative approach has worked so well because all parties have seen it as being in their interest to reach common solutions.

Norway has a long history as a research nation and industrial actor in and around Antarctica. Today the country operates a year-round

Figure 1.1 Map of the Antarctic.

Source: Norwegian Polar Institute.

research station (Troll) in Dronning Maud Land and sends frequent research expeditions into the waters around Antarctica. Norwegian companies, meanwhile, fish in those waters, operate tours as part of the Antarctic travel industry and supply satellite downlink services from Troll.

Norwegian Antarctic policy has remained constant over a long period of time. It is focused deliberately on Norway's special interests as a claimant, while striving for solid, effective international collaboration, especially under the umbrella of the Antarctic Treaty. Norway has played a central role in this Treaty's collaboration and has worked hard to develop effective solutions for management of the area covered by the Treaty. Norway was active, for example, in the talks that led to the Antarctic Treaty's Environment Protocol. Norwegian Antarctic policy emphasises the core values that underpin t he international partnership in the region – peace, scientific research and environmental protection.

Since there has been no previous strategic review of Norway's Antarctic policy, there is no existing white paper or comprehensive document that outlines the country's policy framework for the region. Yet we have entered a time when more

and more actors are reporting an interest in pursuing activities in the Antarctic. Because of the increased diversity of actors and activities, the Antarctic Treaty System agenda has grown in breadth and complexity. This white paper is about Norwegian policies and Norwegian interests within the scope of the Antarctic Treaty System, which includes the Norwegian dependencies of Dronning Maud Land and Peter I Øy. The third Norwegian dependency, Bouvetøya, lies north of the Antarctic Treaty's area of application. Bouvetøya is undisputed Norwegian territory. The Government has found it appropriate to submit a separate white paper on Bouvetøya. In this report, therefore, Bouvetøya will be discussed only to the extent that it directly pertains to issues affecting Norwegian interests in the Antarctic.

Objectives

The purpose of this white paper is to increase awareness of what it means for Norway to be a polar nation in the south. The Government aims to present an overall view of Norwegian interests and Norwegian policies, so that this document can serve as both a political administrative document and a source of information for the broader public.

Norway's Antarctic policy is intended to provide guidance and operating parameters for the following:

- Safeguarding the interests of Norway as a claimant state.
- Fulfilling international obligations, especially those related to the Antarctic Treaty, the treaty's Environment Protocol and the CAMLR Convention.
- Norway's cooperative role under the Antarctic Treaty system.
- Increasing synergy where relevant between Antarctic expertise and Arctic expertise – as regards climate change, for example.
- Sustainable Norwegian business interests.

2 Primary goals

Norway's Antarctic policy is designed to serve Norwegian interests across a diverse range of activities in an enormous geographical area. The interests at issue must be safeguarded within the bounds of an international regulatory framework and a dynamic set of international actors.

In this context, special emphasis will be placed on the following:

- *A well-defined, science-based policy.* Norway is to be a prominent and recognisable actor in both domestic and foreign policy arenas. As a polar nation, we will pursue consistent policies in the Antarctic. Our policies will be anchored in the same values, principles and objectives that guide us in other contexts.
- *Research and knowledge acquisition.* Norwegian research and information gathering will remain a mainstay of Norway's presence and activity in the Antarctic and surrounding waters. Norway will contribute to greater international understanding of the Antarctic and of global issues related to the Polar Regions. Research and monitoring activities are intended to reinforce Norway's position, administrative role and business operations in the area. These activities will be carried out in line with the stringent environmental standards laid down for the area.
- *A dynamic, effective Antarctic Treaty System and collaboration.* One of the main objectives of Norwegian foreign policy is to help develop and win support for robust and predictable international rules of conduct. Norwegian policy in the Antarctic is no exception. The general legal and political frameworks for Antarctic activity are defined by a set of agreements pertaining to the region. Norway will therefore continue prioritising efforts to strengthen the Antarctic Treaty System – that is to say, the work carried out within the framework of the Antarctic Treaty and its appurtenant consultative meetings (ATCM) as well as other related agreements, most notably the Protocol on Environmental Protection to the Antarctic Treaty (The Environment Protocol) and the Convention on the Conservation of Marine Living Resources (the CAMLR Convention). Norway, as one of the original parties to the Antarctic Treaty, wants to assist in integrating countries that have acceded to the Treaty in recent years, and in enabling them to take part constructively in the collaboration.
- *Norway as claimant.* Norwegian policy in the Antarctic has been based on the assertion of Norwegian territorial claims and constructive participation in international cooperation to ensure peaceful development and exploitation in the Antarctic. This policy will remain in place into the future.
- *The Antarctic as a natural reserve, devoted to peace and science.* As a Party to the Environment Protocol, Norway is committed to comprehensive protection of the Antarctic environment and to maintenance of the area's wilderness character. Through the Environment Protocol, the parties have identified the Antarctic as a protected area devoted to peace and science. Norway will continue to be a driving force in protecting the Antarctic environment and preserving it as a reference area for research related to the area's important role with regard to global climate and environmental changes. Norwegian research and monitoring activities will remain key aspects of Norway's presence and activity in the Antarctic and surrounding waters.
- *Norway as a responsible maritime nation.* Norwegian environmental policy is founded on the principle of sustainable management, which in turn relies on scientific guidance. For that reason Norway has played a major role in the development of sound regional cooperative systems. Norway will lead the way in coherent, ecosystem-based management practices that safeguard natural diversity and provide a basis for sustainable resource use. Norway has been active in developing the management regime of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), and will seek to ensure that the Commission remains a pioneer in developing credible, effective management systems. Norway insists on

upholding the same standards of prudent resource management in the waters around the Antarctic as in other marine waters where the Norwegian fishing industry operates.

– *Responsible commercial actor in the south.* Norwegian business enterprises have long traditions in the Antarctic. Fisheries, tourism, space and shipping are among the sectors in which Norwegian companies operate today. Common to all these forms of activity is that they are pursued within a policy framework whose paramount concerns and concepts are responsible management, sustainable resource use and conservation of the natural environment. Norwegian activities must comply with the terms and obligations of the Antarctic Treaty. Where relevant, Norwegian business interests are encouraged to contribute to the knowledge base that underpins sustainable activity in this fragile environment.
– *The Antarctic as part of domestic and foreign policy.* It is incumbent on Norway, as a polar nation, to treat issues involving the Antarctic – and especially Norway's Antarctic claim areas – as an integral part of Norwegian policy in general. Domestically this means that Norwegian legislation is applied, insofar as appropriate, in the country's Antarctic dependencies. Similarly, the foreign policy values and goals that Norway stands up for in other international forums and contexts must be pursued in the Antarctic as well.

3 Norway's history in the Antarctic

Summary

Norwegian Antarctic history is rooted in the pioneering exploration and whaling activities conducted by Norwegians in the 1890s and subsequent decades. Whaling came to play a major role in the Norwegian economy, affecting growth, employment levels and foreign trade. Uncertainties over sovereignty issues, meanwhile, made good relations with the United Kingdom (the leading actor in Antarctica) a policy priority for Norway. Whaling concerns were the main reason for Norwegian annexations in the Antarctic and sub-Antarcic during the interwar period – at Bouvetøya (1928), Peter I Øy (1931) and Dronning Maud Land (1939). All of these areas received status as Norwegian dependencies. The Antarctic Treaty, which entered into force in 1961, created a new framework for Norway's Antarctic policy. Since then, the policy has accentuated research activity and protection of the unique environment in addition to active contributions to international collaboration under the Antarctic Treaty.

3.1 Historic backdrop

3.1.1 Exploration and early presence

Norwegian Antarctic history is inextricably tied to the exploration and whaling activities of the 1890s

Box 3.1 Pioneer era I: Early Norwegian activity in the south

Shipping company owner Lars Christensen's 1892 *Jason* expedition, under the leadership of Captain C. A. Larsen, launched Norwegian activities in the south. Subsequently, another Norwegian, *Carsten Borchgrevink*, lead the British Southern Cross Expedition, which became the first to overwinter on the Antarctic mainland – at Cape Adare in 1898–1900. The station building, prefabricated at Strømmen Trævarefabrik in Norway, is still on site. It is the only place on earth where the first edifice ever erected on a continent remains standing. The station has been maintained by the New Zealand Antarctic Heritage Trust with financial support from, among other benefactors, the Norwegian Government.

Polar historians are in disagreement over who first set foot on the Antarctic mainland. The best-documented incident involves people from the Norwegian whaling expedition on the vessel *Antarctic*, which sailed to the Ross Sea in 1894–1895. On 24 January 1895, eight men from the ship, including Carsten Borchgrevink, Captain Leonard Kristensen and Expedition Chief Henrik Bull, went ashore at Cape Adare.

Figure 3.1 Roald Amundsen's South Pole Expedition, 1911.

Source: National Library in Australia.

Figure 3.2 Per Savio, one of two Sami members of Carsten Borchgrevink's 1898–1900 expedition.

Photo: Norwegian Polar Institute.

Figure 3.3 Carsten Borchgrevink surveying during his 1898–1900 Antarctic expedition. This was the first expedition to overwinter on the Antarctic mainland.

Photo: Norwegian Polar Institute.

and decades thereafter. Via these exploits in the Southern Ocean and on the icy continent itself, the Norwegian pioneers of that time gave Norway's polar identity its southern, Antarctic dimension.

The whaling station and graveyard in Whalers Bay, on Deception Island, and Carsten Borchgrevink's cabins at Cape Adare are important Norwegian heritage sites. Nine Norwegian heritage sites appear on the Antarctic Treaty System's list of historic sites and monuments in Antarctica. Roald Amundsen's South Pole tent, last seen when Robert F. Scott's group arrived at the spot a month after Amundsen, is also on this list. Additional information about internationally recognised Norwegian heritage sites can be found in Chapter 7.3.

3.1.2 Political context of Norway's Antarctic claims

During the interwar period Norwegian claims in the Antarctic dealt primarily with the challenges of the Norwegian whaling industry. At the time that industry played an important role in Norway's national economy, creating wealth, employment and foreign trade. But even though Norway was the dominant country in the whaling fields of the Southern Ocean, its position, politically speaking, was highly vulnerable. Fears arose that Norway's vital whaling industry could be harmed by other countries' policies – above all by the threat of exclusion from productive waters as a result of sovereignty claims by other countries on either the Antarctic mainland or islands in the surrounding ocean. Such fears were not groundless. The United Kingdom and the former British colonies of New Zealand and Australia pursued an active expansion policy that included both large territorial claims and licensing charges for Norwegian whaling, even on the high seas.

Britian's aim for dominance in the Antarctic was evident as early as 1904, when C. A. Larsen raised the British flag at the whaling station in

Box 3.2 Pioneer era II: Voyages of discovery

Foremost among Norway's pioneering explorers is Roald Amundsen – the man whose conquest of the South Pole would carry his country's name to all corners of the world. On his first journey south, he served as First Mate on the scientific *Belgica* Expedition, which became trapped in the ice in the Bellingshausen Sea in 1898, making its members the first to overwinter in Antarctic waters. The next time Amundsen came to Antarctica it was as the leader of the *Fram* expedition of 1910–12. On 14 December 1911 Amundsen made history when he and four companions – Olav Bjaaland, Helmer Hanssen, Sverre Hassel and Oscar Wisting – planted the Norwegian flag at the South Pole. The expedition members discovered large areas that were named and taken into possession on behalf of the King of Norway. No formal occupation by Norwegian authorities took place, however.

Norwegians were also among the first to use aircraft in exploring the Antarctic Continent. The first flyover of the South Pole was executed by the Norwegian Bernt Balchen, on 28–29 November 1929, on Richard Byrd's expedition. Other Norwegian air pioneers in the Antarctic included Hjalmar Riiser-Larsen, Finn Lützow-Holm and Viggo Widerøe, who aerially photographed and mapped Dronning Maud Land in the years from 1929 to 1937.

South Georgia, an island group that previously had been considered more or less ownerless. In the following years, the UK submitted claims of sovereignty over South Georgia and several island groups further south, and from 1908 onward, over the entire Antarctic Peninsula from 20° W to 80° W longitude (the whole region becoming known as the Falkland Islands Dependencies). In 1923 the British claimed a sector-shaped portion of the Antarctic mainland between 160° E and 150° W longitude (the Ross Dependency, which was placed under the sovereignty of New Zealand).

Figure 3.4 The whaling station at Grytviken, South Georgia, established in 1904. This picture is from the NARE expedition of 1989–90.

Photo: John Snuggerud, Norwegian Polar Institute.

Figure 3.5 A whale on the flensing platform at Husvik, South Georgia, in 1956.

Photo: John Snuggerud, Norwegian Polar Institute.

The next year, France stepped forward to claim a narrow sector, from 136° E to 142° E longitude. At the British Imperial Conference of 1926, a statement was adopted asserting that certain areas of Antarctica belonged to the United Kingdom by virtue of their discovery, as claimed, by British persons. This 'wish list' covered approximately 40 per cent of the Antarctic mainland. Though lacking the legal force of annexation, the statement was an important declaration of the political ambitions of the British Empire in Antarctica. These ambitions were realised by British Royal Order on 7 February 1933, when the areas identified during the Imperial Conference were annexed and assigned to Australia (the Australian Antarctic Territory – the entire sector from 45° E to 160° E longitude, apart from the French claim area). In this way the British Commonwealth of Nations (later renamed simply the Commonwealth of Nations) ended up claiming sovereignty over two-thirds of the Antarctic mainland and islands.[1]

All the same it was the British dominance at sea that caused the most anxiety in Norway. Yet out of concern for the whaling industry, one of the main tenets of Norwegian Antarctic policy was to

[1] While one generally speaks of the British 'empire' in the early interwar period, we use the term 'commonwealth' in this report with regard to the period after 1931, when the Statute of Westminster gave dominions such as Australia, New Zealand and Canada full autonomy and equal status within the newly organised British Commonwealth of Nations.

Box 3.3 Pioneer era III: Whaling

The *Jason* Expedition in 1892 started a prolonged period of Norwegian whaling activity in Antarctica. At first, fur seal harvesting was the primary draw, but it soon became clear that whales were the most valuable resource in the Southern Ocean. Large-scale whaling in the early years was almost entirely a Norwegian enterprise. The first vessels were of quite simple design, so efficient operations required good harbours with fresh water where the whales could be flensed and processed. C. A. Larsen set up the first land-based whaling station, in Grytviken, South Georgia, in 1904 after joining forces with the expatriate Norwegian Don Pedro Christoffersen and other prominent persons in Buenos Aires to establish the whaling company «Compañia Argentina de Pesca». This alliance marked the start of large-scale Norwegian whaling in the Southern Ocean an enterprise which included the construction of large island-based production plants, particularly in South Georgia. On Deception Island near the Antarctic Peninsula, the expatriate Norwegian Adolf Andresen, who lived in Chile, adopted Whalers Bay as a whaling outpost in 1906, and in 1912 the Norwegian company Hektor AS established a station there. By 1914, 21 factory ships and six land-based stations were operating in the Southern Ocean, with 62 whaling vessels using their services.

With the introduction of advanced whale-processing vessels by Norwegian shipping companies in the early 1920s, Norway clearly dominated the whaling fields of the Southern Ocean. In the 1930/1931 season (when the total catch reached its historic peak), 27 of the 41 Antarctic whaling expeditions were Norwegian; what's more, most of the crewmembers on expeditions from other countries were Norwegian nationals. Other countries eventually joined the hunt in greater numbers with British, Japanese, Soviet, German and Dutch whalers coming to represent an ever-greater share of the activity. Norway's role in the Antarctic whaling industry diminished after World War II, and ended in 1967. International whaling led to overexploitation of whale stocks in the Southern Ocean, and from the 1950s onwards Norway worked actively to limit the catch. Experience gained from the Southern Ocean has contributed to the development of sustainable management principles for ocean resources.

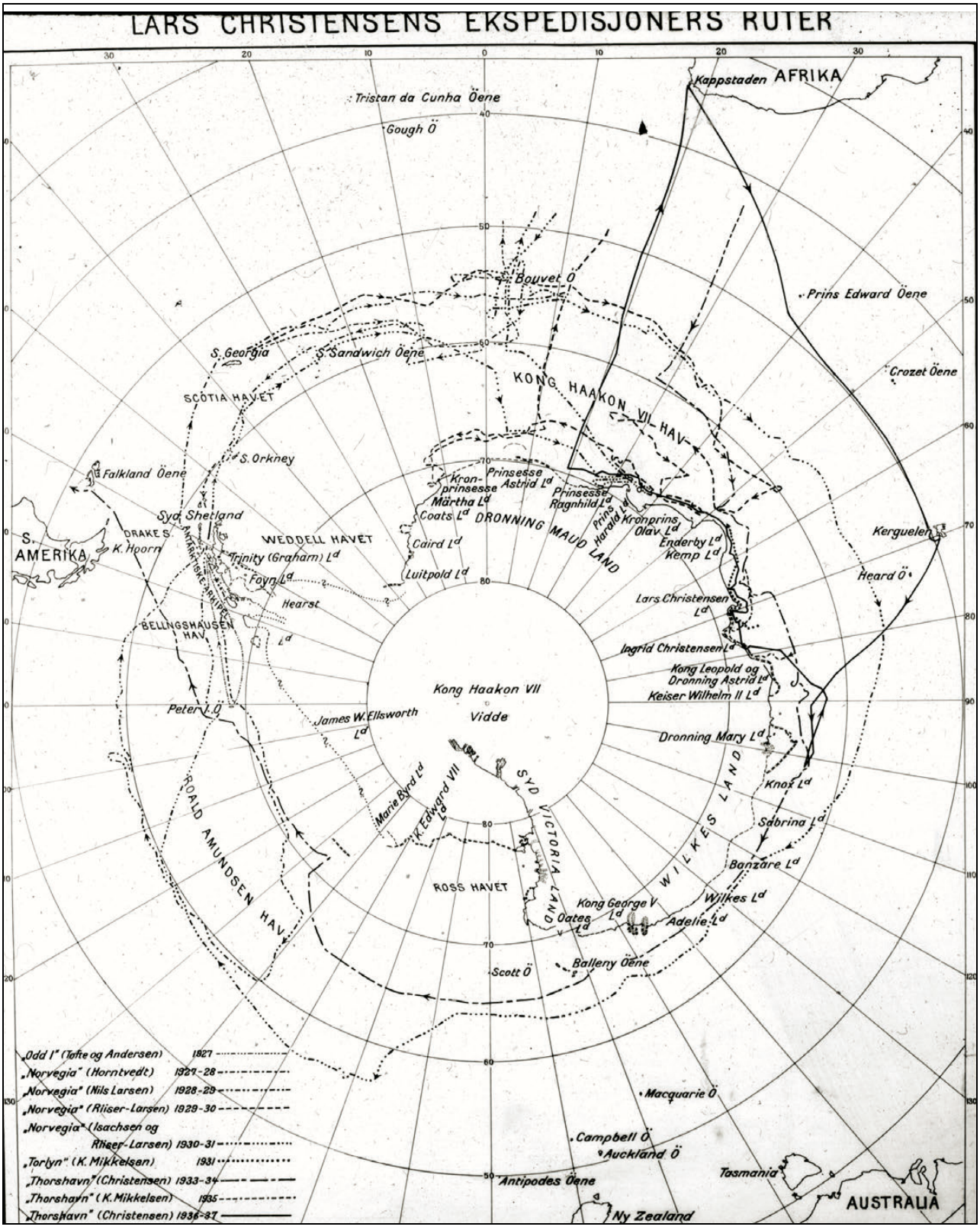

Figure 3.6 Map showing the routes taken by Lars Christensen's expeditions.

Source: Norwegian Polar Institute's picture archive.

establish and maintain the smoothest possible relations with the UK and the rest of the Commonwealth.

3.1.3 Norwegian annexations in the Antarctic: Peter I Øy (1931) and Dronning Maud Land (1939)

In 1927 a shift occurred in Norwegian policy related to the Antarctic. The new course required a more active strategy, with the goal that Norway, too, would become a claimant in the Antarctic. Things had begun to change in 1926, with whaling ship owner Lars Christensen's preparations for the first in what would become a series of exploratory expeditions to the Antarctic (with the vessels *Odd*, *Norvegia* and *Torshavn*). Under authority granted by the Ministry of Foreign Affairs on 31 August 1927, Christensen authorised the leader of the *Norvegia I* Expedition, Captain Harald Horntvedt, to annex any new land he found and to go ashore on the assumption that it was not already occupied by any other country. On 1 December 1927, the expedition went ashore and annexed Bouvetøya, at 54° 25' S latitude and 3° 21' E longitude. The circumstances of the annexation are described in more detail in a separate White Paper on Bouvetøya.

Peter I Øy

In 1928 Lars Christensen provisioned the second *Norvegia* Expedition, which – like the one before – was given annexation powers in Norway's name for all new land the expedition might discover. On 2 February 1929 the expedition went ashore on Peter I Øy, and claimed the island for Norway.

Peter I Øy lies 450 km off the west coast of Antarctica, at 68° 50' S latitude and 90° 35' W longitude. The island, about 180 km^2 in area, had been discovered by Russian Admiral Fabian Gottlieb von Bellingshausen on 21 January 1821 and named after Tsar Peter I of Russia. Pack ice made it impossible for Bellingshausen to get closer than 25 km from the island. It was the first bit of land discovered south of the southern Polar Circle, and was therefore also the southernmost point to have been discovered at that time. But no one had set foot on the island until the *Norvegia* Expedition arrived, and no country – including Russia – had ever claimed it.

The island lie was not within (or near) the area identified in the declaration issued at the British Imperial Conference. When it became clear that

Figure 3.7 From the third *Norvegia* Expedition, 1929–30, showing aircraft N-41, which Hjalmar Riiser-Larsen used in mapping Dronning Maud Land.

Photo: Norwegian Polar Institute.

scarcely anyone would stand in the way of placing the island under Norwegian sovereignty, the annexation was affirmed by the government through a Royal Decree on 6 March 1931. The legal status of the island was determined by legislative amendment on 24 March 1933, when Peter I Øy became a Norwegian dependency. More information is provided in Chapters 5.1 and 5.2. Norway's then Ministry of Trade was given the task of administering the island by Royal Decree on 13 July 1933, with the same powers as that of a county governor. The duties of Police Chief went to the then Ministry of Justice.

Dronning Maud Land

The various expeditions that Lars Christensen equipped each year in the 1926–1937 period were responsible for discovering and mapping vast areas in the part of the Antarctic mainland facing the Atlantic Ocean. These ground-breaking discoveries and surveys by Norwegian explorers and expedition leaders gave the country the basis, under the law as ordinarily understood, for a possible annexation claim over the entire stretch of coast from approximately 16° 30' W to 45° E longitude, including large parts of the interior. A major concern at the same time was to avoid coming into conflict with the United Kingdom. Active dialogue between the two governments and additional input from private actors resulted in a favourable British view of Norway's Antarctic interests. On several occasions from 1933 onwards, the British

Figure 3.8 Consul Lars Christensen, whaleship owner and nation builder. Christensen financed all the Norwegian scientific expeditions of this period. These activities would underpin Norway's sovereignty claims.

Photo: Whaling Museum in Sandefjord (Vestfold Museums).

expressed amenability to a potential Norwegian sovereignty claim on the Antarctic mainland.

The issue of potential Norwegian annexation of the area between the Falkland Islands Dependencies in the west and the Australian Antarctic Territory to the east was raised with the British Government in a memorandum on 26 January 1934. Notification was provided at the same time that the Norwegian Government might consider holding an international conference to discuss the Antarctic situation, but that it was thought bilateral Norwegian-British talks would be the most practical way to proceed. Among Norway's objectives in these discussion, was clarification of the maritime boundary issue in the Antarctic. In a note of reply of 23 October 1934, the United Kingdom stated that it agreed with the Norwegian view and indirectly encouraged Norway to proceed with annexation. However, despite the seemingly favourable circumstances, the Norwegian government chose to maintain a policy of reticence for quite some time. That ended abruptly with an incident that dramatically focused Norway's attention. In December 1938 Adolf Hoel, the polar researcher and head of Norway's «Svalbard- og Ishavsundersøkelser» (precursor of today's Norwegian Polar Institute), found out that on 17 December 1938 Germany had dispatched an expedition to the Antarctic. Both the expedition and its purpose were shrouded in secrecy, but the information Hoel had got wind of indicated to him that the object was to claim the same area of the Antarctic that Norway was planning to annex. Hoel immediately notified the Ministry of Foreign Affairs, which agreed that the German expedition's purpose was in all likelihood to claim land in Norway's sphere of interest. To avert that situation the government quickly decided to carry out the annexation, which took place by Royal Decree on 14 January 1939. The resolution gave the Ministry of Justice authority to establish regulations for police duties in the area.[2]

Foreign Minister Koht himself presented his Ministry's recommendation in support of the Royal Decree, using the following words:

> The King approves and signs a submitted draft Royal Order proclaiming that the portion of the mainland shoreline of Antarctica stretching from the border of the Falkland Islands Dependencies in the west (the border of Coats Land) to the border of the Australian Antarctic Dependency in the east (45° eastern longitude), including the land inland from this shore and the ocean abutting it, is to be brought under Norwegian national sovereignty.

This is the area that would later acquire the name Dronning Maud Land.

According to the Norwegian Foreign Ministry, Norway's right to establish possession of the area was justified on the basis of the geographical exploration Norwegians had independently executed in this area. Norwegian whaling considerations were cited as a reason for Norway to exercise this right. It was also stated expressly that the purpose of the annexation was not to keep other nations out, but to prevent a situation in which Norwegian whaling activities could be excluded or harmed as a result of measures taken by other states.

The contents of the annexation resolution were quickly communicated to most of the countries with which Norway had diplomatic relations. Most of these had no remarks. The United Kingdom – on behalf of the British Commonwealth of Nations – replied accommodatingly on 1 Septem-

[2] No regulations have been issued, so administrative and legal authority rests with the Ministry of Justice and Public Security.

St. meld. nr. 19.

(1939)

Norsk statsvelde i Antarktis.

Tilråding frå Utanriksdepartementet 20 januar 1939 godkjent ved kongeleg resolusjon same dag.

(Målboren av utenriksminister Halvdan Koht.)

Med kongeleg resolusjon den 14 januar 1939 vart det vedteki å ferde ut ei kongeleg kunngjering um at ein part av det antarktiske fastlandet skulle bli dregen inn under norsk statsvelde.

Utanriksdepartementet held det for rett og rimeleg at det førelegget frå departementet som gav grunnane for dette tiltaket, blir sendt fram til Stortinget så fort som råd er, og vil difor

tilråde:

Tilrådinga frå Utanriksdepartementet 14 januar 1939 om å draga ein part av det antarktiske fastlandet inn under norsk statsvelde blir sendt i avprent til Stortinget.

Norsk statsvelde i Antarktis.

Tilråding frå Utanriksdepartementet 14 januar 1939 godkjent ved kongeleg resolusjon same dag.

(Målboren av utanriksminister Halvdan Koht.)

Figure 3.9 Facsimile, excerpt from Report No. 19 (1939) to the Storting, presented by Minister of Foreign Affairs Halvdan Koht.

Box 3.4 Dronning Maud Land – the question of its southward geographic extent

Norway made its claim of Dronning Maud Land in 1939, weighing its words carefully. Foreign Minister Koht defined the annexed area as '… the mainland shoreline of Antarctica … including the land inland from this shore and the ocean abutting it …'. With this formulation, Norway underscored that our polar policies rested on the same principles in both the north and the south by indicating that the Norwegian claim in Antarctica did not constitute a sector. Since the early 1900s it had been an important part of Norwegian polar policy to reject the 'sector principle', on which a number of States had based claims in both the northern and southern Polar Regions. The wording of the claim was not, however, intended to imply any great difference in practice. It follows from Report No. 19 (1939) to the Storting on Norwegian sovereignty in the Antarctic that the purpose of the annexation was to establish possession of 'that land which until now has been without rule and which no one other than Norwegians has studied and mapped'. On this basis, Norwegian authorities have not opposed any interpretation of the Norwegian claim as extending all the way to, and including the pole itself.

ber 1939, and made a generous suggestion, accepted by Norway, that the border of the Norwegian area be set at 20° W longitude.[3] Four countries objected to the Norwegian annexation announcement: the United States, Chile, the Soviet Union and Germany.

The Germans rejected the Norwegian claim. In August of 1939, Germany announced the formation of a 'German Antarctic sector' between 4° 59' E and 16° 30' E longitude. The German claim area, which was given the name Neuschwabenland, lay completely within the area that Norway had already annexed. The German claim never received international approval, and after World War II it was not raised again.

[3] In the Norwegian resolution of 14 January 1939 this border had been defined somewhat more vaguely and more to the east ('the border of Coats Land'), because the Norwegian exploration activities extended only to about 16° 30' W longitude.

3.1.4 From 14 January 1939 to 21 June 1957: Consideration of Dronning Maud Land's constitutional status

More than 18 years would pass from Dronning Maud Land's placement under Norwegian sovereignty until its constitutional status was elucidated and formalised in Norway's Dependencies Act[4] (see Chapter 5, on legislative matters). Part of the

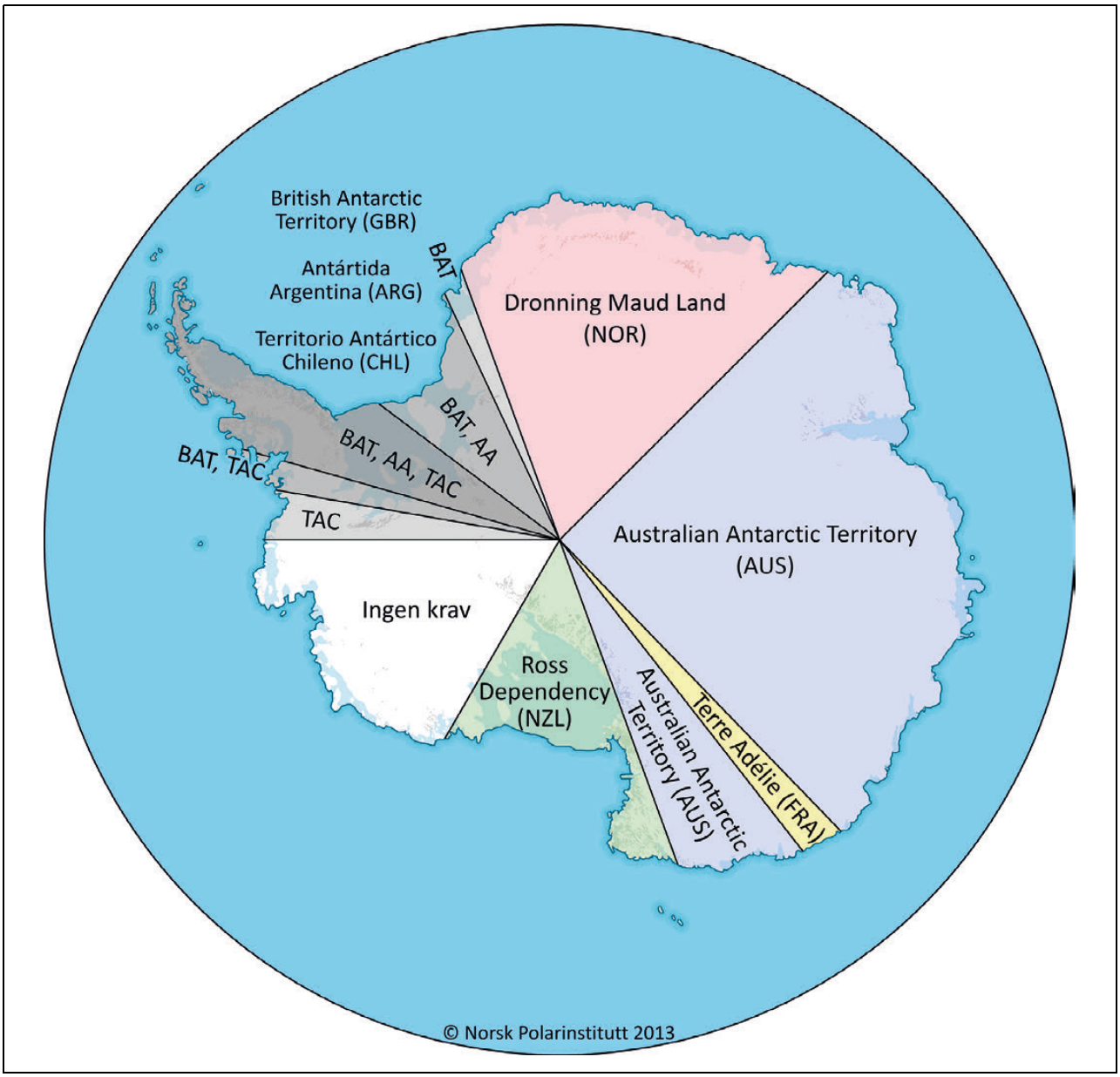

Figure 3.10 Map of the Antarctic, showing claim delimitations.

Source: Norwegian Polar Institute.

reason was the effect of world politics on Norwegian Antarctic policy. Though Norway and the United Kingdom had come to agreement on their claims and borders, other countries clearly held different views on the matter of territorial possessions in the Antarctic. Chile (in 1940) and Argentina (in 1942) had made claims for large areas that were partly in conflict with each other and partly in conflict with the British claim to the Falkland Islands Dependencies. The United States and the Soviet Union, meanwhile, had given notice that they, too, wanted a say in resolving political and legal issues in the Antarctic.

It soon became clear that the United States aspired to play a leading role in this regard. The Americans laid out their plans in a note dated 9 August 1948 to the seven claimant countries (Norway, the United Kingdom, New Zealand, Australia, France, Argentina and Chile). The note proposed that these countries in association with the United States establish joint rule of Antarctica. This proposal for a condominium was given a mixed reception. Norway and several other countries strongly opposed it. In addition, a sharp protest came from the Soviet Union (which had not submitted any sovereignty claims, but considered itself equally entitled to an opinion in the matter). Due to the lack of support, the US proposal was quietly shelved.

Around this time the Norwegian authorities began discussing what actions the country's new territorial addition required of them. An initial concern was what measures Norway would have to take if other countries advanced new claims in the Antarctic. The leading view was that Norway ought to strengthen its claim by carrying out scientific research in the area, a view that resulted in the Maudheim Expedition of 1949–52.

The matter of formalising the annexed area's constitutional status had also come up for consideration. At the initiative of the Ministry of Foreign Affairs, the Ministry of Justice issued a set of recommendations on 28 May 1948. It was submitted to the Storting as Proposition No. 70 (1948) to the Odelsting. Among its specific proposals was the naming of 'Dronning Maud Land' and the suggestion to apply the Act of 27 February 1930 regarding Bouvetøya and Peter I Øy to the area. But as a consequence of the American note of 9 August 1948, consideration by the Storting was postponed. In 1951 it was postponed again, this time because the Parlimentary Committee on Foreign and Constitutional Affairs believed the issue should not be raised due to the ongoing conflict between the United Kingdom and Argentina over sovereignty in West Antarctica.

For several more years there was no substantive discussion of the constitutional issue. When it re-emerged, it was a result of preparations for the International Geophysical Year (IGY). This scientific event would last from 1 July 1957 to 31 December 1958, with 12 countries, among them Norway, taking part in a variety of expeditions and activities at research stations in the Antarctic interior. To facilitate scientific cooperation and avoid political trouble, the parties agreed informally that nothing should be done in connection with the IGY that would affect Antarctic sovereignty issues.

In Norway, all the same, the pre-IGY activities led to renewed discussion of Dronning Maud Land's constitutional status. The prevailing view was that it ought to be determined before the opening of the IGY. On 21 June 1957, therefore, a bill amending the Act of 27 February 1930 relating to Bouvetøya and Peter I Øy was sanctioned. With that, Dronning Maud Land – a vast ice-covered area nearly 3 million km2 in extent – received lawful status as a Norwegian dependency. More about this can be found in chapters 5.1 and 5.2.

3.2 History of the treaty system

3.2.1 The Antarctic Treaty and the treaty system

International scientific cooperation associated with the IGY, and the desire to structure it more efficiently, led to the establishment in 1957 of the Special Committee on Antarctic Research (SCAR), whose name would later be changed to the Scientific Committee on Antarctic Research. At the first meeting of SCAR, in February 1958, it became clear that the participating countries planned to continue carrying out their activities in the Antarctic, and even expand some of them. This spurred a development which opened the way for the negotiations that resulted in the *Antarctic Treaty*, a unique and innovative international agreement that was signed on 1 December 1959 and entered into force on 23 June 1961. The original treaty parties were the same 12 countries that had cooperated during the IGY. These included, in addition to the seven claimant states, the United States, the Soviet Union, Japan, Belgium and South Africa.

[4] Act of 27 February 1930 No. 3 relating to Bouvetøya, Peter I Øy and Dronning Maud Land (Dependencies Act), with subsequent amendments by the Storting.

It was the United States that took the initiative in the spring of 1958 to negotiate an agreement to ensure that the scientific cooperation begun during the IGY could continue. The Antarctic Treaty established a cooperative multinational regime that marked a new era in that continent's history. It significantly changed the legal framework for the Antarctic policies of Norway and other countries, and for their activities in the Antarctic. Oversimplifying somewhat, one could say that all the activities undertaken in the Antarctic during this era must be understood in light of the Antarctic Treaty and the regulations and guidelines it contains.

3.2.2 Norwegian activity and policy related to the Antarctic Treaty

Through the 1960s, while other countries were increasing their activities in the Antarctic, Norway was scaling down. The Belgian, Japanese and Soviet research bases in Dronning Maud Land were kept in operation; the Norwegian base, called Norway Station, was turned over to South Africa. Later, the South Africans expanded their activities by adding the new South African National Antarctic Expedition base (SANAE), which was also situated inside the Norwegian dependency. Over the next 15–16 years, Norway sent no scientific expeditions of its own to the Antarctic mainland. But on occasion small groups of Norwegian researchers or individuals took part in expeditions from other countries (such as the United States), or were transported into the area by aircraft from other countries.

In October 1969 the Government of Norway endorsed a memorandum from the Ministry of Industry concluding that Norway should uphold its sovereignty claims in the Antarctic, and that the establishment of a fixed station with a one- or two-year span of operation would have to be considered once more experience was obtained in the joint expeditions with the United States (i.e. American expeditions in which a few Norwegian scientists had participated). This statement was welcomed as the first clarification of Norwegian Antarctic policy since the country's accession to the Antarctic Treaty, a view reflected in the following

Figure 3.11 The year-round Troll station was officially opened by HM Queen Sonja on 12 February 2005.

Box 3.5 Earlier Norwegian scientific activity

Members of the first Norwegian expeditions to the Antarctic conducted scientific studies on a rather large scale, even though commercial and political motives played a substantial role. The Maudheim Expedition, which overwintered from 1949–52 at 71° 03' S latitude and 10° 56' W longitude, inaugurated a new era by putting polar research more in the foreground. This Norwegian-British-Swedish expedition was in its way pioneering, with respect to the level of international research cooperation undertaken, which over time would become such a crucial element in Antarctic development.

As part of its activities related to the International Geophysical Year, Norway was responsible for an Antarctic scientific expedition in 1956–60 which established a research station called Norway Station. This was a wintering station on the Fimbul Ice Shelf at 70° 30' S latitude and 2° 32' W longitude. Scientifically speaking, Norway Station was a resounding success. The station was also influential as a demonstration of Norwegian presence in the region. It validated the annexation of Dronning Maud Land and gave Norway an important role in the negotiations that led to the Antarctic Treaty.

newspaper commentary: *'For the first time a Norwegian government has produced something that could only be termed a declaration of principle regarding what we want and what we intend to do on a longer-term basis on the only foreign continent where we claim a right to any territory.*[5] In January 1973 the Government also endorsed a Ministry of Foreign Affairs memo whose conclusion (as in the previous case) was that Norway among other things should hold fast to its sovereignty claims in the Antarctic while supporting an expansion in research cooperation. It has been clear ever since that research activities would play a key role in Norwegian Antarctic policy.

[5] 'Norge i Antarktis' (Norway in the Antarctic), leading article in Aftenposten, 25 October 1969.

Box 3.6 Recent Norwegian scientific activity

The first official NARE Expedition (Norwegian Antarctic Research Expeditions) took place in 1976–77, marking the start of more frequent Norwegian visits to the Antarctic. In the early 1990s, expeditions began to be conducted in close cooperation with other Nordic-Antarctic countries – Finland and Sweden.

In 1989–90, a permanent Norwegian research station was built at Jutulsessen in Gjelsvikfjella, 235 km from the coast at 72° 01' S latitude and 2° 32' E longitude. Situated at an elevation of 1,275 m, the station was given the name Troll. In 2004–05, the station was expanded and upgraded to provide year-round service. In connection with the expansion, a 3,000-m-long airstrip was constructed 7 km from the station. The Troll Airfield, as it is called, opened officially on 12 February 2005 in conjunction with HM Queen Sonja's opening of the year-round Troll research station.

Since the establishment of Troll as an all-year facility, there has been a substantial increase in Norwegian research activity in Antarctica. Much of it has occurred in cooperation with other countries, including several major projects undertaken during the 2007–09 International Polar Year.

The opening of Troll as a modern, year-round platform for scientific work has also led to an extensive upgrade of Norway's own Antarctic research. The Troll station accommodates research and monitoring activity throughout the year, with equipment for observing meteorological phenomena and ultraviolet radiation levels. It also serves as a field station for glaciology, biology and physics. TrollSat downlinks satellite data relevant to a variety of environmental parameters, and the Norwegian Institute for Air Research's new observatory monitors mercury, ground-level ozone, aerosols, organic pollutants, hydrocarbons and greenhouse gases.

The Troll station and Troll Airfield have made it possible for Norway to be a driving force for international cooperation in Dronning Maud Land.

3.2.3 A policy of cooperation

In October 1974, when he was asked in the Storting what was being done to protect Norwegian interests in the Antarctic, Foreign Minister Knut Frydenlund pointed to Norway's cooperative engagement under the Antarctic Treaty. His reply included the following words: 'It is quite clear that a continuation of the cooperation now taking place is the best way of securing Norway's interests in these areas.'[6] That statement has remained standing as a concise expression of Norwegian Antarctic policy applicable for the long term. Most subsequent official declarations of Norwegian policy related to the Antarctic have highlighted Antarctic Treaty cooperation as a major element in advancing Norwegian interests in the region.

From the 1970s onwards, as research activities gradually attained higher priority in Norwegian Antarctic policy, Norway began to play a more active role in Antarctic Treaty issues related to political cooperation. The country's role as a bridge-builder between the various actors and interest groups within the treaty organisation was characteristic of Norwegian policy. Also typical was Norway's strong contribution to the expansion of the Antarctic Treaty System into new policy areas – not least with regard to environmental and resource issues. Norway was active, for example, in developing the Convention for the Conservation of Antarctic Seals (1972) and in negotiating the Convention on the Conservation of Antarctic Marine Living Resources (the CAMLR Convention), which came into force in 1982.

The issue of regulating future exploitation of mineral resources in the Antarctic was first raised by Norway at a special 'informal' conference of the Consultative Parties to the Treaty in May 1973. As a result of that conference, which was arranged by a Norwegian organisation called the Fridtjof Nansen Foundation, via a grant from the Ministry of Foreign Affairs, the issue was taken up formally at the next consultative meeting, in Oslo in 1975. With that Norway took leadership of negotiations during the 1980s for a possible agreement to regulate future mineral exploitation (the Convention on the Regulation of Antarctic Mineral Resource Activities, or CRAMRA). When it became clear that CRAMRA would not be ratified, the Consultative Parties to the Treaty – upon an initiative from Norway and including active Norwegian participation – agreed instead on a protocol to the Antarctic Treaty. This Protocol on Environmental Protection to the Antarctic Treaty, signed on 4 October 1991 and brought into force 14 January 1998, designates the Antarctic as a natural reserve devoted to peace and science.

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[6] Excerpt of the reply by Minister of Foreign Affairs Knut Frydenlund to a question from Erik Gjems-Onstad, a member of the Storting, during the Storting's question hour on 9 October 1974: 'What is being done to look after Norway's interests in Bouvetøya, Peter I Øy and Dronning Maud Land?'

4 International legal framework

4.1 The Antarctic Treaty

4.1.1 Introduction

Under Article VI of the Antarctic Treaty, the provisions of the treaty apply to the land and marine area south of 60° S latitude. This means that the treaty covers the Norwegian areas of Peter I Øy and Dronning Maud Land, but not Bouvetøya, which lies further north.

Prior to the conclusion of the Antarctic Treaty, seven states had laid claim to territory in Antarctica: Norway, the United Kingdom, New Zealand, Australia, France, Argentina and Chile. Article IV of the Treaty is the very cornerstone of international collaboration under the Antarctic Treaty. This provision preserved the status quo of the territorial claims asserted by states regarding their right of sovereignty. No party may be considered to have renounced any claim, nor may any new claims be asserted, on the basis of activities carried out while the treaty is in force. Article IV states that nothing in the treaty shall be interpreted as a renunciation or diminution of any claim or right of claim to territorial sovereignty over an area of Antarctica, or as a change in the view of any of the treaty parties regarding a claim to territorial sovereignty, and furthermore that no act or activity shall constitute a basis for asserting, supporting or denying a claim to territorial sovereignty or create any right of sovereignty over an area in Antarctica. No new claim or enlargement of an existing claim to territorial sovereignty of an area in Antarctica is permitted.

These issues have thus been 'put on ice', or, as has also been said, the parties have 'agreed to disagree'. The effect is twofold. Firstly, it formalises the obligation of claimants not to assert new claims. Secondly, the other treaty parties are not to impede the claimant states' rights and obligations in the area stemming from other conventions, such as the UN Convention on the Law of the Sea.

4.1.2 Antarctic Treaty Consultative Meetings

Any state that is a member of the United Nations may accede to the treaty; see Article XIII. However, Article IX of the treaty distinguishes between consultative and non-consultative parties. The consultative parties are empowered to make decisions and adopt resolutions regarding the implementation of the Antarctic Treaty. To be entitled to status as a consultative party, a treaty party must be able to demonstrate that it has established research activity in Antarctica. Non-consultative parties have status as observers at the con-

Figure 4.1 At the opening of ATCM XII in Tromsø, May 1998. The meeting chairman, Ambassador Rolf Trolle Andersen, is flanked by the meeting's executive secretary, Jon Ramberg (left), and its chief rapporteur, Odd Gunnar Skagestad (right). It was the second time the meeting was held in Norway.

Photo: Private archive

sultative meetings. This distinction was made to ensure that decisions of potential importance to the future of the Antarctic are made by the countries with interests in, and actual knowledge of, the continent.

In addition to the twelve original signatory states, 17 other countries have so far been granted consultative status. In 2015, therefore, the treaty had 29 consultative parties. Including the non-consultative parties, the contracting parties to the treaty now total 51 countries, representing over 80 per cent of the global population.

The consultative meetings under the Antarctic Treaty are held annually in a system called the Antarctic Treaty Consultative Meeting (ACTM). Responsibility for planning and organising meetings rotates among the consultative parties. The ACTM and the activities carried out under the Antarctic Treaty in general have a dedicated secretariat, which was established in 2004 and is located in Buenos Aires, Argentina.

Recommendations, measures, decisions and resolutions are adopted on a consensus basis by the consultative parties present at the meeting. Measures are adopted at the meeting, but must subsequently be approved by all parties before they are legally binding under international law.

4.1.3 Requirement that Antarctica be used for peaceful purposes only

Article 1 of the Antarctic Treaty establishes that Antarctica shall be used for peaceful purposes only and be free from activities of a military nature, including the testing of any type of weapons. Nonetheless, the treaty does not prevent the use of military personnel or equipment for scientific research or other peaceful purposes, such as transport assignments. Furthermore, Article V explicitly states that all nuclear explosions in Antarctica and all disposal of radioactive waste are prohibited.

Articles II and III of the treaty stipulate that there shall be freedom of scientific research in Antarctica, and that the parties shall work to promote international scientific cooperation through such means as sharing information about research programmes and exchanging scientific personnel.

Figure 4.2 Inspection: A Norwegian inspection team in action in accordance with Article VII of the Antarctic Treaty (February 2009).

Photo: Private archive (Inger Holten).

4.1.4 Inspection system

In order to verify compliance with the treaty provisions, a system for inspections was introduced in Article VII that gives the consultative parties free access to inspect one another's activities and installations. The observers designated by the countries under the procedure set out in Article VII (1) shall have complete freedom of access at all times to every area of Antarctica. The parties are also obligated to notify the other parties in advance of all expeditions to and within Antarctica involving the state party's ships or nationals, or expeditions that are organised in, or depart from, the party's territory. Information shall also be provided on all military personnel or equipment that a party intends to bring into Antarctica.

To date, Norway has carried out inspections on four occasions, in January 1990, December 1996, January 2001 and February 2009. The inspections were conducted at research stations belonging to Germany, the United Kingdom, India, Russia, Belgium and South Africa. In recent years, some parties have conducted joint inspections. Certain parties have chosen to inspect activities other than research stations, such as sailboats and cruise ships visiting Antarctica. The activities at the Troll research station have been inspected on four occasions, most recently by a German-South African inspection team and by a US-Russian inspection team in the 2013/14 season. The recommendations of the inspection teams are presented and considered at the ATCM. The recommendations resulting from the Norwegian inspections have concerned issues such as the governance and ownership structure of the research stations of certain countries, the degree of commercial activity at the stations and solutions to ensure environmentally sound operations.

The inspection system is intended as a means of building trust; active use of the right of inspection must also be seen as an appropriate tool for further developing and strengthening the collaborative regime created under the Antarctic Treaty system. The post-inspection recommendations can also be an important contribution to the development of an optimal practice for implementing the provisions of the treaty and the Protocol on Environmental Protection to the Antarctic Treaty (the Environment Protocol). Norway is intent that the recommendations of the inspection teams be followed up, and will work to find an effective means of ensuring a more structured follow-up within the framework of the annual consultative meetings.

4.1.5 Revision opportunities

Under Article XII a consultative party may – once the treaty has been in force for 30 years, which is to say since 1991 – request a review conference to evaluate the effectiveness of the treaty. So far, none of the treaty parties have asked for such a conference or indicated that they wish to withdraw from the cooperative arrangements.

4.1.6 Other agreements in the Antarctic Treaty system

The Antarctic Treaty has also given rise to several other intergovernmental agreements, which – along with the treaty itself – are often referred to as the 'Antarctic Treaty system'. This network comprises the following agreements:

- The *Convention for the Conservation of Antarctic Seals (CCAS),* from 1972.
- The *Convention on the Conservation of Antarctic Marine Living Resources (the CAMLR Convention),* from 1982.
- The *Protocol on Environmental Protection to the Antarctic Treaty,* signed in 1991.

The Government will:

- Actively contribute to ensuring that cooperation under the ATCM takes place in an engaged, effective manner that is relevant to Antarctic developments and challenges.
- Use the right of inspection to strengthen cooperation under the Antarctic Treaty, and work to devise a good system within the framework of the annual consultative meetings for responding to the recommendations issued after inspections carried out by various participating states.

4.2 The Protocol on Environmental Protection to the Antarctic Treaty

The Protocol on Environmental Protection to the Antarctic Treaty (the Environment Protocol) was signed on 4 October 1991. Norway played an active role in drafting the protocol. As a claimant state in Antarctica, Norway has a special interest in and responsibility for determining how to safeguard the Antarctic environment in the best way. Norway has therefore emphasised the importance of securing a binding, comprehensive

Box 4.1 UN Convention on the Law of the Sea

The UN Convention on the Law of the Sea of 10 December 1982 entered into force in 1994[1], and is the most comprehensive, multilateral UN treaty. A total of 167 countries are party to the convention, which is often referred to as the 'constitution for the seas'. The convention contains detailed rules governing the rights and obligations of states parties and their responsibility to promote sound, peaceful exploitation of marine areas, as well as to safeguard the environment and other general interests.

The UN Convention on the Law of the Sea applies to all marine areas, including those in the Antarctic Treaty's area of application, which is the area south of 60° S latitude.

The rights of coastal states under the UN Convention on the Law of the Sea follow automatically from their status as claimants. Under the convention, coastal states have the right to establish territorial waters extending up to 12 nautical miles from the baselines and an exclusive economic zone of up to 200 nautical miles. Territorial waters are part of a coastal state's sovereign territory. A coastal state also has sovereign rights on the continental shelf and in any established exclusive economic zone. So far Norway has not established territorial waters or an exclusive economic zone in the Antarctic. The Act of 27 June 2003 No. 57 relating to Norway's territorial waters and contiguous zone contains provisions on territorial waters, but this statute does not apply to Dronning Maud Land and Peter I Øy.

Norway presented documentation on the extent of the continental shelf at Bouvetøya and Dronning Maud Land to the Commission on the Limits of the Continental Shelf in New York in 2009. In view of Article IV of the Antarctic Treaty and the interests of Antarctic cooperation, the commission was asked not to consider the documentation relating to Dronning Maud Land for the time being.

[1] The convention entered into force for Norway on 24 July 1996.

regime for protection of the Antarctic environment.[1]

Under Article 2 of the Environment Protocol, the protocol and other appurtenant protocols and annexes are applicable to the Antarctic Treaty area and to dependent and associated ecosystems.

Under the protocol, the parties commit to ensuring comprehensive protection of the Antarctic environment and dependent and associated ecosystems. Article 2 of the protocol designates Antarctica as a natural reserve devoted to peace and science. Article 3 of the protocol further states that protection of the Antarctic environment, including its wilderness character and its value for aesthetic purposes and for the conduct of scientific research, shall be fundamental considerations in the planning and conduct of all activities in the Antarctic Treaty area.

4.2.1 Prohibition of mineral resource extraction

Under Article 7 of the Environment Protocol, all activities relating to mineral resources, other than scientific research, are prohibited. This prohibition can only be rescinded in accordance with clearly defined procedures. Until 50 years have elapsed from the protocol's entry into force, meaning until 2048, the prohibition can only be set aside by a consensus decision of the Antarctic Treaty Consultative Parties.

Article 25 of the protocol further states that if, after 50 years, one or more of the Antarctic Treaty consultative parties requests it, a conference shall be held to review the operation of the Environment Protocol. Such a review conference may adopt amendments, including amendments to the prohibition of mineral resource activities, by majority decision. However, the majority must consist of at least three fourths of the states that were consultative parties at the time the protocol was adopted. Article 25 (5) also explicitly states that the prohibition on mineral resource activities shall remain in force until it is replaced by a legally binding regime for such activities.[2] To date, no parties have requested that the prohibition be rescinded or amended. As is the case for the Antarctic Treaty, it is considered unlikely that any parties would request a review conference, or that there would be sufficient agreement on a potential proposal to rescind the prohibition.

In conjunction with the Environment Protocol's entry into force, a separate Committee for Environmental Protection (CEP) was established

[1] From Proposition No. 12 (1992–93) to the Storting regarding consent to ratification of the Environment Protocol.

[2] From Proposition No. 12 (1992–1993) to the Storting regarding consent to ratification of the Environment Protocol.

(pursuant to Article 11 of the Protocol). The CEP convenes during the annual Antarctic Treaty meetings to provide environmental, scientific and technical advice and to formulate recommendations to the parties in connection with the implementation of the Environment Protocol. Norway chaired the CEP during its first few years, and laid the foundation for the independent advisory role it still plays in cooperative activities associated with the Antarctic Treaty.

4.2.2 Annexes to the Environment Protocol

In addition to the protocol itself, six annexes have been adopted to date which regulate environmental impact assessments, conservation of Antarctic fauna and flora, waste disposal and waste management, prevention of marine pollution, area protection and management (which covers historic sites) and management of and liability arising from environmental emergencies. Annex VI (relating to liability in emergencies involving an imminent threat of harmful environmental impacts) was adopted in 2005 and will enter into force once approved by all the consultative parties. Norway approved this annex in 2013. The purpose of Annex VI is to make the party conducting an activity in Antarctica liable for taking prompt and effective action in cases of environmental emergencies. Any party causing such environmental emergencies is liable for the costs incurred if other parties must take action in response. In cases where no response action is taken, a compensation payment is to be made into a special fund that the treaty parties have agreed to establish.

The Environment Protocol and associated annexes have been incorporated into Norway's Antarctic regulatory framework by means of the regulations relating to the protection of the environment and safety in Antarctica; see Chapter 5, *Legislation*.

Cooperation under the Antarctic Treaty is significantly strengthened by the Environment Protocol, which underscores the importance of protecting and conserving the Antarctic environment and dependent and associated ecosystems as one of the fundamental pillars of Antarctic cooperation, together with peace and research.

The Government will:

- Participate actively in the work under the Environment Protocol and support the prohibition of mineral resource extraction in Antarctica.
- Ensure a sound basis for scientific assessment and advice by the Committee for Environmental Protection, through strong representation by Norwegian experts.

4.3 Convention on the Conservation of Antarctic Marine Living Resources

The Convention on the Conservation of Antarctic Marine Living Resources (the CAMLR Convention) was adopted on 20 May 1980 and entered into force in 1982. The Convention regulates the management of marine living resources in the Antarctic Treaty area and the marine areas south of the Antarctic Convergence. The Antarctic Convergence is the region where cold water masses from the south meet the warmer waters further north. South of this dividing line of currents there is a unique marine ecosystem. For practical purposes, the boundary of the Antarctic Convergence is defined by coordinates in Article 1, and is therefore regarding as lying along this line.

According to Article II, the objective of the convention is the conservation and responsible use of marine living resources in Antarctica. However, under Article VI the management of whales and seals is governed by the International Convention for the Regulation of Whaling and by the Convention for the Conservation of Antarctic Seals.

The CAMLR Convention is premised on the understanding of the Antarctic marine ecosystems as a coherent, complex interaction between the Antarctic marine living resources and their physical environment. This necessitates an ecosystem-based management regime, aimed at conserving the natural interactive relationships between the different species, both those that are harvested and those that are dependent on the species being harvested. As data and knowledge have gradually been collected, the regulatory framework has been further elaborated, with catch quotas imposed and certain areas closed. Knowledge of the status and development of stocks is limited, so low quotas have been set to prevent the overexploitation of fragile ecosystems and ensure that species dependent on the species being exploited are not negatively affected.

Management is carried out through the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR). One of the commission's main duties is to adopt regulations, based

Box 4.2 Some treaties of particular importance for Antarctica

The UN Fish Stocks Agreement – formally, 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* – was adopted on 4 August 1995 and entered into force on 11 December 2001. The agreement supplements the UN Convention on the Law of the Sea and provides an international legal framework for conservation and management regimes for straddling and highly migratory fish stocks. The Agreement contains important principles for the sustainable management of fish stocks that migrate between the high seas and the Exclusive Economic Zone (EEZ) of the various states. Under the agreement, the parties are to collaborate, either directly, regionally or subregionally, on the management of straddling and highly migratory fish stocks.

The *Agreement on the Conservation of Albatrosses and Petrels (ACAP)* is a sub-agreement under the Convention on the Conservation of Migratory Species of Wild Animals (the Bonn Convention) of 1979. The ACAP entered into force in 2004, and requires the parties to the Agreement to take measures to conserve albatrosses and petrels.

The *Convention for the Conservation of Antarctic Seals (CCAS)* was adopted in 1972 and regulates the harvesting and management of Antarctic seal stocks. The CCAS applies to the same area as the Antarctic Treaty, and to specific species of seals.[1] None of these seal species may be killed or captured within the convention area, except in accordance with conditions established by the Convention. (Three of the species are completely protected under the annex to the Convention, while quotas have been established for the three other species; see points 1 and 2 of the annex.) For economic and political reasons, no sealing is carried out in the Antarctic today. Three seal reserves have been created under the CCAS.

The *International Convention for the Regulation of Whaling (ICRW)* was adopted in 1946 and regulates the conservation and management of whale stocks. A special commission – the *International Whaling Commission (IWC)* – was established for this purpose. In 1994 the IWC designated a whale sanctuary (the Southern Ocean Whale Sanctuary) in the area from Antarctica to 40° S latitude. Norway chose to abstain from voting, because the proposal was not based on a scientific recommendation. However, Norway did not enter a reservation in respect of the decision.

The *International Convention for the Prevention of Pollution from Ships (MARPOL)* of 1973 aims at preventing pollution of the sea, land and air by shipping activities. In 1990 a decision was adopted to the effect that the marine area south of 60° S latitude is to be considered a 'special area' in which discharges of oil or substances containing oil and all types of waste are prohibited. In 2011, the IMO prohibition of the use and carriage of heavy fuel oil in the same areas entered into force.

The main objective of the *International Convention for the Safety of Life at Sea (SOLAS)* of 1974 is to establish minimum standards for the construction, equipment and operation of ships, thereby helping to increase the safety of life at sea.

The *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal* of 1989 makes it illegal to export hazardous wastes or other wastes for disposal in the area south of 60° S latitude.

Under the *Unidroit Convention on Stolen or Illegally Exported Cultural Objects* of 1995, a cultural object that is stolen or illegally removed from the territory of a state party to the Unidroit Convention shall, upon request, be physically returned to the territory of that state. Norway acceded to the convention in 2001.

The *Unesco Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property* of 1970 lays down rules for the protection of cultural heritage in the fight against the illicit trafficking of cultural property.

On 15 May 2015, the International Maritime Organisation (IMO) adopted an additional set of requirements for ships operating in polar waters (the *Polar Code*). This code imposes new safety and environmental requirements in the Antarctic that supplement the current SOLAS AND MARPOL provisions.

[1] The southern elephant seal, leopard seal, Weddell seal, crabeater seal, Ross seal and southern fur seal

on scientific data reviewed by CCAMLR's Scientific Committee, governing the right to fish as well as quotas, by-catch, fishing gear, catch areas, catch periods and various area-based management measures. Since it was first established, CCAMLR has played a key role in the development of international marine environment policy. CCAMLR has been successful in achieving its aims, and continues its active efforts to combat illegal, unreported and unregulated fishing.

Twenty-four states and the European Union are members of CCAMLR, while a further 11 states are parties to the CAMLR Convention. CCAMLR meets once a year in Hobart, Australia, where its permanent secretariat is located.

The Government will:

- Actively contribute to ensuring that CCAMLR remains at the forefront of efforts to develop an ecosystem-based regional resource management regime.

5 Legislation

5.1 Introduction

As detailed in Chapter 4, *International legal framework*, Norway is one of seven countries that have made territorial claims to parts of Antarctica. Norway's exercise of authority is regulated by the Act of 27 February 1930 No. 3 on Bouvetøya, Peter I Øy and Dronning Maud Land, etc. (short name: Dependencies Act). Although the Dependencies Act applies to Bouvetøya as well, this report discusses only legislation as it pertains to Norway's Antarctic dependencies, Dronning Maud Land and Peter I Øy.

Under section 1 of the Dependencies Act, Dronning Maud Land and Peter I Øy are placed under Norwegian sovereignty as *dependencies*. An area with dependency status is part of Norwegian territory, but not part of the 'Kingdom of Norway'. In the context of constitutional law, no territory that is part of the Kingdom of Norway may be ceded, while that is not the case for dependencies. This follows from Article 1 of the Constitution of Norway, which affirms: 'The Kingdom of Norway is a free, independent, indivisible and inalienable realm.' Beyond this constitutional significance, their *status* as dependencies itself has no implications for Norwegian legislation in Dronning Maud Land and Peter I Øy.

Norwegian legislation must, as in every other area, be aligned with our international legal obligations. In this respect, our obligations under the Antarctic Treaty system, in particular, are of key importance; see Chapter 4, *International legal framework*. Generally speaking, Norway's treaty obligations apply in principle to dependencies, unless special exceptions have been made. It will often follow from an interpretation of the treaty in question that by virtue of its content the treaty does not apply there, thereby making any such exception superfluous.

Private law, criminal law and procedural law all apply to the dependencies in the Antarctic. This is discussed in greater detail below, in chapter 5.2.1. With regard to other areas of law, the Norwegian

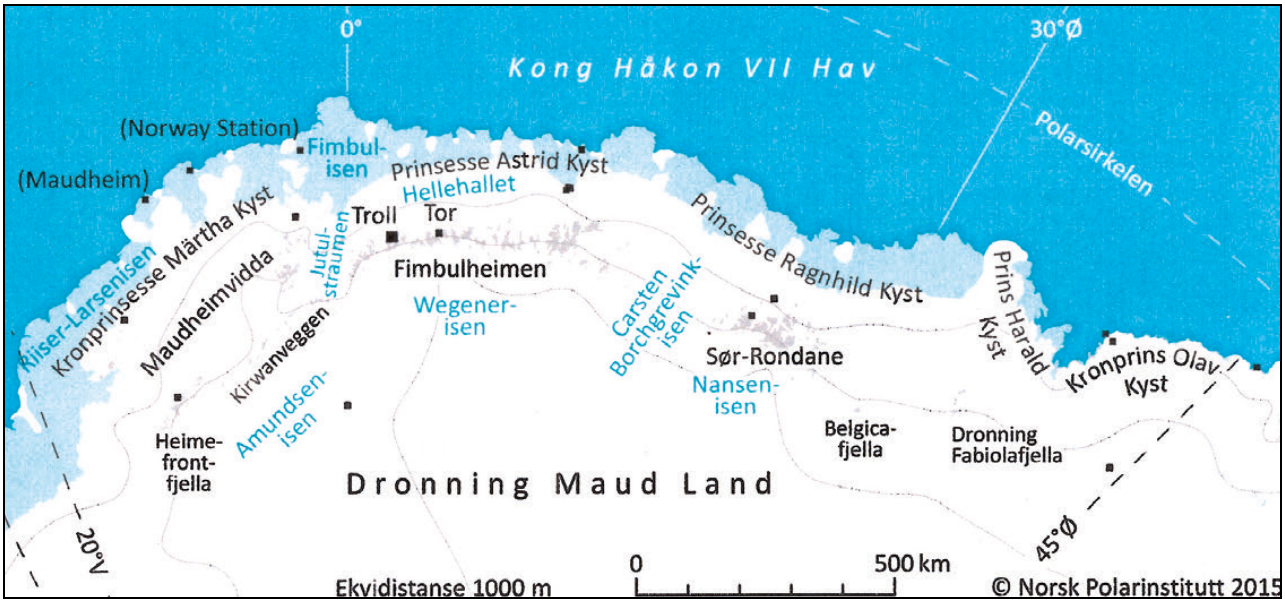

Figure 5.1 Map of the northern part of Dronning Maud Land. New Norwegian («nynorsk»), one of Norway's official written languages, is consistently used for place names in the Norwegian polar territories.

Source: Norwegian Polar Institute.

authorities have traditionally been disinclined to make laws and regulations applicable in the Antarctic dependencies, often in view of objectives and practical considerations such as geographical location, activity levels and other local circumstances. In recent years, the Norwegian Gene Technology Act and Electronic Communications Act have been made applicable to these areas.

Just as there is disagreement on territorial claims in the Antarctic (see chapter 4.1.1, above), there is also disagreement on the issue of jurisdiction. The states that have claimed land areas in the Antarctic (claimant states) claim, on grounds of principle, jurisdiction over all persons, vehicles, etc., present in their respective claim areas. This is referred to as 'territorial jurisdiction'. States that do not accept the territorial claims of the claimant states assert jurisdiction over their own nationals throughout the Antarctic, a principle referred to as 'personal jurisdiction'. In practice, compliance with and enforcement of national legislation in the Antarctic is largely a matter of each country controlling its own nationals and its own expeditions, regardless of where they operate.

Norwegian legislation in the Antarctic is based on the principles of territorial and personal jurisdiction alike. Under the territorial principle, the legislation is geographically applicable to Dronning Maud Land and Peter I Øy and every person in those areas. Under the principle of personal jurisdiction, the legislation is applicable to all Norwegian nationals regardless of where in the Antarctic they may be. In practice, however, it has been decided on several occasions that legislation shall not apply to persons who are, for example, part of an expedition organised by another state that regulates these matters in the same way Norway does.

In addition to territorial jurisdiction and personal jurisdiction, Norway has flag state jurisdiction over vessels registered in Norway. Flag state jurisdiction means that Norway has the right to regulate the activity of Norwegian vessels on the high seas.

The Regulations of 26 April 2013 No. 412 relating to the protection of the environment and safety in Antarctica are a good example of applying the principles mentioned above. Section 4 of these regulations also contains a special provision on the relationship to the authorities of other states. Under these regulations, legal proceedings may be instituted only with the consent of the Norwegian Ministry of Foreign Affairs if the act was committed by a person who is not a Norwegian national or resident of Norway, or if the act was committed elsewhere than in Dronning Maud Land or on Peter I Øy. It would be natural in such cases to consider whether another state plans to prosecute the case effectively, for example based on the principle of personal jurisdiction. More detailed information on the regulations may be found in chapter 5.3, below.

5.2 The Dependencies Act

5.2.1 Introductory provisions of the statute

The Dependencies Act is a key statute for Norway's dependencies in the Antarctic, both because section 1 establishes their constitutional status, and because section 2 provides the basis for the application of laws there. Under section 2 of the Dependencies Act, Norwegian private law and criminal law and Norwegian legislation on the administration of justice (procedural law) apply to the Norwegian Antarctic dependencies. The King decides the extent to which other statutes shall apply. In other words, section 2 of the Dependencies Act provides the methodical basis for the legal technique to be used to ascertain whether a specific statute and appurtenant regulations apply in the dependencies. The provision must be interpreted as meaning that if the provision in question is not considered as a provision of private, criminal or procedural law, it does not apply in the dependencies unless the King has determined otherwise.

Box 5.1 A brief history

The Dependencies Act was originally a statute governing Bouvetøya – the Act of 27 February 1930 relating to Bouvetøya. The statute was amended on 24 March 1933 to include Peter I Øy, and on 21 June 1957 to encompass Dronning Maud Land.

It was amended again on 2 June 1960 as a result of Norway's accession to the Antarctic Treaty. New resolutions on cooperation within the Antarctic Treaty System necessitated statutory amendments in 1972, 1990, 1991 and 2004. By means of a statutory amendment adopted on 27 June 2008, the short title 'Dependencies Act' was added to the title, which now reads in full: Act of 27 February 1930 No. 3 on Bouvetøya, Peter I Øy and Dronning Maud Land, etc. (the Dependencies Act).

Figure 5.2 Four polar explorers seize the day – all 24 hours of it – at the South Pole. An example of an expedition subject to notification under the Antarctic Regulations.

Source: Stein Tronstad, Norwegian Polar Institute.

The method whereby private, criminal and procedural law is distinguished from other legislation has also been employed in the Svalbard Act and the Jan Mayen Act; see Act of 17 July 1925 No. 11 relating to Svalbard and Act of 27 February 1930 No. 2 relating to Jan Mayen.

Pursuant to section 2, second and third paragraphs, of the Dependencies Act, the provisions of section 4 of the Svalbard Act shall apply with equivalent effect in the dependencies. Section 4 of the Svalbard Act authorises the King to prescribe regulations in a number of areas, including tourism, aviation and other forms of communication. The King also has authority to establish provisions regarding penalties in the event of breaches of such regulations. Section 2 of the Dependencies Act also provides that the King may issue regulations relating to environmental protection; see the third paragraph.

Under section 7, second paragraph of the Dependencies Act, provisions may also be adopted to implement Norway's international legal obligations in Norwegian law. The provision is primarily aimed at the obligations under the Antarctic Treaty system. Provisions laid down in pursuance of section 7, second paragraph may therefore be applied to both Norwegian dependencies and other parts of the Antarctic; see Proposition No. 41 (1989–1990) to the Odelsting.

5.2.2 Other provisions in the Dependencies Act

The Antarctic Treaty's prohibition of nuclear explosions and the storage of radioactive waste has been implemented in Norwegian legislation through section 4 of the Dependencies Act. Section 5 contains provisions governing the right of inspection under the treaty. Under this provision Norwegian authorities may give one or more persons authority to act as observers, enabling them at any time to inspect stations, installations and other facilities in the Norwegian dependencies or other parts of Antarctica. Correspondingly,

Box 5.2 Duty to give notice of activity in Antarctica

Notification must be sent to the Norwegian Polar Institute no later than one year before a planned activity commences. The notification must include information regarding the persons who will be travelling in Antarctica, the purpose and scope of the activity, plans for cleaning up and an assessment of the activity's potential impacts on the Antarctic environment. Norway's Antarctic Regulations state that activities in the Antarctic must be planned and executed in a safe and self-sufficient manner. Any risks to life or health posed by the activity must be identified and reduced as far as possible. The party responsible for organising an activity in the Antarctic must, before leaving for the region, provide guarantees to cover any expenses incurred in connection with potential rescue operations, and must have contingency plans to safeguard life and health. This is because no special search and rescue resources have been built up in the Antarctic; see further information in chapter 9.6.

The regulations also lay down contingency planning requirements for dealing with an environmental emergency and insurance to cover financial liability that may arise as a result of harmful environmental effects. The party responsible for an activity in the Antarctic has a duty to take measures to prevent environmental damage in connection with the activity. If no such measures are taken, that party may be held financially liable.

observers designated by another party to the Antarctic Treaty may also inspect the same stations, installations, etc. Further information about inspection rights may be found in chapter 4.1.4 of this white paper.

5.3 Environmental and safety regulations in the Antarctic

The Regulations of 26 April 2013 No. 412 relating to protection of the environment and safety in Antarctica (the Antarctic Regulations) lay down strict rules for the protection of the Antarctic environment and conservation of its wilderness and aesthetic values. The regulations also contain provisions aimed at ensuring that all activity is carried out safely. The obligations that Norway has assumed under the Environment Protocol and other Antarctic Treaty System resolutions on the environment and safety have to a large extent been implemented through these regulations, but other regulatory frameworks also serve to fulfil Norway's obligations. The Norwegian Polar Institute is the administrative authority for the Antarctic Regulations. Section 7 of the Dependencies Act provides statutory authority for these regulations, which replaced the previous regulations on Antarctic environmental protection from 1995.

The regulations include rules on providing notice of all activity to be carried out in the Antarctic, and on contingency plans and insurance (see Box 5.2).

Antarctic flora and fauna are both extremely vulnerable and are protected under the Environment Protocol. Under national regulations, the taking of or harmful interference with plants and animals is prohibited. However, the regulations do make provision for the taking or harvesting of flora or fauna for research purposes. Any waste produced by expeditions must be removed from the Antarctic upon departure. This is essential to preserve Antarctica as the largest, most unspoiled wilderness area in the world, with unique environmental qualities. Under the regulations, travellers to the Antarctic have a duty to make themselves aware of specially designated protection and management zones and cultural heritage and historical sites, and to comply with the rules that apply in each area.

5.4 Other relevant legislation

5.4.1 Provisions relating to the regulation of fishing

On 13 March 1998, Norway adopted a provision regarding the regulation of fishing from Norwegian vessels in the Antarctic (the area covered by the Convention of 20 May 1980 on the Conservation of Antarctic Marine Living Resources, or the CAMLR Convention). This provision applies to Norwegian nationals and persons resident in Norway who engage in fishing using Norwegian vessels in marine areas of the southern hemisphere subject to the CAMLR Convention. Fishing without a permit issued by the Norwegian authorities is prohibited. All fishing operations from Norwegian vessels must occur with scientific observers from other state parties to the convention on

board. In this way, fishing vessels help to collect data for use by the Scientific Committee of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR).

A Catch Documentation Scheme (CDS) has been introduced to monitor international trade and provide evidence that Patagonian toothfish imported by a member of the organisation has been caught in compliance with CCAMLR rules or outside the CAMLR Convention area. The scheme is continuously assessed with a view to improving it and eliminating any loopholes.

5.4.2 Territorial waters and economic zone

A Norwegian act relating to Norway's territorial waters and contiguous zone is also applicable to Dronning Maud Land and Peter I Øy, but has not yet entered into force with regard to these two areas. So far, Norway has not issued any special provisions regarding baselines and territorial waters. Nor has Norway established a 200-nautical mile economic zone in these areas.

5.5 Need for a review of legislation

The preparation of white papers on Antarctica and Bouvetøya has shown that a review is needed of the legislation governing Norway's dependencies. This applies primarily to the Dependencies Act itself. The issues that apply to Bouvetøya in particular are discussed in the white paper to the Storting on Bouvetøya; see chapter 1.

The Dependencies Act shows signs of having been amended in step with the broadening scope of Norway's international legal obligations. It is therefore necessary to examine the statute to assess whether it meets our current regulatory needs. It must also be reviewed to determine whether it provides a solid basis for implementing Norway's international legal obligations, in particular its obligations under the Antarctic Treaty System. As explained above, all of the latest amendments to the Dependencies Act have come as a result of developments in the Antarctic Treaty System. New international legal obligations have made it necessary to provide a new legal basis for these obligations in the statute. An assessment should be made of whether the Dependencies Act can be formulated so that obligations resulting from new resolutions adopted within the Treaty System, and which require a basis in law, can be incorporated into Norwegian law without having to amend the statute.

The Government will:

- Review legislation relating to Norway's dependencies with a view to improving and updating rules and regulations and administrative matters.

6 Research and knowledge

6.1 The value of Norwegian research in the Antarctic

Norway is one of the foremost polar research nations. For natural reasons, its activities are predominantly focused on the Arctic, but Norway also has a long history of research, expeditions, mapping and commercial activity in the Antarctic. This tradition in combination with our current logistical resources and scientific expertise provides an excellent springboard for Norwegian research in the Antarctic.

The fact that Norwegian polar research covers both the Arctic and the Antarctic is an advantage. Studies of the environment, ecosystems, ice, oceans and atmosphere in both polar areas are a basis for understanding global phenomena such as climate change and other large-scale phenomena, including the long-range transport of pollutants, ecosystem dynamics, atmospheric processes and ocean currents. What we have learned about the Arctic can be applied to our study of developments in the Antarctic. The Antarctic influences, and is itself influenced by, global climate change by way of changes in the floating ice shelves, in air and ocean circulation patterns and in the level of the sea. Norway has strong research communities in these fields that contribute to the growth of knowledge globally.

Quality is an overarching goal in all research and a prerequisite for achieving scientific influence and status. The relative incidence of citations is a criterion often used to measure quality. Norwegian polar research exceeds the global average

Figure 6.1 The evening sun at Troll, the Norwegian research station in Dronning Maud Land.

Photo: Stein Tronstad, Norwegian Polar Institute.

in terms of the frequency of publication citations,[1] but Norway still trails the leading nations. We have the potential to rank in the top 10 by building up expertise, recruiting competent researchers and participating extensively in international collaboration. Norwegian polar research will face a generational change in the coming years. It is crucial that new scientists be given the opportunity to develop and apply their expertise in the Antarctic.

A sound knowledge base is essential for the Antarctic Treaty parties to manage the environment of the treaty area responsibly and effectively. Norway adds to this knowledge base through research. Research is also essential for meeting our obligations under the Environment Protocol and the CAMLR Convention. For example, knowledge of how different activities impact the environment is important for planning and carrying out activities in accordance with the Environment Protocol. In-depth knowledge of marine ecosystems is a prerequisite for ensuring the sustainable management and harvest of the resources in the waters around Antarctica. Research is also of decisive importance for exploiting new fields, such as marine bioprospecting; see chapter 8.9. The Antarctic also offers promising conditions for space research. Because interference from water vapour and radio frequency noise is minimal, the continent is a good site for astronomical and cosmological observation; see chapter 8.7

In addition to the obvious intrinsic value of sound science, research activities are of great value to Norwegian interests and Norwegian policy in the Antarctic, and they underpin Norway's role as a responsible, science-based polar nation.

The Government will:

- Promote the development of knowledge in and of the Antarctic.
- Facilitate the recruitment, within current budgetary limits, of new and established scientists to conduct research in the Antarctic.

6.2 Status of Norwegian research in the Antarctic

Norwegian researchers in the Antarctic contribute information for management purposes and for the development of basic science; they do so both independently and in participation with international research efforts. In 2010, Norwegian polar research was ranked No. 3 for the Arctic and No. 21 for the Antarctic (measured by the number of publications). The largest research nations in the Antarctic are the United States, the United Kingdom, Australia and Germany. Although the Arctic is the primary focus of Norwegian polar research, Norwegian research in the Antarctic is attracting growing attention and interest.

The basic factors underpinning Norway's effort are infrastructure, expertise and international collaboration.

6.3 Infrastructure

Given the geographical and climatic conditions in the Antarctic, good infrastructure is a prerequisite for all research, monitoring and mapping. The Norwegian infrastructure has been developed to support research and monitoring activities.

The Troll research station in Dronning Maud Land was upgraded to a year-round facility in 2005 and today makes it possible to carry out research and monitoring activities all year long. The station has instruments to measure meteorological data and UV light, and is a field station for glaciological, biological and geophysical field programmes. The TrollSat satellite station downlinks satellite data on weather and climate, space weather, ice conditions and the environment. The number of continuous and automated measurement series at Troll can be increased, maximising the benefits of a year-round station. Optimising the use of research infrastructure is an important goal. Given resource considerations and the unique opportunities that Troll represents for research and monitoring, an increase in year-round research and monitoring activities is advisable. Norwegian scientists also require access to the research infrastructure of other countries in the Antarctic. As a result of the rise in international interest in Antarctic research, a growing number of countries are establishing new summer and year-round research and monitoring stations, making it easier to cooperate, coordinate and share equipment and data despite nationality. The Troll research station and associated logistical services allow Norway to spearhead efforts to increase research coordination and promote cooperation between the various research stations in Dronning Maud Land.

In a report on Norwegian research activities in the Antarctic in the 2013–2022 period (*Norsk for-*

[1] The Nordic Institute for Studies in Innovation, Research and Education, NIFU 2 (for the period 2005–2009).

Figure 6.2 HM King Harald visits Troll in February 2015. This was the first time a reigning monarch visited the Antarctic continent.

Photo: Stein J. Bjørge, *Aftenposten*.

skingsinnsats i Antarktis 2013–2022), the former National Committee for Polar Research at the Research Council of Norway pointed out that while land-based research infrastructure can be used more effectively, marine researchers require better access to infrastructure. A new national, ice-class research vessel, *Kronprins Haakon,* is currently under construction and due to be operational in 2018. This vessel will give Norwegian scientists a unique platform for conducting marine research, climate research and other polar research in both the Antarctic and the Arctic.

The Government will:

- Help to ensure that available infrastructure capacity is exploited by setting priorities and expanding capacity.
- Help to ensure that steps are taken, within established frameworks, to meet the requests of foreign institutions wishing to establish a presence at the Troll research station.
- Facilitate optimal utilisation of the new research vessel *Kronprins Haakon* for purposes such as international research cooperation on marine ecosystems and stocks.

6.4 Expertise

The largest Norwegian research institution in the Antarctic is the Norwegian Polar Institute. The institute plays a key role in topographical and geological mapping, environmental monitoring and management-oriented research, and serves as an expert strategic advisor to the authorities on polar issues. In the Antarctic, the Norwegian Polar Institute engages in both marine and terrestrial research of relevance to the current management regimes in the area, including CCAMLR. The Institute also contributes to international climate research, particularly on ice, oceans and ecosystems. Through the Norwegian Antarctic Research Expeditions (NARE) funding scheme, the Norwegian Polar Institute facilitates state-financed Antarctic research. The Norwegian Polar Institute is also responsible for logistics and operations in Dronning Maud Land, as well as for station operations and land-use planning at Troll. The Institute of Marine Research plays a central role in Norwegian marine polar research, mapping and advisory services. The institute's activities in the Antarctic revolve primarily around CCAMLR and the management of marine living resources, with particu-

lar focus on resources that can be exploited commercially. Monitoring krill stocks is a vital activity, entailing the collection of data from commercial vessels and dedicated expeditions. Both the Institute of Marine Research and the Norwegian Polar Institute participate in efforts to provide a scientific basis for fisheries regulation and for discussing the issue of marine protected areas in the Antarctic.

Several Norwegian universities and research institutes also play a role in international efforts to increase scientific knowledge of the Antarctic. Some of their research relates to systems inside the Antarctic geographical area while other studies take advantage of the region's unique conditions to address more general objectives, like contributing to knowledge of the climate and the atmosphere.

Research is also crucial to Norwegian commercial activities in the Antarctic, especially research aimed at enhancing marine expertise. The Norwegian state provides substantial funding for research in the Antarctic. The majority (around 70 per cent) of Norwegian polar research in the Antarctic is financed by appropriations from the central government budget to the Norwegian Polar Institute, the Institute of Marine Research and other research institutes, and around 14 per cent is funded through the Research Council of Norway's research programme. The private sector also contributes to both the planning and funding of research in the Antarctic. In 2010, business and industry financed some 3 per cent of Antarctic research.

Complex sets of issues related to management, climate and the environment in the Antarctic make an interdisciplinary approach necessary. Polar issues can also be examined fruitfully from a social science and humanities perspective.

The Government will:

- Promote the development and application of technology for automatic measurement and remote measurement (such as by satellite, aircraft, drone and unmanned vessel).
- Facilitate the increased use of fishing vessels for research purposes.

6.5 International cooperation

Extensive international research cooperation is currently being carried out in the Antarctic, both through the established organisations and on a project basis. The Scientific Committee on Antarctic Research (SCAR) and CCAMLR's Scientific Committee provide the framework for international collaboration on research and monitoring in the Antarctic. SCAR is a committee of the International Council for Science (ICSU), which is charged with initiating, promoting and coordinating scientific research in the Antarctic.

In 2010, 43 per cent of publications on Norwegian research in the Antarctic were based on international cooperation. While this represents a large share, it is slightly below the average for Norwegian research in general (56 per cent in 2013). To achieve the goal of higher quality and optimal utilisation of research infrastructure, Norwegian research in the Antarctic should to an even greater extent be oriented towards international cooperation and publication in prestigious international scientific journals. The growing international research activity in the Antarctic is a basis for new global, interdisciplinary cooperation and improved reciprocal access to infrastructure and research data. Through the EU research programme Horizon 2020, moreover, it will be possible to increase EU-funded Antarctic research, which currently is relatively modest.

Research in the Antarctic is highly resource-intensive and requires comprehensive interdisciplinary expertise and collaboration on infrastructure and research data. Through international research cooperation, we can gain knowledge that would otherwise lie beyond the reach of a single country.

The Government will:

- Ensure that Norway plays a central role in international efforts to establish multilateral cooperation on infrastructure and data sharing in the Antarctic.
- Encourage Norwegian Antarctic scientists to participate more actively in SCAR working groups and publish more often in international scientific journals.

6.6 Goals for Norwegian research in the Antarctic

The Government has set the following primary goals for Norwegian research in the Antarctic:

1. Utilise Norwegian research and Norway's advantages in the Antarctic to strengthen Norway's position as a polar research nation.

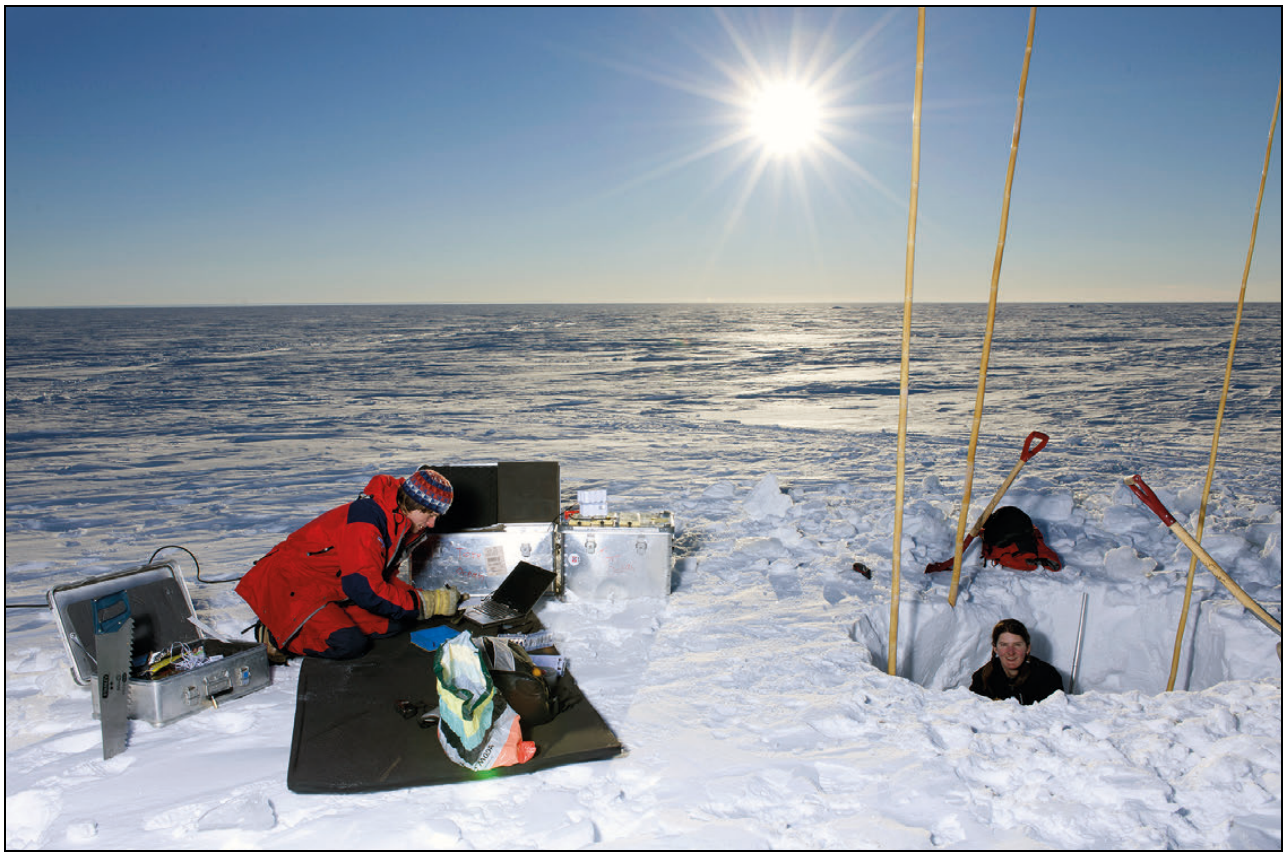

Figure 6.3 Measuring ice mass movement on the Fimbul Ice Shelf.

Photo: Norwegian Polar Institute.

2. Support and set conditions for Norwegian management and activity in the Antarctic.
3. Help acquire broad-based insight into global climate and environmental changes, in part by exploiting the synergies between polar research in the south and in the north.
4. Acquire research-based knowledge that allows Norway to strengthen and fulfil its obligations as a treaty party in an optimal manner.

Norway's general research policy was defined in Meld. St. 18 (2012–2013) *Long-term perspectives – knowledge provides opportunity*. This white paper underscores the importance of enhancing the quality of Norwegian research. Steps must be taken to promote bolder, more innovative research, a stronger focus on internationalisation and greater interaction in both the development and use of knowledge. International statistics have documented the need for higher quality and greater internationalisation in parts of Norwegian polar research.

The long-term plan for research presented by the Government in the autumn of 2014 provides an important basis for determining priorities in upcoming years[2]. The plan sets three main objectives: enhancing competitiveness and innovation capacity, addressing major social challenges and developing research communities of outstanding quality. Six thematic priorities are highlighted in the plan, including prime topics for Antarctic research such as the seas and oceans, climate, the environment and an innovative private sector.

The Research Council of Norway has drawn up two plan documents that recommend strengthening research activities in the Antarctic: *Norges forskninginnsats i Antarktis 2013–2022*, a report from the Norwegian Polar Committee on Norwegian research activities in the Antarctic (Research Council of Norway, 2012; see information in chapter 6.3), and *Norsk polarforskning,* a document on Research Council of Norway's polar research policy 2014–2023 (Research Council of Norway, 2013). The documents are based on the broad participation of research communities and provide a solid foundation for defining priorities in future

[2] Meld. St. 7 (2014–2015) Long-term plan for research and higher education 2015–2024.

Box 6.1 Earth system science

Earth system science (ESS) covers the study of individual processes and interaction at all levels between the biosphere, geosphere, atmosphere, cryosphere and hydrosphere, and is based on data from all five spheres. Human beings (the anthroposphere) also affect processes within and between these spheres, and are themselves affected by the same processes. There are several reasons why the polar regions are of particular interest in an ESS context:

- The ecological systems there are often simpler.
- Both natural variations and the effects of human activity can be greater in polar regions than elsewhere.
- Several of the driving forces for and effects of dominant global processes are to be found in polar regions (thermohaline circulation, ice cover).

Certain processes of global significance are found in the polar regions (the Aurora Borealis or Northern Lights, the Aurora Australis or Southern Lights, and other plasma phenomena).

activities under the auspices of the Research Council of Norway.

At the same time, given Norway's position and interests in the Antarctic, research must also take account of other important considerations and demands. In addition to developing new insight and knowledge, research must aim to underpin Norway's position, policy, management and commercial activities in the area. It must also be carried out in accordance with the environmental requirements established for the area.

The Government will:

- Motivate research institutions to collaborate more closely with business and industry and the public sector on training polar researchers.
- Motivate business and industry to invest more extensively in understanding the Antarctic and participating in international polar research cooperation.

6.7 The need for knowledge in connection with climate change

Together with the Arctic, the Antarctic plays a key role in the global climate system. The inland ice sheets in Greenland and Antarctica account for around 99 per cent of the total volume of freshwater ice in the world. The ice in West Antarctica alone contains enough water to raise the sea level by several metres. Accelerated melting of the Antarctic and Greenland ice caps would be irreversible, with dramatic, long-term global effects.

The temperature has risen most steeply in the western and northern parts of the Antarctic Peninsula, increasing by 0.53° C per decade between 1951 and 2006. The temperature increase observed is caused by warm air conveyed to the peninsula by strong westerly winds. The warming in West Antarctica is attributable to the higher surface temperature of the waters in the tropical Pacific Ocean. It is unclear how much of the Antarctic warming is due to human impact, and how much can be explained by natural variation.

In the Antarctic, satellite data show that the average extent of sea ice has increased slightly in

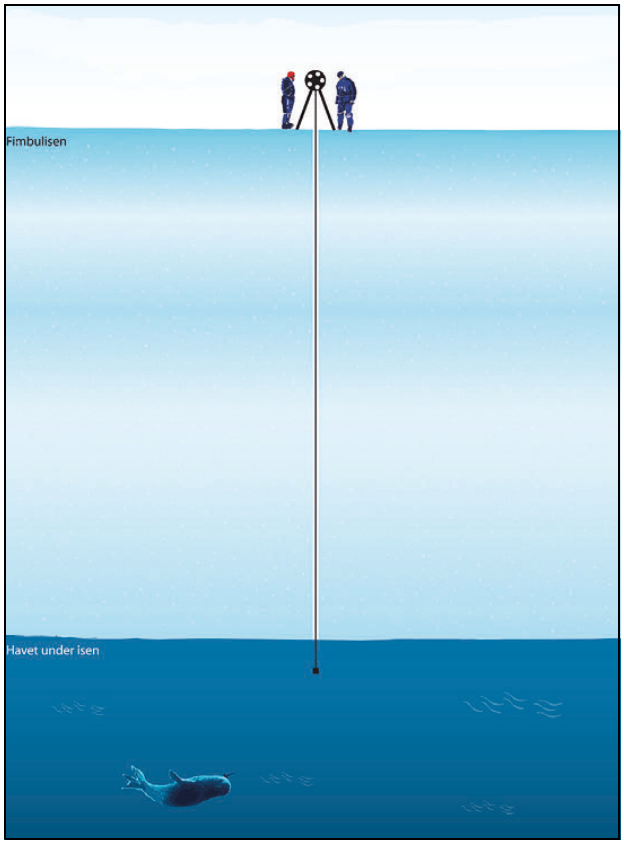

Figure 6.4 Ice core drilling in the Fimbul Ice Shelf.

Illustration: Eirik Berger, Norwegian Polar Institute.

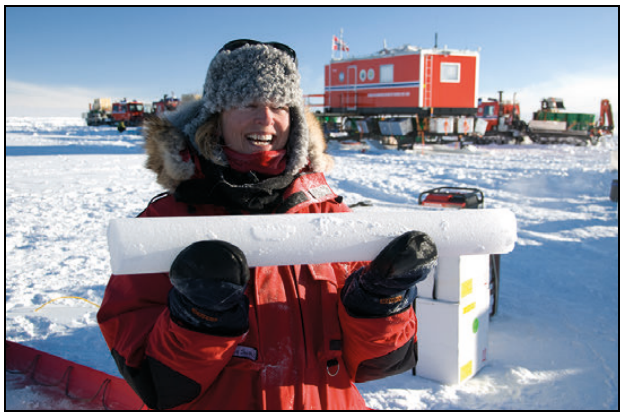

Figure 6.5 The first ice core to be extracted from the ice.

Photo: Jan-Gunnar Winther, Norwegian Polar Institute.

the area as a whole, but that there are large regional differences. Whether this increase is an indication of a lasting change is uncertain, because the ice extent varies considerably from year to year around Antarctica. Based on the knowledge available, it is reasonable to expect that the Antarctic sea ice will gradually decline in area and thickness.

The Antarctic ice masses flow towards the coast from the inland ice in the high-elevation interior. When the ice reaches the sea, it floats outwards and forms a rim of floating ice, called the ice shelf. Warmer ocean water that penetrates beneath the ice shelf can cause it to melt and break up. This process is largely limited to the Antarctic Peninsula and the area around the Amundsen Sea in West Antarctica. The Intergovernmental Panel on Climate Change has concluded that the loss of ice along the coast of Antarctica (due to calving and melting) is greater than the expansion of inland ice caused by heavier precipitation. Models show that Antarctica will continue contributing to a sea level rise.

Current studies of potential climate changes in the Antarctic are based on circulation models that view atmosphere, ice and oceans comprehensively. Despite the uncertainty of the model results, researchers agree that temperatures over the Antarctic could rise several degrees in this century if greenhouse gas emissions to the atmosphere continue to increase at the present rate. It is expected that the surface temperature in the Antarctic in the year 2100 will remain well below the freezing point over most of the continent, and that the temperature rise will not contribute to melting of the Antarctic ice sheet.

Nonetheless, lack of knowledge is a fundamental obstacle to achieving a full understanding of climate change in the Antarctic and the significance of the Antarctic for global climate change. Research in the Antarctic in general and climate research in particular is extremely resource-intensive and requires a wide range of interdisciplinary expertise. Through international research cooperation, we can acquire knowledge of climate change that it would not otherwise be possible for a single nation to achieve on its own.

The Government will:

- Facilitate increased research cooperation with other countries with focus on the role the Antarctic plays in the global climate system, and on how changes in ice masses will affect the sea level.

Box 6.2 The ICE Ice Rises climate project

ICE Ice Rises is a climate project aimed at studying the ice rises on the ice shelves along the coast of Dronning Maud Land. An ice rise is compressed ice that has been lifted up in areas where the ice shelves run aground on the seabed. These groundings have an effect on the ice shelves, in part by braking their movements out at sea. The project's goal is to learn whether these ice rises affect the speed at which the ice moves towards the sea – and if so, how – as well as whether they have any bearing on the melting of the ice and the level of the sea. The objective is thus to improve our understanding how the ice moves in the complex system of glaciers, ice rises and ice shelves. The results of this research will be used in ice models.

The fieldwork associated with this project was conducted over the course of three Antarctic summers, from 2011 to 2014. The ICE Ice Rises project was led by the Norwegian Polar Institute through the Centre for Ice, Climate and Ecosystems (ICE), a national competence centre for ice and climate research in the polar regions.

6.8 Topographical and geological mapping

Most of Antarctica is covered by ice, but where mountains breach the ice there are bare rocky areas free of vegetation. This gives geologists an opportunity to study how the rocks were formed and which geological processes must have taken place in the Earth's crust. In the past few years, scientists have also begun to use geophysical methods to obtain information on the bedrock beneath the ice. Antarctica is a continent of great geological diversity. There are fossiliferous sedimentary rocks, lava and deep magmatic rocks and a wide range of metamorphic rocks as well as active volcanoes and glacial deposits.

The distinctive jagged mountain peaks that are so characteristic of the landscape in central parts of Dronning Maud Land are a result of Antarctica's geological development over millions of years.

The Norwegian Polar Institute has national responsibility for the topographical and geological mapping of Dronning Maud Land. This has resulted in a series of natural environment maps with a scale of 1:100 000 and detailed maps of the area around the Troll research station. These maps also provide geomorphological, glaciological and biological information.

The first geological mapping of Dronning Maud Land was carried out during the Maudheim expedition (the Norwegian-British-Swedish Antarctic Expedition) of 1949–52. Over the past 30 years, a number of expeditions involving geological surveys have been conducted. Nonetheless, Norway's geological mapping activities in Antarctica have been rather minimal. This is primarily due to the substantial resources required as a consequence of costly and challenging logistics and mobility difficulties. Current knowledge of the geology of Dronning Maud Land is therefore limited, and more expertise and capacity are needed.

The Government will:

- Secure monitoring and mapping activities in the Norwegian Antarctic dependencies.
- Seek to ensure that sufficient mapping and monitoring are carried out to safeguard Norwegian interests and fulfil Norway's international obligations.

Box 6.3 Geological maps

The bedrock in Dronning Maud Land has been investigated and mapped by geologists from several countries, including South Africa, Japan, India, Germany, Russia and Norway. In addition to bedrock maps published by the Norwegian Polar Institute, geological maps have also been produced by the National Institute of Polar Research (NIPR) in Japan, the Federal Institute for Geosciences and Natural Resources (BGR) in Germany and the National Centre for Antarctic & Ocean Research (NCAOR) in India/the Geological Survey of India. Some map data have also been published in doctoral theses and scientific publications. The existing maps have different scales, and the standards and norms for classification of the rock units also differ. At present, there are no uniform map series, scales or norms for bedrock classification, and there is no overall geological map of Dronning Maud Land.

The Norwegian Polar Institute has therefore initiated a four-year project (2014–2017) to develop a standardised, general geological map of the bedrock in Dronning Maud Land. The project is funded by the Norwegian Ministry of Foreign Affairs. The goal of the project is to transfer and compile older and more recent maps into a uniform digital geological GIS database. The original versions of existing maps are to be digitised, and the new map will be compiled to the scale of 1:250 000. A new uniform international coding standard will be used for the general map. The GIS database will be administered, maintained and updated by the Norwegian Polar Institute. Target groups will include the scientists working in Dronning Maud Land, other research and education institutions, Norway's public administration and interested members of the public searching for information on geological conditions in the Antarctic.

7 Climate and environment

7.1 Environmental goals and challenges

Through the Protocol on Environmental Protection to the Antarctic Treaty (the Environment Protocol), the treaty parties have designated Antarctica as a natural reserve, devoted to peace and science. As a polar nation in both the southern and northern hemispheres, Norway seeks to be a major force for conservation of the Antarctic environment and of Antarctica as a reference area for research on the significance of this region to global climate and environmental changes.

In the past decade, a range of environmental measures have been carried out in accordance with the Environment Protocol. Today, Antarctica is one of the last large pristine areas in the world. The flora, fauna, ecosystems and cultural heritage in the Antarctic are under growing pressure from internal and external factors that interact in a complex network. Human activity on the continent is on the rise. New research stations are being built, and research activities are expanding. At the same time, more tourists are visiting the continent. There is also growing interest in the substantial biological resources in the marine areas around Antarctica. Moreover, pollutants recognise no borders, even though the level of environmental pollutants in the Antarctic is lower than elsewhere in the world. On top of it all, there is climate change. Together with the Arctic, the Antarctic plays a key role in the global climate system. The ice in West Antarctica alone contains sufficient water to raise the sea level by 4–5 metres.

Figure 7.1 An iceberg off the coast

Photo: Bjørn Krafft, Institute of Marine Research.

Accelerated melting of the Antarctic and Greenland ice caps would in practice be irreversible, leading to dramatic, global impacts. The consequences of the climate changes in the Antarctic are multiple and are liable to affect the living conditions of plants and animals.

For the time being, none of the human activities in the area covered by the Antarctic Treaty takes place on a large scale, and individual factors of influence can scarcely be said to pose a major threat to the integrity of the Antarctic environment – with the possible exception of climate change, which could alter environmental conditions considerably in the long term. All the same, we know little about the effects of the combination of stresses on the environment, whether current or future, represented by climate change and other impacts. Climate change in tandem with increased human activity makes it wise to monitor developments and evaluate the consequences of such activity against the goal of conserving the Antarctic environment.

The Government will:

- Ensure that Norway leads the way in addressing environmental issues in the Antarctic.
- Work to ensure that the unique natural and cultural environmental values in the Antarctic are safeguarded and impacted as little as possible by local activity, and to impose stringent environmental requirements on all Norwegian activity in the Antarctic.
- Work to ensure that Norway can make a significant contribution towards increasing environmental knowledge that can serve as a basis for environmental management in the Antarctic.

7.2 A simple, yet very complex, biological environment

The Antarctic continent is species-poor. The terrestrial and freshwater ecosystems represent some of the simplest systems in the world and are the endpoint of the global gradient in diversity. However, biodiversity in the ocean is both varied and rich, and more than 9,000 species have been recorded, ranging from microbes to whales.

Many of the animal species, both aquatic and terrestrial, are endemic. They exist nowhere else. They have evolved in extraordinary, isolated surroundings and have adapted to the extreme conditions in the south.

Figure 7.2 Penguins with the research ship *Lance* in the background.

Photo: Harvey Goodwin, Norwegian Polar Institute.

Despite the extensive research carried out in the Antarctic, there are still significant gaps in our knowledge as to which species are present, where they are found and how abundant they are. Our view of the status of environmental values in the Antarctic is therefore incomplete. We are also challenged in accessing all the existing knowledge on the status of Antarctic environmental values. Initiatives such as the Antarctic Environments Portal (www.environments.aq), a web portal and channel of information designed to provide the Antarctic Treaty System's Committee for Environmental Protection (CEP) with easy access to up-to-date research findings on the Antarctic environment, form an important basis on which to improve resource assessments and ensure sound scientific recommendations for decision-making within the Treaty System.

Figure 7.3 Arctic terns fly around the globe. They nest in Svalbard and then fly south to spend the spring and winter (South Pole summer) in the pack ice of the Southern Ocean.

Photo: Tor Ivan Karlsen, Norwegian Polar Institute.

7.3 Cultural heritage

The physical traces left by expeditions, harvesting and research in the Antarctic now constitute a significant bank of knowledge and experience of former activity in the region. They are also important in an international perspective. Among the 90 cultural heritage assets placed on the list of historic sites and monuments approved by the Antarctic Treaty Consultative Meeting (ACTM) in 2014, there are nine objects testifying to early Norwegian activity on the continent.

Norwegian cultural heritage policy on the Antarctic aims to ensure that important historical assets stemming from Norwegian activity are safeguarded. Norway's active participation in international efforts to conserve cultural heritage in the Antarctic is integral to the country's policy

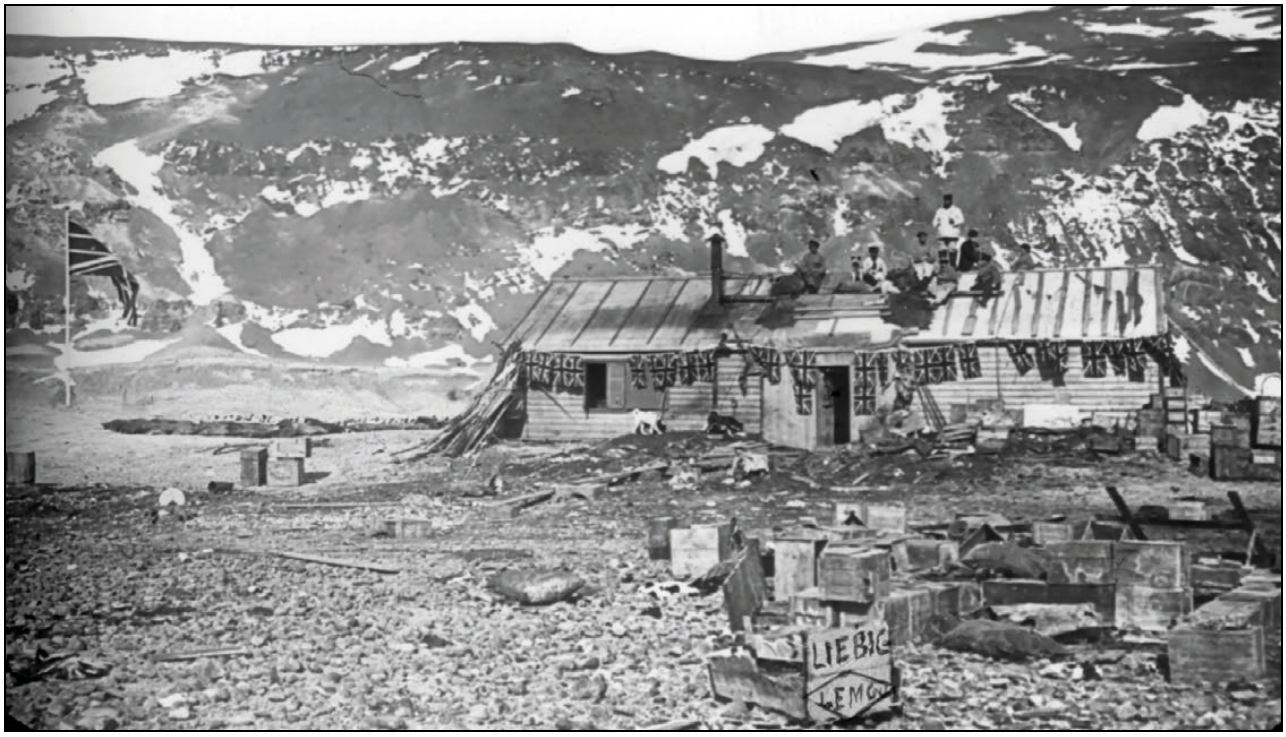

Figure 7.4 Carsten Borchgrevink's cabin at Cape Adare, New Year's 1900.

Photo: Norwegian Polar Institute.

Box 7.1 Environmental values in Antarctica: A look at its flora and fauna

Antarctica is the coldest, windiest and driest continent on Earth. It has a total area of around 14 million km^2, which doubles in the winter when the ocean ice stretches close to 1,000 km from the coast. About 98 per cent of the continent is covered with ice and snow, which accounts for more than 90 per cent of all the ice in the world.

The vegetation on the Antarctic continent is mainly a combination of algae, lichen and species of mosses. Two flowering plants have been recorded in the northern parts of the Antarctic Peninsula.

The seabirds of Antarctica find all their sustenance in the marine environment. They spend their entire lives at sea, going ashore only in the nesting season. Three groups of seabirds predominate in Antarctica: penguins, albatrosses and petrels.

The waters around Antarctica abound in algae, plankton and various species of crustaceans. Some 200 species of fish have been recorded south of the Antarctic Convergence. The Antarctic Convergence is a 'front system' where the cold surface water from the south meets and sinks below the warmer waters from the Atlantic, the Pacific and the Indian Oceans. In the food web, krill is a particularly important source of nutrition for predators higher up the food chain. Squid are also plentiful. Antarctic fur seals, crabeater seals, Weddell seals, leopard seals, southern elephant seals and Ross seals are all to be found in Antarctica. In the summer season, both toothed and baleen whales inhabit the ocean around Antarctica.

Some of the marine species remain in the Antarctic all year long, while others are only there in the summer, when these waters are rich in phytoplankton and zooplankton.

and its cooperative role under the Antarctic Treaty.

The Directorate for Cultural Heritage has compiled as much information as possible on the state of Norwegian cultural monuments in the Antarctic. For logistics reasons, it is extremely difficult to obtain a complete, up-to-date overview,

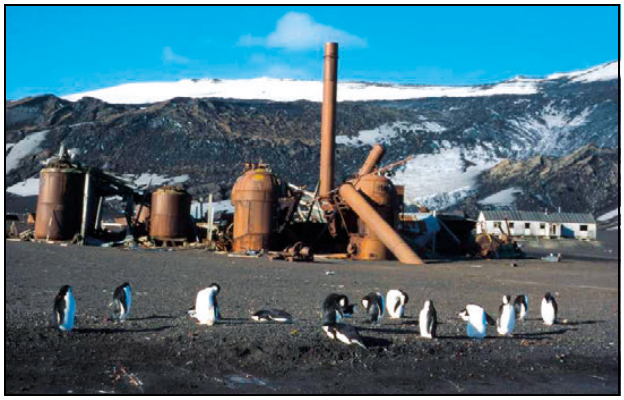

Figure 7.5 The whaling plant at Whalers Bay. Deception Island is an important Norwegian cultural heritage site.

Photo: Norwegian Polar Institute.

particularly of cultural heritage sites relating to early sealing and whaling activity. Since the most important and best-known sites and objects are located in the claim areas of other countries, international cooperation is important and sometimes the key to implementing measures. Norwegian protection and conservation measures have been carried out in accordance with a detailed priority list, and in line with political guidelines set out in Report No. 16 (2004–2005) to the Storting *Living with Our Cultural Heritage*.

Protecting and repairing cultural heritage assets in the Antarctic present special challenges. The natural process of decay is one. Another is the increase in traffic and its potential negative impacts. Cultural heritage sites are a popular tourist destination. Whalers Bay Historic Site on Deception Island, for example, is one of the two most visited places in Antarctica every year. Protection and restoration also pose practical challenges. In the case of some cultural heritage

Figure 7.6 Norwegian heritage sites in Whalers Bay.

Photo: Norwegian Polar Institute.

assets, it is neither possible nor advisable to initiate conservation measures. Particularly valuable cultural heritage sites can be protected by putting in place preventive measures.

A number of new research stations have been built in Antarctica. The construction of new buildings also entails the closure of other station buildings and other types of research facilities. In some cases, the treaty party that owns disused buildings wishes to protect them for their historical significance. This raises a range of issues, and the question of cultural heritage value must be considered in light of the provisions in the Environment Protocol regarding clean-up when an activity has been discontinued. Norway considers it important that issues relating to cultural heritage management and assessment of cultural heritage status are placed on the Antarctic Treaty cooperation agenda.

The protection and conservation of historical values and cultural heritage sites in Antarctica are a stated objective in the Environment Protocol to the Antarctic Treaty. The Norwegian authorities are therefore actively committed to protecting and safeguarding evidence of Norway's cultural heritage in Antarctica.

This includes a number of cairns, C. A. Larsen's shelter on Paulet Island and Carsten Borchgrevink's two huts at Cape Adare. Other historical remains include the Whalers Bay whaling station and the cemetery on Deception Island. Also on the list is Roald Amundsen's South Pole tent. All nine of these objects are located outside Norway's claim areas in the Antarctic. A cairn in Dronning Maud Land left by a mapping team from the Maudheim expedition in 1949–52 may be a candidate for addition to the list of historic sites and monuments.

In 2011, in connection with the centennial celebration of Roald Amundsen's expedition to the South Pole, the Government pledged funding for the restoration of the two Borchgrevink huts at Cape Adare. The Norwegian Directorate of Cultural Heritage is working with the New Zealand Antarctic Heritage Trust on this conservation project.

It is no longer possible to actively maintain all or parts of the Whalers Bay Historic Site. The Directorate of Cultural Heritage documented the historical remains in 2002 and again in 2014, and their deterioration was deemed to be so advanced that they are being abandoned to further natural decay. Norway has promised funding to organise archival materials from the whaling company so as to facilitate historical research, and in collaboration with the UK Antarctic Heritage Trust Norway now provides information to visitors describing and explaining the historical remains of the whaling era.

Figure 7.7 Reindeer in South Georgia, introduced by Norwegian whalers from 1911 onwards. In 2014 the stock was removed for environmental reasons.

Photo: Kit M. Kovacs and Christian Lydersen, Norwegian Polar Institute.

With regard to the other Norwegian cultural heritage assets on the ATCM's list of historic sites and monuments, which are mainly the cairns, supervision is not always practically possible. However, we do know that the grave (the first on the continent) of biologist Nicolai Hanson, who died at Cape Adare in 1900, is in good condition and is tended whenever anyone visits the site. Amundsen's tent will be left untouched under the ice out of regard for its cultural value. The ruins of C. A. Larsen's stone hut on Paulet Island, which is also a Swedish cultural heritage site due to its link with Otto Nordenskjöld's Antarctic expedition in 1903, is the only other cultural heritage monument that may be considered for conservation.

The Government will:

- Secure important Norwegian cultural heritage sites in Antarctica.
- Continue Norway's participation in international cooperation on protecting and conserving particularly important historical remnants.

7.4 External impacts – hard to control

The external environmental impacts caused by activities outside Antarctica probably have a greater effect on the state of the environment in

Antarctica than activities carried out on the continent itself. Of primary importance in this regard is climate change.

7.4.1 Climate change

Along with the Arctic, the Antarctic plays a key role in the global climate system. Scientists have long thought that the ice in the inner part of the Antarctic continent was unaffected by the global warming trend. However, new research shows that the entire continent is warming up, a process that appears to have taken place over the last 50 years.

Global climate change will affect both the physical and biological environments in Antarctica, and could significantly change the very character of the continent. The most vulnerable freshwater systems are located on the northern Antarctic Peninsula and the Antarctic islands, where just a small rise in temperature could have wide-ranging effects on ecosystems.

The sea ice in the Antarctic is important in several ways. Climate change could have an impact on krill and thereby also on the Antarctic marine ecosystem. An anticipated trend towards warmer, fresher water, stronger westerly winds and a gradual move of the front system in a southerly direction could cause species at all levels of the food chain to move further south, depending on the conditions the species prefer. If the sea ice cover is reduced, the Antarctic krill population is expected to decline in range and be negatively affected by ocean acidification. The climatic effects on krill are expected to vary substantially from one place to another, but the sum of knowledge today indicates that a warmer climate will bring negative change due to the link between the ice cover and krill.

Decline in the population of several species of penguin has been documented in large parts of the Antarctic[1]. The combination of the anticipated deterioration in ice conditions and changes in the food chain as a result of climate change could affect these species[2].

A warmer sea opens the possibility of new species being able to move into these waters, with unknown consequences for the present Antarctic marine environment.

[1] See e.g. Trivelpiece et al. 2011 – National Academy of Sciences (USA); Trathan et al. 2011 – PLOS ONE; Jenouvrier et al. 2014 – Nature Climate Change.

[2] Ainley et al. 2010 – Ecological Monographs.

7.4.2 Pollution

There is little indication that the Antarctic is affected by the long-range transport of pollutants to the same extent as the Arctic. Environmental contaminants have indeed been found in animals in the Antarctic, but the substances registered here are different. For instance, high levels of insecticide and pesticide (Mirex and HCB) transported to the region from far away have been found in the south polar skua, a seabird in Dronning Maud Land. Few studies have been made to date of the effects of these substances on the fauna of Antarctica, and it is important that we learn more. Mapping the pollution situation in the Antarctic is an important part of the atmospheric research programme that has now been established at the Troll station. At the Troll air pollution measurement facility, the Norwegian Institute for Air Research (NILU) has recorded long-range transboundary air pollution from the fires causing deforestation in the Amazon Basin.

7.4.3 Depletion of the ozone layer

The ozone layer protects all life on earth from the sun's harmful ultraviolet radiation. Emissions of substances like chlorofluorocarbons (CFCs) and halon deplete the atmospheric ozone layer, causing areas of low ozone concentration. Global emissions of ozone-depleting substances have declined significantly since the mid-1980s as a result of commitments made in the Montreal Protocol of 1987 on protection of the ozone layer. The ozone layer is now showing signs of thickening, but will still take decades to fully recover. At the end of September 2006, the ozone hole over the Antarctic was the largest ever observed, and the World Meteorological Organization and the UN Development Programme believe it unlikely that the ozone layer over the Antarctic will be fully recovered until 2065.

7.4.4 Ocean acidification

Man-made emissions have increased the amount of carbon dioxide (CO_2) in the atmosphere and the ocean. Ocean acidification takes place when CO_2 reacts with seawater, forming carbonic acid and lowering the pH level of the water.

The ocean takes up huge quantities of carbon in the water, in the sea floor and through the photosynthetic activity of phytoplankton and other organisms. Thus the ocean functions as a carbon

storehouse, and has absorbed around 30 per cent of man-made CO_2 emissions.

The waters around Antarctica contain more CO_2 than other marine areas because cold water absorbs more CO_2 than warmer water. The consequences of ocean acidification will therefore be visible first in cold waters. Acidification is expected to accelerate and increase in scope as this century progresses. The ocean's degree of acidity can affect the shell formation process of certain marine organisms and impair their ability to function. Many of these organisms are key species in the food chain, providing vital sustenance for krill, fish, squid, penguins, seals and whales. Scientists have a crucial task in understanding the mechanisms behind ocean acidification and its effects on ecosystems.

So far, only a few studies have focused on the effects of ocean acidification on commercial species in the Antarctic. However, research has shown that a rise in the ocean's acidity can have a negative impact on krill in the early stages of development.

The effects of climate change and ocean acidification can also lead to ecosystems becoming less resilient to other impacts.

The Government will:

- Preserve the continent as a reference area for research on the effects of global environmental and climate changes and research on the role of the Antarctic in the global climate system.
- Work to adapt Antarctic environmental management to climate change.

7.5 Growing activity poses a challenge to environmental objectives

7.5.1 Expansion of infrastructure

The scale of research infrastructure has increased substantially in the last 50 to 60 years, with about 70 summer and year-round research stations currently operating on the continent. The stations are scattered across a large geographical area, and many are situated near the most biologically attractive areas on and near the Antarctic Peninsula. Meanwhile, several new stations have been built in the more deserted areas of the continent, in the process reducing its expanse of untouched territory. Several countries have given notice of plans to erect new stations. Some of these countries have previously had no stations, but some of the major Antarctic players are also increasing the number of their stations.

7.5.2 Growing traffic pressure

The number of visitors to Antarctica is steadily growing. While only around 5,000 tourists came to the Antarctic in the course of a summer season 20 years ago, today just under 40,000 tourists arrive every year, after a slight decline in the years around 2010. Most of these tourists go ashore in the areas with special natural or cultural heritage values around the Antarctic Peninsula. Only a handful of tourists visit other parts of Antarctica, but these areas too have become more accessible over the years, resulting in more human activity and impact in areas that were formerly completely unspoiled.

The lack of knowledge regarding biological deposits and impacts at the busiest visit sites, among other matters, makes it difficult to determine how the increase in traffic will affect the natural and cultural environments, or to gauge the potential magnitude of these effects.

The rise in research, fishing and tourist activity also entails an increase in ship traffic in the Antarctic. This creates a greater risk of adverse environmental incidents as well as acute harm to the environment. In the past few years, there have been a number of incidents of varying severity.

Most of the regulatory framework for ship traffic is international. The main conventions have been drawn up by the UN's specialised shipping authority, the International Maritime Organisation (IMO). Rules for ships sailing in the Antarctic must therefore be negotiated and enacted through the IMO to ensure the creation of a global regime governing every country and flag.

7.5.3 Harvesting and catches

Toothfish and krill are the main species fished in the waters around Antarctica, where krill play a key role in the ecosystem.

Fishing regulated under the CAMLR Convention does not pose any real threat to the biological marine system in the Antarctic, because resource management is based on the ecosystem principle. In future, it will be important also to take account of the effects of climate change when determining the annual catch quotas for krill. The Antarctic krill biomass is expected to decrease due to reduction of the sea ice cover, and to be adversely impacted by ocean acidification. Even if the abundance of krill were to remain at the present level,

krill could stay at greater depths for longer periods so as to avoid warmer, fresher surface water. This could lead to krill spending less time in the shallow shelf areas, where they are normally available to fishermen and to seals and seabirds (including penguins) that are dependent on krill and reproduce on land. The information available about the effect of climate change on krill stocks is considered by CCAMLR during its annual krill stock assessments.

7.5.4 Introduction of non-native species

The introduction and spread of alien species is a growing global problem. The risk of their finding their way to the Antarctic is increasing with the rise in human activity and transport. Introduction of non-native species has been documented, primarily on land, but some non-native marine species have arrived, too. Some that have become established in Antarctica have done so by expanding their habitat. These species can be considered invasive, rather than introduced species. Alien species can do extensive damage wherever they establish themselves, and can be the cause of significant changes in the ecosystem. Introduced species can also be bearers of diseases capable of destroying a natural system that has not built up immunity to those diseases.

The Government will:

- Work towards holistic, ecosystem-based management of the marine and terrestrial environment in the treaty area, with particular focus on protecting vulnerable areas of special value.

8 Business activity and resource management

8.1 Introduction

Norwegian businesses have long traditions in the Antarctic. In recent times they have focused in particular on activities in which Norwegians possess special expertise or other advantages, in some cases provided to them by nature. Norwegian companies today operate extensively in the Antarctic. The sectors in which they and the Norwegian authorities are active, or in which there may be a potential for economic activity, include:

- Fisheries and fisheries management
- Tourism and travel
- Space activities
- Shipping
- Bioprospecting

Common to all these forms of activity is that they are conducted within a policy framework whose paramount concerns and goals are responsible management, sustainable resource use and conservation of the natural environment. Within this framework there should be room for environmentally sound research, tourism and commercial activity. The Norwegian authorities have developed national laws and regulations that fulfil our international legal obligations and, at the same time, facilitate business activity in the Antarctic.

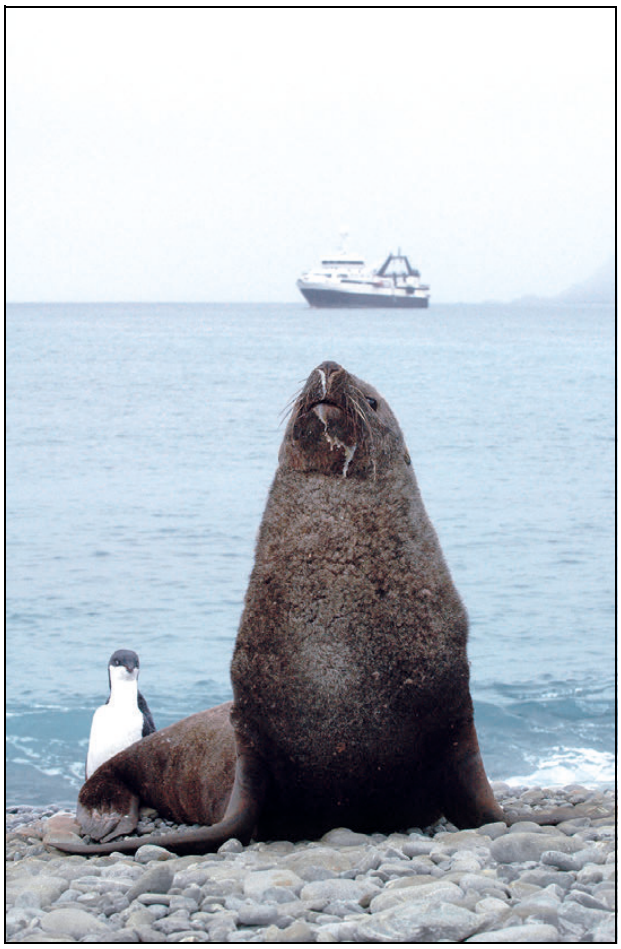

Figure 8.1 Norway is working to promote sustainable fisheries in the Antarctic.

Photo: Bjørn Krafft, Institute of Marine Research.

8.2 Fisheries and fisheries management

8.2.1 Fisheries and fisheries management

Extending from the Antarctic Convergence to the Antarctic mainland is the distinctive Antarctic marine ecosystem. The climate is cold and variable, and over thousands of years the ecosystem's distribution of species and other dynamic processes have developed in unique ways. The ecosystem, which is subject to large natural variations, is dominated by krill. Krill, in other words, is the most important building block for all life higher up in the food chain, including fish stocks, seabirds and marine mammals. The ecosystem is vulnerable because many of the organisms have adapted to extreme conditions. Land-based birds (including penguins) and marine mammals (seals in particular) are vulnerable to environmental changes that force krill concentrations away from the areas where those animals nest and bear their young. There are indications that global warming and ocean acidification may have consequences for the krill-based ecosystem, partly by altering the krill population and partly by altering its geographical range. The toothfish, an important harvestable species in the Antarctic, is vulnerable because individual toothfish grow slowly. If these

stocks were overexploited or subjected to other negative influences, it would take a long time to build them up again. We have little basic knowledge of these species – including where, for example, the toothfish spawn – so the consequences of climate change are hard to assess.

The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) employs an ecosystem-based approach to resource management in which conservation is seen as including both the responsible use of resources and the maintenance of ecosystem integrity. Emphasis has been placed on making sure that harvests taken by humans do not compromise access to food for other species that depend on the species being harvested, such as krill. The area under CCAMLR's administrative responsibility is divided into subareas, and each year the Commission approves overall quotas for a range of species in the different areas. The quota setting is based on research data and recommendations issued by CCAMLR's Scientific Committee. The legal framework for CCAMLR's activity is examined in more detail in chapter 4.3.

Within the area covered by the Convention on the Conservation of Antarctic Martine Living Resources (the CAMLR Convention), the fishing industry directly targets toothfish (*Dissostichus sp.*), mackerel icefish (*Champsocephalus gunnari*) and Antarctic krill (*Euphausia superba*); limited fishing for crab species and other species also takes place. CCAMLR's Scientific Committee each year evaluates the status of these fisheries and issues management recommendations on the basis of the best available scientific information. This information includes detailed data from the fishing activity itself and from international scientific surveys. CCAMLR regulates fishing by way of equipment rules, by-catch rules, reporting obligations and catch documentation. Other resource management tools used by CCAMLR include rules for bottom-fishing gear to protect vulnerable habitats, the authority to close off areas to fishing and programmes to systematically monitor predator species that are dependent on the species being harvested in any given ecosystem.

Figure 8.2 Krill is the most important resource for the Norwegian Antarctic fishery.

Photo: Bjørn Krafft, Institute of Marine Research.

8.2.2 Krill

Krill has been fished since the 1970s. The peak harvest, in excess of 500,000 tonnes, came in 1982. The harvest was greatly reduced after the fall of the USSR. In recent years it has increased again, with several new countries participating in the catch. Compared to fisheries in other oceans, however, the activity is small and takes place across an extremely large area. The density of fishing vessels in the Antarctic is such that a single vessel in the entire North Sea would represent the equivalent density. Today, the vast majority of fishing occurs in CCAMLR Area 48, which includes the South Shetland Islands, the South Orkney Islands and South Georgia (see Figure 8.4 below). This area is particularly prized because of its dense stock of krill in shallow waters combined with predictable interannual catch volumes and the fact that the harbours and the fishing zones are relatively close together. There are major krill resources in the convention area. In Area 48 alone, CCAMLR estimates the total krill biomass at approximately 60 million tonnes. Although assessments vary, researchers believe that the total krill stock in waters around Antarctica amounts to several hundred million tonnes. Nevertheless, a catch limit of only 3.7 million tonnes has been set for the entire convention area. Vast distances and challenging weather and ice conditions during the harvest season affect the vessels' ease of access to the fishing areas, and thereby the length of time and the amount of krill the vessels can extract. In recent years the total krill harvest has ranged between 220,000 and 280,000 tonnes. In Area 48 the catch limit is set at 620,000 tonnes, which is to say more than twice the current catch level. The catch limit is determined on the basis of historical fishing data and the best available scientific information. The governing principle is that harvest activity must not adversely affect species such as krill.

According to CCAMLR regulations, at least 50 per cent of krill vessels belonging to each flag state are to carry international observers.

The Association of Responsible Krill Harvesting Companies (ARK), which represents business interests, contributes importantly to the knowledge- base that underpins CCAMLR's management of krill. The organisation works on the assumption that the industry itself has a responsibility to help ensure the sustainable use of resources. It currently has members from the krill industry in Norway, Chile and South Korea. ARK is an observer to the CCAMLR, and has drawn praise for the efforts of its members to fish in accordance with regulations.

Today krill is used in dietary supplements, Omega 3 products, medicines and cosmetics, while its by-products are useful in such products as aquaculture feed. If it is possible to overcome the technical and market barriers that currently limit the degree of krill exploitation, krill could become an even more important nutritional source.

Box 8.1 Mackerel icefish

The catch of mackerel icefish (*Champsocephalus gunnari*) is restricted to less than 3,000 tonnes. The stock collapsed after excessively large harvests in the 1970s and 1980s. In one year during that period, more than 200,000 tonnes were caught. Norwegian actors do not participate in this fishery.

Figure 8.3 Mackerel icefish.
Photo: Bjørn Krafft, Institute of Marine Research.

8.2.3 Toothfish

Many countries also fish for toothfish. Toothfish fishing is conducted in all waters surrounding the Antarctic continent. An upper limit for the harvest has been established. Quotas are distributed over several areas. The fishery is regulated in 'Olympic' fishing style, with free competition among participating vessels after setting aside quotas dedicated to special research plans. Catches are reported continually, and fishing is stopped when the catch ceiling is reached. All vessels are required to have an observer on board, so that resource managers can learn from the fishing activity itself. The total annual catch is about 15,000 tonnes, divided between Patagonian tooth-

fish (*Dissostichus eleginoides*, ~11,000 tonnes) and Antarctic toothfish (*Dissostichus mawsoni*, ~4,000 tonnes). There is significant interest in this fishery, because toothfish have high market value. The commercial fishing fleet itself helps regulate the fishery through a tagging and recapturing programme during which biological information is collected. All vessels are required to tag and release a certain portion of their catch and to report recaptures. The recapture data and other available information are analysed by CCAMLR in determining the basis for quota setting.

8.2.4 Science-based management

Resource management in the convention area is to be based on knowledge and carried out in accordance with advice from the CCAMLR Scientific Committee. The base of information for managing Antarctic resources is extremely limited. Annual quotas are set using a precautionary approach. The scientific foundations of the Commission's management decision-making are crucial to fulfilling the sustainability obligations established by the convention. Research is important so that enough information is gathered when exploiting the resources. If we wish to increase resource exploitation in the Antarctic, we must meet the increased need for scientific studies.

The need for monitoring and research became obvious in connection with the Commission's decision to introduce a Feedback Management Strategy (FBM) for the krill fishery. Currently under development, this is a new and more dynamic management tool. Since FBM is still at an early stage in development, there is little practical experience to indicate how well it will work. The system in any case relies on the timely use of data collected by scientists or by the fleet itself, so the fisheries can be told –within the same season – when activities must be halted or moved to other areas.

There is a major need for scientific surveys to quantify the following:

– How climate variations, anthropogenic climate change and ocean acidification may alter the

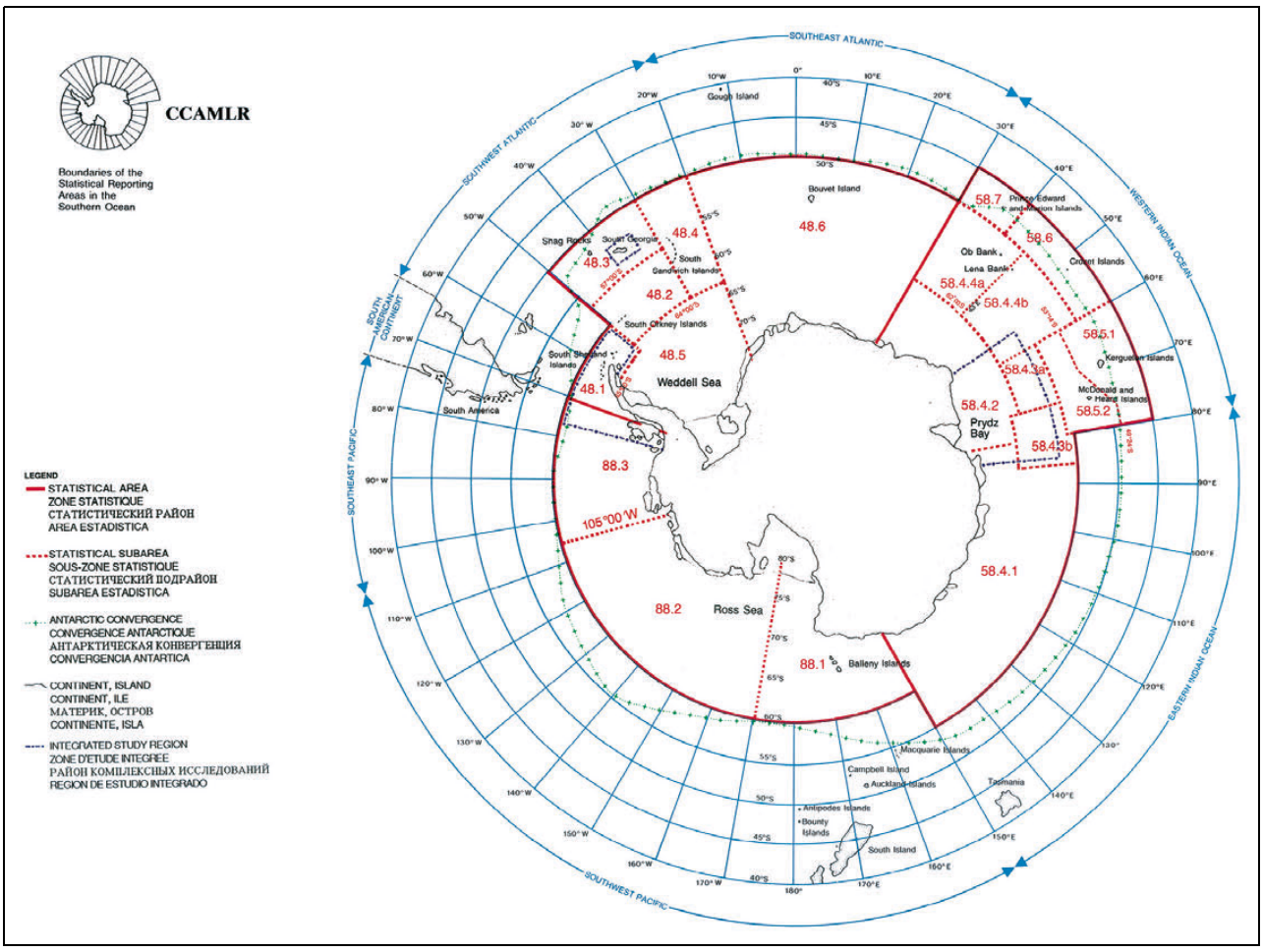

Figure 8.4 Overview of CCAMLR's activity area, including statistical subareas.

Source: ccamlr.org.

function and carrying capacity of the ecosystem.
- How the physical environment affects local krill distributions and density levels.
- How the annual fishery affects the local distribution of krill and the ability of apex predators to find food.

The second and third points above relate to information that must be obtained through a combination of science conducted while commercial fishing is under way and dedicated independent research.

8.2.5 Strengthening efforts to combat Antarctic fisheries crime

The Commission has made a large effort to prevent illegal, unregulated and unreported toothfish fishing, and has put a number of measures into effect. These include a system for blacklisting vessels that have participated in illegal, unregulated or unreported fishing, including vessels from CCAMLR member states and non-member states. It has been challenging to achieve consensus within the Commission on blacklisting member-state vessels that have taken part in illegal, unregulated or unreported fishing, but on this matter, too, developments in recent years have been positive. The Commission, moreover, has introduced a catch-documentation system to monitor international commerce in toothfish as well as measures to ascertain whether the fish have been caught in conformance with regulations. Norway implemented this system in 2000. Norway places very strong emphasis on efforts to reduce illegal, unregulated and unreported fishing, and has worked actively to strengthen CCAMLR's measures to combat such fishing. This is something the Government will carry on doing.

In 2013, a working group on fisheries crime was set up at INTERPOL. This group's work includes intelligence-sharing, operations to counter specific illegal activities and capacity- building. Since the group's establishment, parties active in the Antarctic have been in the spotlight. In September 2013 Norway became the first country in INTERPOL's history to request the publication of a 'purple notice' regarding a certain fishing vessel that had conducted unregulated fishing in the CCAMLR area since 2004. Through such a notice Norway sought information on the vessel and its owners, operators and others who profit from its activity. A few weeks later, the vessel was inspected in ports in the Indian Ocean. In December 2013, New Zealand requested INTERPOL to publish a new notice, with support from Australia and Norway, regarding another vessel. Some months later that vessel was detained by Malaysian authorities and prosecuted. New Zealand also initiated the publication of three notices in January 2015, requesting information on the ownership and control of vessels active in the CCAMLR area.

These cases demonstrate that broad international cooperation on enforcement measures is urgently needed in the waters of the Antarctic. It must also be acknowledged that illegal fishing begins and ends on land. Not only must such activity be stopped at sea, but punitive action must be taken against those who plan, conduct and profit from it. When unlawful activities are detected it is possible for the authorities to respond even if their physical presence in the violation area is limited. The challenge is to introduce a system that allows for secure information- and intelligence-sharing and can provide operative support to the responding agency. INTERPOL has proved itself a useful tool in the fight against fisheries crime.

The Government will:

- Support international cooperation at operational level through INTERPOL and other relevant organisations to uncover fisheries crime across the Antarctic.
- Work for a more robust law-enforcement regime that can contribute to more effective sanctions against unlawful fishing in the Antarctic.

8.3 Norwegian policy in CCAMLR

Norway is the leading krill-harvesting nation in Antarctic waters, and the Norwegian authorities set the same standards for responsible management in these ocean areas as in other areas where Norwegian actors harvest resources.

The top considerations relating to Norway's presence in the Antarctic – among them the provisions of the Antarctic Treaty and its Protocol on Environmental Protection (the Environment Protocol) – are also fundamental to Norwegian policy in CCAMLR. Safeguarding Norway's special interests as a territorial claimant and commercial actor within the CCAMLR's ambit is also important.

All substantive CCAMLR decisions are based on consensus. Norway works actively to ensure

Box 8.2 CCAMLR Ecosystem Monitoring Program (CEMP)

The CCAMLR Ecosystem Monitoring Program (CEMP) was established in 1985. This is a programme to monitor the effects of fisheries on species that themselves are dependent on the various species being fished. Such monitoring is one of several methods the Commission uses to ensure that the fisheries are run in compliance with the CCAMLR mission statement on protection and responsible use of marine living resources in the Antarctic.

The goals of CEMP are:

1. To make observations exposing significant changes in critical components of the marine ecosystem in the convention area, and
2. To distinguish between changes resulting from the harvesting of commercial species and changes stemming from environmental variability, both physical and biological.

As a basis for this monitoring, a set of indicator species has been selected. It is thought that these species will respond measurably to changes in their access to species being targeted by humans.

The indicator species currently used in the CEMP are:

- Adélie penguin
- Chinstrap penguin
- Gentoo penguin
- Macaroni penguin
- Black-browed albatross
- Antarctic petrel
- Cape petrel
- Antarctic fur seal

To ensure that localities can be compared over time, CCAMLR has agreed to a set of data collection methods, data submission formats and data analysis procedures. The CEMP programme at Bouvetøya provides data and scientific knowledge about population size, fitness and reproductive success of krill predators in an area relatively unaffected by fishing. This is valuable in evaluating the possible effects of fishing in areas where fishing activity is high.

that the organisation makes targeted decisions that will succeed operationally. On several complex issues it has been important for Norway to achieve agreement between fishing and conservation interests. To do so we draw on resource-management experience from our immediate vicinity and the development of comprehensive management plans for Norwegian waters.

For Norway, it is important that decisions made in CCAMLR are based on the best available scientific knowledge, so the country pays close attention to the recommendations of CCAMLR's Scientific Committee. With regard to the krill fishery, Norway advocates balancing the need for new management measures against the degree of likelihood that harvest limits are being exceeded. To date, the actual harvest of krill has been far below the level considered consistent with the precautionary principle. It is important in any case to make sure the Scientific Committee has sufficient data on which to base its recommendations for the krill stock. The Institute of Marine Research undertakes annual monitoring expeditions in which it cooperates with the fishing industry and with the efforts of other countries. The fishing industry also helps with information- gathering through its extensive reporting on catches and its cooperation with researchers. Fishing trials and research catches are also important in generating knowledge about the marine ecosystem.

8.3.1 Krill fishing notifications

In the last few years, interest in the krill fishery has been increasing. In the notification process for the 2014/2015 season, 21 vessels from six member states gave notice that they wished to take part in the fishery. The harvest estimates in their notifications total 611,000 tonnes. This would suggest a krill catch near the policy level in the area where fishing currently takes place. The notifications, however, do not give a true picture of the upcoming season's likely catch or of the krill-fishing vessels to be involved. Norway would like the CCAMLR to devise systems capable of providing a more realistic view of plans for taking part in the krill harvest – for example, by assessing whether to charge a notification fee in connection with fishing vessel registration.

8.3.2 Vulnerable benthic habitat

Regarding vulnerable marine ecosystems (VMEs) on the sea floor, CCAMLR has actively implemented measures adopted in UN fisheries resolutions from 2006 and 2011. Out of concern for such ecosystems CCAMLR has adopted a number of rules for fishing with bottom gear. Equipment constraints and area closures are among them. Both trawl and gillnet fishing are prohibited. In addition, threshold density levels have been adopted for indicator species (a pre-defined list of species associated with fragile habitats); such thresholds trigger a duty, embedded in the regulations, to notify the CCAMLR secretariat. If a vessel reports 10 or more indicator units within a defined line segment, the area within a radius of 1 nautical mile from the line segment is to be immediately closed to fishing. Such an area is to remain closed until the matter has been considered by both the Scientific Committee and the Commission.

8.3.3 Marine protected areas

In recent years the commission has discussed whether marine protected areas should be established in the CAMLR Convention area. Marine protected areas (MPAs) or other area-based conservation measures are part of the global objective under the UN Convention on Biological Diversity with a view to protecting 10 per cent of coastal and marine areas by 2020.[1] Of particular interest are areas important to biodiversity and ecosystem services. In 2009 CCAMLR established a MPA of 9 4,000 km^2 around the South Orkney Islands, following a recommendation from CCAMLR's Scientific Committee. In 2011 the CCAMLR parties came to agreement on an overarching framework for creating MPAs (Conservation Measure 91/04). It still has proved difficult, however, to agree on concrete measures for designating new MPAs, because the parties emphasise different interests. Norway actively supports efforts within the CCAMLR to establish MPAs, and is working to ensure that specific proposals are given a form and content that all parties can support. The Norwegian view is that proposed measures should be based on well-founded scientific recommendations, and that such measures comply with the framework created in 2011. It is hoped that the Scientific Committee will be assigned a more active role in developing the specific proposals. Establishing a MPA that is consistent with the framework and with current scientific standards will provide useful experience in continuing efforts to develop the framework and decision-making processes. The creation of a MPA with positive, verifiable effects could also serve as a model for drawing up similar measures elsewhere in the CCAMLR activity area.

MPAs can be important means of conserving natural assets a nd ecosystems within the convention area, and may also be a tool for the sustainable management of marine resources. Protected areas can be set up as reference areas for research on the consequences of climate change. Norway emphasises that decisions to designate MPAs should rest on solid science; their purpose should be clearly defined and their protective measures should be effective, targeted and suitable for long-term protection of the natural environment and ecosystems. Where marine ecosystems within the CCAMLR are less impacted, and where environmental conditions indicate an area should be protected for the future, it should be possible to protect it without regard to whether the area in question is under pressure today. On establishing a MPA within CCAMLR's convention area, fishing may be permitted as long as it is not in conflict with the objective of the protective measure. Fishing activity permitted in a protected area must be regulated in a way that supports the objective of the protective measure.

Norway is keen to ensure that CCAMLR management decisions relating to the establishment of MPAs include plans for monitoring and data-acquisition, so that the protective measures function as intended. When a sustainable fishery is combined with a well-designed research programme, the fishing fleet itself can play a key role in monitoring the protected area and acquiring more information. Differentiated degrees of commercial regulation inside a MPA would make it possible to design programmes for the different vessels active there, treating them as scientific platforms in a cooperative approach to research that Norway has already practiced with krill vessels. Norway has worked to increase understanding among the CCAMLR parties that the fishing fleet can contribute positively to the implementation of conservation measures, and that regulated fishing can be accommodated within such measures.

It is important that the establishment of protected areas does not lead to poorer access for col-

[1] CBD (2010) Aichi Biodiversity Targets. Convention on Biological Diversity: http://www.cbd.int/sp/targets/ Accessed 23 February 2015.

lecting research data; nor should it move the fishing fleet in a way that creates excessive fishing pressure in a different area. The fishing fleet is a resource for monitoring and information gathering. All management measures aimed at dynamic natural processes should be followed up with monitoring. The same applies to MPAs, because climate change may lead to changes in the Antarctic environment. Norway believes effective measures must be introduced to acquire more knowledge about the designated areas. Priorities should be established, both geographic and thematic, for building this knowledge base. Because of the distances involved and the resource and capacity constraints on Antarctic research, it is crucial to make sure protected-area designations do not become 'dormant' measures lacking in practical effect. Regular reassessments and potential revisions of MPAs are important to ensure that the measures imposed serve their intended purposes.

8.3.4 Norwegian coastal state jurisdiction in relation to the CAMLR Convention

Bouvetøya is outside the Antarctic Treaty area but south of the Antarctic Convergence, and it lies within the CAMLR Convention area. Bouvetøya is therefore a part of the Antarctic ecosystem. Norwegian management of Bouvetøya can be an important factor in CCAMLR's ecosystem management, and vice versa. Norway, for example, contributes monitoring data from Bouvetøya to CCAMLR's ecosystem monitoring programme, CEMP (see Box 8.2). More detail about the Bouvetøya monitoring programme is provided in the white paper on Bouvetøya.

Because Bouvetøya lies within the CAMLR Convention area, there is a degree of overlap between the convention's provisions and Norway's management of marine living resources in the waters around Bouvetøya. The CAMLR Convention states in Article IV (2) (b) that nothing in the convention and no acts or activities taking place while the convention is in force shall be interpreted as a renunciation or diminution by any of the contracting parties of the rights that the coastal states possess under international law.

The CAMLR Convention came into being with the parties' agreement on a final statement. In this statement, the chairman elucidated how the rights of the contracting parties are to be interpreted with respect to marine areas surrounding islands where the other contracting parties have recognised the sovereignty of pertinent parties. The final statement focuses materially on whatever conservation measures CCAMLR might adopt in the future. It asserts that it is up to the relevant coastal state itself to decide whether such measures shall also apply within the area of jurisdiction of the coastal state.

With regard to Bouvetøya, therefore, the introduction of any protective or other conservation measures would be a national matter.

The Government will:

- Actively help to ensure that CCAMLR has a sound scientific basis for making decisions and developing its management regime for the Antarctic marine ecosystem.
- Help to develop and improve efficiency in CCAMLR fisheries management by expanding the knowledge base for krill management.
- Help to ensure that CCAMLR retains an ecosystem-based management approach in which conservation and rational use of marine living resources are viewed in relation to each other and properly balanced.
- Improve research and monitoring of marine living resources by seeking to establish international five-year monitoring and research programmes for marine ecosystems in the CCAMLR area.
- Work to see that CCAMLR creates a representative network of marine protected areas and other effective area-based management measures within the convention area.
- Work to introduce a system in which a notification fee is charged to register vessels for fishing in the CCAMLR area.

8.4 Norwegian fisheries

Norway stands for responsible, sustainable and ecosystem-based management of marine resources in the Antarctic. Resource exploitation must be ecologically, economically and socially sustainable. The intention is to manage the marine environment in such a way that ecosystem productivity remains unchanged or is strengthened. Norway is working to ensure that the international management of Antarctic marine resources facilitates a healthy balance between use and protection.

The interest in Antarctic fishing is primarily directed at krill and toothfish stocks. Today, Norway represents more than half of the krill fishery in the Antarctic, followed by South Korea and Japan. Norway plays a dominant role in the krill

fishery, with three vessels accounting for more than 50 per cent of the total harvest. Norway also has one vessel that fishes for toothfish.

8.4.1 The krill fishery

In the 2013/2014 season, the Norwegian fleet (Aker BioMarine and Olympic Seafood) harvested about 160,000 tonnes of krill. This constitutes about 60 per cent of the total catch of krill in the convention area.

The two Norwegian krill-fishing companies are affiliated with the Association of Responsible Krill Harvesting Companies (ARK). This organisation, founded by the Norwegian companies, works to ensure that the industry itself takes responsibility for keeping fisheries sustainable by developing technology, strengthening CCAMLR's krill-management database and making other contributions. The three Norwegian krill vessels always have an international observer on board to monitor the fishing and collect research data for CCAMLR; in this way they set a standard far above the CCAMLR's requirement of 50percent observer coverage.

The Norwegian companies have also contributed to CCAMLR's data-acquisition efforts by making their vessels available for scientific surveys. The Institute of Marine Research and the fishing industry work together to produce estimates of the krill death rate during harvest. The industry funds a week of field research every year in CCAMLR Area 48.2 in cooperation with the Institute of Marine Research.

The Antarctic Wildlife Research Fund (AWR) was established in January 2015 by representatives of the Antarctic and Southern Ocean Coalition (ASOC), the Pew Charitable Trusts, WWF-Norway and Aker BioMarine. The Fund has a scientific advisory group composed of leading scientists in the field of Antarctic research, and its goal is to facilitate and promote research on the Antarctic ecosystem. The research is funded by donations from both commercial partners and individuals, and shows that both industry and private persons want to help preserve a living and sustainable ecosystem in the Southern Ocean by raising the level of scientific understanding.

Cooperation between the krill industry and the research community is an excellent example of how industry and resource managers can work

Figure 8.5 The krill vessel *Saga Sea* in action.

Photo: Bjørn Krafft, Institute of Marine Research.

together to improve the informationbase and monitoring systems for the benefit of krill stock management. This cooperation should be strengthened so that Norway can contribute even more to CCAMLR's management of living resources in the Antarctic.

8.4.2 Toothfish

Many countries also fish for toothfish. Toothfish, unlike krill, are caught by vessels capable of operating in different fisheries in other areas for the rest of the year. Toothfish are fished at between 500 and 2,000 metres' depth, and the fishery is a lucrative one.

Since the 2011/2012 season, a Norwegian shipping company, Ervik Havfiske, has assigned one vessel to the toothfish fishery in the CCAMLR area. Traditionally, according to notifications, the vessel has fished in areas 88.1–88.2. The same shipping company, using a different Norwegian vessel, took part in the fishery in the period 2003/2004–2006/2007.

8.4.3 Research

Research is important as a foundation for resource exploitation. Norwegian fishing of both krill and toothfish is based on sustainable marine management principles. Should there be a desire to exploit additional resources in the Antarctic, the need for scientific data would increase. Conducting research in the Antarctic is both challenging and cost-intensive because of the special weather conditions and enormous ocean areas.

The CCAMLR Scientific Committee is the key actor in developing research plans for the convention area, including research on krill. Norway makes a significant contribution to the work of the Committee. Given Norway's role as an important fishing nation, there may be reason to consider increasing Norwegian involvement in the Committee's various working groups.

In 2011 the Institute of Marine Research began a krill-monitoring programme in the South Orkney Islands. A commercial fishing vessel equipped with acoustic instruments operates there one week per year on a fixed course to assess the amount and composition of the krill stock. Its measurements are compared with the results of similar surveys conducted in other harvest areas by research groups in the UK and the United States. See chapter 6 for more detail on Norwegian research activity in the Antarctic.

The Government will:

- Facilitate continued value creation through sustainable harvesting of krill and toothfish resources by the Norwegian fleet.
- Work in CCAMLR for a general requirement that 100 per cent of vessels harvesting krill carry scientific observers.
- Encourage private businesses to invest more in acquiring Antarctic knowledge and expertise, and to collaborate in international polar research. A good example is how the krill industry and the research community work together to improve scientific knowledge and monitoring systems with a view to sound krill management. This cooperation should be strengthened so that Norway can contribute even more effectively to CCAMLR's management of marine living resources in the Antarctic.

8.5 Tourism in the Antarctic

8.5.1 Antarctic travel and tourism

The easiest way to reach the Antarctic is by sea, and at present there is very little air traffic to the continent for tourists. Figures from tour operators show that around 40,000 tourists now visit the Antarctic each year,[2] and most of these are cruise tourists. By comparison, only about 7,000 tourists came to the Antarctic in the 1992/1993 season.[3]

Figure 8.6 The South Pole expedition undertaken by Liv Arnesen and Ann Bancroft in 2001 is an example of a privately planned Antarctic expedition.

Photo: www.yourexpedition.com.

[2] Source: IAATO Antarctica Tourism Fact Sheet 2014–2015. www.iaato.org.

[3] Source: IAATO Antarctica Tourism statistics: Tourist landings in Antarctica – Trends 1992–2009, www.iaato.org.

Box 8.3 International Association of Antarctica Tour Operators (IAATO)

IAATO is a membership organisation established in 1991 to promote and practice environmentally sound private-sector tourism to Antarctica. There are currently 116 IAATO members. The organisation's members collaborate on developing, approving and implementing operational standards to counteract potential environmental impacts. Many guidelines have been put in place during the past 20 years. These have proven effective at reducing negative environmental effects and include, but are not restricted to, the following: Location-specific guidelines, criteria for site selection, number of passengers per guide, number of passengers ashore, guidelines for cleaning footwear, measures to prevent the spread of non-native species, wilderness etiquette, garbage-handling routines, navigation planning, communication procedures, emergency and evacuation procedures, reporting routines, guidelines for marine species, rules for station visits, etc.

The Norwegian Polar Institute (NPI) is Norway's administrative authority for environmental and safety regulations in the Antarctic, and processes reports and impact assessments submitted by private Norwegian expeditions and Norwegian-organised tourism bodies. Participants in activities that have been approved in Norway, or in another state that has comparable regulations and has ratified the Antarctic Treaty's Environment Protocol, are not obliged to give notice under Norway's Antarctic Regulations. On average in recent years, about two private expeditions per year have been approved. NPI has not issued a general prohibition against expeditions, but required that one expedition be postponed. See chapter 5.3 for a discussion of the regulations.

Parties to the Antarctic Treaty have adopted a number of measures to ensure that tourism in the Antarctic is conducted in an environmentally friendly fashion. These include requirements for emergency preparedness and insurance, a limit on the number of passengers on cruises that offer shore visits, and coordination of landings by tour operators. Representatives to the Antarctic Treaty Consultative Meeting (ATCM) have adopted strict traffic guidelines for tourism, and 'Visitor Site Guidelines' have been issued for 36 locations. These guidelines state clearly where visitors are permitted to move about, how many passengers may go ashore at any given time, how long the visit may last, the required number of guides per passenger, the permissible size of ships putting tourists ashore and the number of ships allowed per day. Camping policies, recommended paths, prohibited areas and other matters have also been specified.

In addition, the International Association of Antarctica Tour Operators (IAATO) has developed its own rules for ship tourism. The Organisation has also produced a certification scheme for guides and expedition leaders called the IAATO Field Staff Online Assessment, which applies to the Antarctic Peninsula and South Georgia.

Antarctic tour operators are eager to instil in visitors an increased awareness of environmental and safety concerns. Knowing more about the fragile Antarctic environment may cause tourists to take better care of it during their stays on the continent; environmental awareness may also enrich their experience.

Cruise tourism is the largest and most accessible form of tourism in the Antarctic. 'Air & land' tourism has grown in popularity, but this form of tourism still constitutes a small part of the whole.[4] Antarctic tourism is generally divided into five travel types:[5]

- Cruise with shore visit
- Cruise without shore visit
- Air & cruise, with shore visit
- Air & land, the Antarctic interior
- Overflight without landing

8.5.2 Cruise tourism

Over half of cruises to the Antarctic include disembarkation on the continent. The combination 'air & cruise' now accounts for a relatively small share, around five per cent of the total. Formerly there were two Norwegian cruise operators offering trips to the Antarctic. At present there is one Norwegian cruise operator in the Antarctic: Hurtigruten Group ASA, with its expedition ship MS *Fram*. The ship made 10 journeys in 2013/2014, and nine are planned for 2014/2015.

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4 According to the IAATO, about 300-400 tourists make such trips each year. Source: IAATO Antarctica Tourism Fact Sheet 2014–2015. www.iaato.org.

5 Source: IAATO Antarctica Tourism Fact Sheet 2014–2015, www.iaato.org.

Figure 8.7 Norwegian tourism in the Antarctic: Hurtigruten (MS *Nord-Norge*) is the largest Norwegian actor.

Photo: Øystein Overrein, Norwegian Polar Institute.

8.5.3 Sustainable tourism

Today the Antarctic is a relatively expensive niche destination that only a few experienced operators can offer. In all likelihood this will not change greatly in the near future. Nevertheless, it is important to be aware that demand will increase if it becomes easier to travel to, or around, the Antarctic. One of the challenges associated with increased tourism to the Antarctic is ensuring that human activities do not result in litter, pollution, landscape damage or importation of invasive species.

Future Antarctic tourism must take place within a sound framework of environmental and safety policies. What Norway has learned in Svalbard may be transferable to the Antarctic.

Today there is very little air traffic carrying tourists to the continent. Tourists and private expeditions bound for Dronning Maud Land normally fly via Novo Airbase using the services of The Antarctic Company (TAC). Norwegian expeditions also use this transport route. The airstrip at Norway's Troll station is used only for research purposes, and lacks the capacity to accommodate tourists. The Troll station itself also prioritises research-related activities, and is not equipped for tourism. Several other countries have less restrictive policies with regard to visits by tourists at their Antarctic research stations.

8.6 Space activities

8.6.1 Satellites

Antarctica is ideally situated for the establishment of ground stations to serve satellites travelling in polar orbits. Downlink stations in Antarctica make it possible to receive data more frequently and thereby free up capacity on polar-orbiting satellites. Antarctica also has certain geographical advantages for space activities. The continent's high open plateaus provide excellent line-of-sight communication with satellites and views of space for observatories. Moreover, interference from light, radio-frequency noise and other pollution is minimal compared with the inhabited parts of the world.

Several countries, including the United States, Germany, India, Japan, South Korea and South Africa conduct satellite-based activities and space-related research in Antarctica. Stations such as McMurdo (United States) and TrollSat are very important for retrieving data from weather and earth-observation satellites. Norway currently cooperates with a number of key actors, including the National Oceanic and Atmospheric Administration (NOAA) and the *National Aeronautics and Space Administration* (NASA) in the United States, the European Space Agency (ESA), the European Union (EU) and the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT). Countries such as the United States, Germany, Japan, Russia and China engage extensively in space-related research activities in Antarctica.

Figure 8.8 The TrollSat satellite station near the Troll research station in Dronning Maud Land.

Photo: KSAT.

8.6.2 The TrollSat satellite station

The satellite station TrollSat is situated near the Troll research station in Dronning Maud Land. The state-owned company Kongsberg Satellite Services (KSAT) owns and operates TrollSat, and is one of the world's leading providers of downlink and control services for satellites in polar orbits. TrollSat is the largest station for receiving satellite information in Antarctica, and provides access to important data used in such fields as meteorology, environmental monitoring and navigation. Troll-Sat also has the capacity to deliver near-real-time services for Antarctic environmental monitoring – of oil spills and sea ice, for example, as well as for ship detection. Today, four antennas are available for data downlinks and three for transmitting satellite-based information back to users.

In addition to earth-observation antennas, TrollSat has a reference station for the civilian European navigation satellite system Galileo. Troll-Sat is a strategically important station for Galileo and ensures reliable navigation data in the Antarctic. TrollSat is remotely operated from Tromsø, but a local presence is needed to perform the necessary maintenance and operational tasks.

The Antarctic Treaty lays out certain broad frameworks for activity in the Antarctic, and these extend to space activity. TrollSat's services are consistent with the scope of activity and duties outlined in the Antarctic Treaty. In contrast to similar activities at Svalbard, the satellite downlink services at Troll have not to date been the subject of special national regulations; see Norway's regulations concerning the establishment, operation and use of satellite ground stations, which are primarily designed to safeguard ground-station activities at Svalbard. The ground-station regulations are being revised, and separate regulations for ground stations in Antarctica are currently being drafted.

Box 8.4 Kongsberg Satellite Services (KSAT)

Kongsberg Satellite Services (KSAT) is the largest supplier in the world of services related to data downlinks and satellite operations in polar orbit. The company operates more than 40 antennas positioned around the world, including Svalbard (SvalSat) and Dronning Maud Land (TrollSat).

The company is half owned by Kongsberg Gruppen and half by Space Norway, which itself is owned by the Ministry of Trade, Industry and Fisheries. The company is headquartered in Tromsø, and has 135 employees. KSAT had sales of approximately NOK 500 million in 2014.

8.6.3 Benefiting research, resource management and business

Satellites that move in polar orbits pass over the North Pole and the South Pole 14 times a day. They are used in large part for earth observation, meteorology and navigation. The satellites are especially useful in resource and environmental management and in weather forecasting services. Data received by TrollSat provide insight into weather, air quality, wind, waves, ocean salinity, air and water temperature and a variety of other types of information used in climate and environmental research. Weather forecasts in general, and extreme weather warnings in particular, rely on satellite-based observations.

It is helpful to place ground stations as far north and as far south as possible in order to downlink data as often as possible and maximise the efficiency of the station network. KSAT is the only company that can offer downlink services from both the Arctic (Svalbard) and Antarctica (Dronning Maud Land). By integrating the stations at Svalbard and Dronning Maud Land, meteorological data can be supplied every 50 minutes. This capability helps make weather forecasting more reliable. The Norwegian ground stations are critical to the provision of weather data. Both the American weather-forecasting agency NOAA and the European organisation EUMETSAT are dependent on these stations to provide their services. In addition, the Chinese meteorology organisation CMA is considering using TrollSat for data reception.

TrollSat's downlink services are also of interest to commercial clients, and the station supplies environmental and weather data to several international customers. Orbital path monitoring and data downlinks are also necessary during satellite launches to ensure that events unfold as planned and to make corrections if necessary.

8.6.4 Future Norwegian space activities in Dronning Maud Land

Troll is a key site for different types of space weather observations. The term 'space weather'

refers to short-term changes in space phenomena such as the solar wind, electromagnetic radiation and the interplanetary magnetic field that cause shifts in the earth's magnetosphere and ionosphere. Space weather can affect radio communications, navigation systems, electronic equipment and electrical systems, sometimes putting human life at risk. As a result of improved technology and expertise, the use of space weather observations is becoming operationally useful in communications and navigation. Regular observations from Antarctica will be important to obtaining a global picture. Other countries expect that Norway will assume its share of responsibility for this in the Antarctic. Magnetometers, aurora cameras and GPS and Galileo downlink receivers for ionospheric measurements will enable Troll to contribute to global space weather services in the future.

In a joint agreement on satellite navigation between Norway and the EU, which was signed in 2010, Norway committed itself to operating Galileo's terrestrial infrastructure for at least 20 years. Three additional earth observation antennas are also planned to ensure continued service to the US and European weather services through 2042.

The Government will:

- Facilitate continued Norwegian space activity in Antarctica in accordance with the Antarctic Treaty; see the white paper Meld. St. 32 (2012–2013) *Between Heaven and Earth: Norwegian space policy for business and public benefit*.
- Facilitate expansion of TrollSat's ground station services and data reception for international earth observation satellites, as a long-term contribution to international environmental and resource monitoring.
- Potential establishment of new activities or infrastructure will conform to overall guidelines governing the infrastructure at Troll.

8.7 Shipping

8.7.1 Ship traffic in the Antarctic

Most ship traffic in the Antarctic is made up of cruise ships and fishing vessels, along with the supply ships that transport personnel and supplies to the research stations. From time to time, private pleasure craft also come to the Antarctic.

All tour operators active in the Antarctic with vessels exceeding 500 GT (apart from fishing vessels) are members of the International Association of Antarctica Tour Operators (IAATO). Currently, only one Norwegian-registered cruise vessel operates in the Antarctic: the Hurtigruten ship *Fram* (300 passengers). At present 31 commercial fishing vessels with a license to operate in the Antarctic are registered, and five of these are Norwegian. The vessels operating in the Antarctic are large oceangoing vessels with crews ranging from 22 to 136 persons.

The Antarctic is characterised by vast distances, extreme weather and periods of darkness and ice-covered water. Ships and crews at work in these areas face constant challenges.

8.7.2 Regulations

The greatest challenges in the Antarctic are cross-border ones that can only be handled through close international cooperation. The law of the sea, including the UN Convention on the Law of the Sea, is the legal framework for all activities in marine areas. The law of the sea and other international rules as stipulated by the International Maritime Organization (IMO), such as vessel standards and crew training apply to Antarctic shipping just as they do to shipping in other areas. But until now few laws and regulations have addressed the special conditions faced by ships in the polar areas. Norway, therefore, has pushed for the introduction of additional binding global rules for navigating in polar areas (the Polar Code) by the IMO. Norway has worked to develop a Polar Code with provisions ensuring that design and equipment are suitable for polar operations, and that environmental factors are properly considered.

In the Antarctic, the Polar Code's geographical area of a pplication begins at 60° S latitude. Generally, the Polar Code will apply to both existing and new vessels covered by the International Convention for the Safety of Life at Sea (SOLAS) and the International Convention for the Prevention of Pollution from Ships (MARPOL). The code contains a section on safety and another on the environment, and both sections include a binding portion and a portion containing guidelines and recommendations. For ships operating in these waters the Polar Code applies special standards with regard to construction, equipment, operations, marine environmental protection, navigation and crew competence.

One of the most important parts of the Polar Code is the Polar Certificate requirement for ships. This certificate will state the vessel's limitations and list the conditions it is built for, including those related to ice. An operations manual con-

taining detailed information and procedures is also to be produced. By and large, fishing vessels are not subject to the code's safety requirements, but they must satisfy the environmental requirements of the code. Any expansion of the code's safety provisions to include additional vessel categories, such as fishing and pleasure craft, will not begin until a Phase II. There is consensus in the IMO that a Phase II can begin at the earliest in the next two-year period (2016–18). The Polar Code enters into force on 1 January 2017.

The MARPOL convention established a number of particularly stringent requirements for shipping in the Antarctic. To prevent oil pollution there is a prohibition on carrying heavy oil, whether as fuel or cargo. There is also a total ban in the Antarctic on discharging oil, chemicals and garbage waste (except for ground-up food waste when the ship is at least 12 nautical miles from shore or fast ice).

8.7.3 Challenges

Safe maritime navigation in the Antarctic requires high-quality navigational charts and ice data. Ocean mapping in the Antarctic has been inadequate, but cruise ship operators have been charting the waters for several decades for their own use. The IAATO, in cooperation with Lindblad Expeditions and its Arctic partner, the Association of Arctic Expedition Cruise Operators (AECO), has found a method whereby cruise operators can share historical marine charting data from the Arctic and Antarctic. This initiative by participants from the industry represents a major step forward on safety. It increases safety for ships, crews and the passengers by reducing the risk of accidents. Accident prevention in turn reduces the risk of damage to the environment.

The Government will:

- Help ensure that the IMO pays close attention to the Antarctic region's special environment in future regulatory work related to Antarctic shipping.

8.8 Bioprospecting: Collection and use of genetic resources from the Antarctic

Many organisms in the Antarctic have special adaptations for the region's extreme environment – its low temperature and dry climate, for example, and in some cases high saline levels. That makes Antarctic genetic resources potentially valuable in bioprospecting and in subsequent uses of the genetic material. Genetic material being collected in the Antarctic may have the potential for commercial exploitation today, and such activity is expected to increase in the coming years.

The line between research and bioprospecting is difficult to discern, and remains unresolved. The question of when research becomes a bioprospecting activity, and how that term should be defined, is highly topical in several international forums and processes. Within the Antarctic Treaty System there is no fixed definition of bioprospecting. At the national level, work is underway on regulations under the Nature Diversity Act and the Marine Resources Act to govern extraction and utilisation of genetic material.

Problems related to bioprospecting in the Antarctic have been discussed at several ATCM meetings. The parties are in agreement that issues involving the collection and use of genetic resources within the Antarctic Treaty area shall be handled within the Antarctic Treaty System.[6] It is therefore Norway's view, and that of the other parties to the Antarctic Treaty, that regulation of the Antarctic genetic resources shall not be dealt with in other international processes where international rules for the use of genetic resources are discussed.[7]

To help build consensus for improved assessment criteria with regard to bioprospecting activities in the Antarctic, the parties to the Antarctic Treaty agreed in 2013 to provide a report about bioprospecting to the ATCM. The parties also agreed there is a need to prepare proposals for mechanisms to improve the exchange of information about bioprospecting activities in the Antarctic, and to consider whether the organisation's Electronic Information Exchange System (EIES) can be expanded to meet this need.[8]

The provisions of the Antarctic Treaty system on such matters as research freedom, sharing of research results, regulations on the harvesting of living resources and environmental protection bear importantly on bioprospecting in the Antarctic. Access to biological material is regulated, for

[6] See Resolution 7 (2005), Resolution 9 (2009) and Resolution 6 (2013).

[7] Work on international rules for the use of genetic resources takes place in connection with the FAO's International Treaty on Plant Genetic Resources, the Convention on Biological Diversity (Nagoya Protocol) and the UN Convention on the Law of the Sea.

[8] See Resolution 6 (2013).

example, by the Antarctic Treaty's Environment Protocol, which contains provisions that protect flora and fauna and require environmental impact assessments for all planned activities in the Antarctic. The CAMLR Convention, too, regulates access to biological material through its measures protecting marine living resources.

International forums such as the UN General Assembly and forums associated with the Convention on Biological Diversity (Nagoya Protocol) discuss issues related to fair access to and benefit sharing from commercial exploitation of genetic material. Consideration has been given to whether benefits from the commercial exploitation of genetic resources in areas under national jurisdiction should be subject to some form of financial compensation obligation. In areas beyond national jurisdiction, the problem is whether and how to introduce a benefit-sharing mechanism by which developing countries receive a portion of the benefits from commercial exploitation of genetic resources.

Increasing commercial interest in Antarctic research raises several issues involving resource ownership and use, and about fair distribution of the benefits from exploiting genetic resources. With regard to non-commercial research a balance exists, consistent with the Antarctic Treaty, between research freedom and the exchange of research results. But in commercial research, it may be necessary to keep research results secret and protect patents related to discoveries and methods. This issue must be considered in relation to Article III (1) (c) of the Antarctic Treaty, where it is stated that, to the extent feasible and practical,[9] scientific observations and findings from the Antarctic shall be exchanged and made freely available.

Under international law the right to regulate the extraction of genetic resources and set conditions for such extraction in areas under national jurisdiction, including possible benefit-sharing mechanisms, is a matter of national sovereignty and sovereign rights. The Government believes that bioprospecting regulations should be developed for the Antarctic under the auspices of the Antarctic Treaty System.

For Norway it is important that regulations on bioprospecting in the Antarctic respect the Antarctic Treaty system and encourage research collaboration and appropriate forms of knowledge-sharing; they should also safeguard the environment and ensure that governments possess the necessary degree of control. At the same time, rules must be considered for benefit sharing from the commercial use of genetic resources. This matter must be considered in conjunction with the need to promote research and facilitate commercial exploitation of the resources. Norway has opposed proposals to adopt a, principle of free access to Antarctic genetic resources without any provisions on benefit-sharing. In the Norwegian view, access to the benefits and benefit sharing are two sides of the same coin, and must therefore be regulated at the same time.

Resistance from certain countries will make it challenging to develop a regulatory framework for bioprospecting in Antarctica. At this stage, emphasis should be placed on implementing the 2013 resolution on reporting and exchanging information in order to gain an overview of the extent of this type of activity. Emphasis should also be placed on implementing the special obligations set out in the Antarctic Treaty.

The Norwegian authorities would like to know more about the extent of Norwegian research on genetic resources in the Antarctic. Until now, no specific national reporting procedures have been instituted for Norwegian bioprospecting in the region. Relevant activities are subject to reporting obligations under Norway's Antarctic regulations, as detailed in chapter 5.3 of this white paper. These reporting obligations do not necessarily cover what the collected biological material is to be used for, but the purpose of the collection must be given. If bioprospecting is not the most important or only purpose for the gathering of material, or if bioprospecting does not become relevant until afterwards, the initial reporting or notification will not indicate that the gathered material is to be used for such a purpose. It is possible, nevertheless, to request such information when processing activity notifications and applications for the collection or harvesting, and later, upon receipt of the final report. The final report is to be submitted immediately after the activity or collection of material is completed. Bioprospecting may often occur after the conclusion of a research project whose original purpose was different – that is to say, a research project whose main purpose was not bioprospecting. Several years may pass from the time biological samples are gathered for specific research objectives until other studies are made, using residual material, that could be described as bioprospecting. Such studies or findings, moreover, may be the work of actors completely different from those who originally gathered the biological samples. Accordingly, the reg-

[9] See Norwegian translation of Article III.

ulations relating to environmental protection and safety in the Antarctic are not formulated so as to obtain information on all bioprospecting of material from the Antarctic. The need for special bioprospecting rules is assessed regularly in light of developments.

The Government will:

- Work for the development, under the Antarctic Treaty System, of regulations on the collection and use of genetic resources with a view to facilitating extraction and utilisation of genetic material within an environmentally defensible framework.
- Work to ensure that an effective reporting system is established for increased information exchange on this type of Antarctic activity within ATCM and CCAMLR.
- Encourage Norwegian actors to report on this type of activity in the Antarctic so that Norway will be able to contribute knowledge and exchange information in the ATCM and CCAMLR.

9 Logistics, infrastructure, search and rescue

9.1 Troll and Troll Airfield: Norwegian activity hub in Dronning Maud Land

The Troll station with its Troll Airfield serves as a hub of field activity in Dronning Maud Land and for the field station on Bouvetøya as well. Several permanent monitoring stations have been set up at the Troll station, including the Troll air-monitoring station (Norwegian Institute for Air Research), the Troll meteorological station (Norwegian Meteorological Institute, met.no) and the TrollSat satellite data receiving station (KSAT). Both Norwegian and foreign research projects and a wide variety of monitoring programmes have been conducted at or from Troll.

Troll Airfield is intended for use by scientific researchers; it was built to make transport to Dronning Maud Land (especially its western region) better and safer. The airstrip is not set up to accommodate commercial operators.

The Antarctic, including Dronning Maud Land, is not subject to Norway's Aviation Act. Nor have the statute's provisions been made applicable in the area on any other basis. The landing strip at Troll is therefore not subject to concession or design rules. Pilots themselves are responsible for determining whether it is prudent to use the

Figure 9.1 HM King Harald of Norway at Troll Airfield, February 2015.

Photo: Stein J. Bjørge (Aftenposten)

airfield at any given time. An aircraft operator follows regulations established by the authorities that issued his or her Air Operator Certificate (AOC). For Norwegian operators, that means complying with the rules of the Ministry of Transport and Communications or the Civil Aviation Authority.

The Norwegian Polar Institute is responsible for operations at Troll, and manages them in accordance with conditions approved by the Ministry of Climate and Environment. The overall impact of activity at Troll is assessed in relation to Norway's regulations on environmental protection and safety in Antarctica; see chapter 5.3 of this white paper. In addition to the framework conditions that underlie the permit from the Ministry of Climate and Environment, a number of documents govern Troll's development. These include a land-use plan, which is an areal guideline for infrastructure development meant to accommodate current and possible future research activities. If activities come into conflict, scientific research is to be assigned highest priority.

The Norwegian Polar Institute is responsible for evaluating and approving the establishment of all infrastructural elements related to basic existing infrastructure (including transport infrastructure) at and around Troll. Key factors to be heeded include the land-use plan, logistical needs and strategic guidelines for research, environmental factors and basic infrastructural capacity.

Box 9.1 Troll and Troll Airfield

Norway's Troll research station became a permanent year-round station in 2005. It lies about 235 km from the coast, in Jutulsessen in Dronning Maud Land – 1,270 m above sea level.

The current station normally houses six people during the Antarctic winter, while a substantially larger group occupies the station in the summertime. In addition to the main station, several separate buildings have been erected to house laboratories, provisions, generators, an emergency station and barracks with bedrooms and garage.

In 2005 the 3,000-m Troll Airfield was established. People and equipment can now be carried to and from the research station quicker, cheaper and with less risk than before. Troll Airfield is normally in service from October to March, but has also been used in the winter for medical evacuations. Extensive investments have been made in approach lights and in fire-fighting and snow-removal equipment. The result is improved safety, especially in emergency situations outside the summer season.

Troll Airfield is part of an air transport network that includes Cape Town, South Africa, and the Russian Novolazarevskaya station in Dronning Maud Land to the east of Troll and nearer the coast. The airfield at Troll is in active use by the Norwegian programme as well as by other national programmes in Dronning Maud Land.

9.2 Troll: A green station

Troll is a green station with ambitious environmental goals for energy use, waste handling, transport and other aspects of its operation. Its goal is to be on par with the leading stations of Antarctica in developing and implementing environmentally friendly solutions. Taking the environment into account is integral to the station's activities, particularly when establishing new infrastructure.

Continuous efforts are made to raise the environmental standard still further, using lessons learned from Troll's own operations and from other national operators in the Antarctic. New and alternative solutions are implemented as technological developments permit. Energy production and conservation are key focus points in making Troll operations greener. Fuel is the largest pollution source associated with Norwegian national activity in the Antarctic, and it represents a major logistical and economic challenge as well. Since Troll opened as a year-round station in 2005, alternative energy use has burgeoned in Antarctica as new stations have come into operation. Wind power in particular has been embraced, as has solar in some cases. The windmills at the United States's McMurdo Station, at New Zealand's Scott Station in the Ross Sea and at Germany's Neumayer III station, which opened in 2009, are all examples of this trend.

In recent years a great deal of work has been done identifying ways to use alternative energy and taking steps to reduce Troll's energy needs. This effort will continue, with several measures to be assessed in more detail – including whether wind energy production and solar energy use are feasible. Energy storage technology that would

permit wind and solar energy to be exploited more efficiently holds great promise. Its development would also benefit Norwegian R&D communities and industrial players by strengthening Norway's position as an innovator in polar energy solutions.

A large part of Troll's fuel needs stems from the transport of fuel for refilling the airplanes that fly between Cape Town and Dronning Maud Land. Arrangements using an aircraft type that does not need refuelling at Troll could save substantial energy. Increased ground transport cooperation with other countries and new transport vehicle technologies could result in energy savings as well.

9.3 Logistical solutions: Environment, safety and economy

The Norwegian Polar Institute is mandated both to organise its own field research and to provide shared services for other Norwegian researchers in the Antarctic using its logistical resources. That is why more or less all Norwegian research activities in the Antarctic are led and coordinated by the Institute.

Serious accidents and environmental incidents are among the largest risks associated with activity in the Antarctic. Norway has very high safety standards, and its activities in the region will continue to reflect high health, environment and safety standards.

With regard to air evacuations and search and rescue (SAR) operations, various national programmes have entered into joint agreements, some of them are bilateral and some multilateral. Some such agreements apply only to a single activity or season. In practice, the national programme that organises an activity or programme is responsible for any SAR needs arising due to accident or misfortune.

9.4 Air and ship transport – room for development

Eleven countries that do research in Dronning Maud Land have set up the Dronning Maud Land Air Network (DROMLAN). Along with Cape Town, South Africa, Troll Airfield is an important hub in this air transport partnership. Since 2005 DROMLAN has employed a variety of different aircraft types; replacing these older craft with a more modern and environmentally friendly alternative is a major goal.

The Antarctic stations require large amounts of fuel and supplies. The only way to bring in such quantities of goods is by ice-class transport vessel. By cooperating in the hire of ice-strengthened vessels, the Dronning Maud Land Shipping Network (DROMSHIP) seeks to resupply the research stations of participating nations in Dronning Maud Land in a cost-effective, environmentally sensitive way.

The potential exists for additional logistical cooperation in the region. Working together to ease transport challenges could have positive

Box 9.2 DROMLAN and DROMSHIP

Most of the flights serving the research stations in Dronning Maud Land are organised through the Dronning Maud Land Air Network (DROMLAN).

In the Dronning Maud Land Shipping Network (DROMSHIP), national Antarctic operators from Norway, Germany, Belgium, Sweden and Finland originally cooperated in the rental of ice-class vessels. Since 2009, the Norwegian Polar Institute has had a contract with Royal Arctic Line of Greenland for use of the 10,300-tonne ice-strengthened container ship *Mary Arctica*. This vessel is state of the art, built in 2005. Because of its load capacity such a vessel can supply stations along the whole stretch of territory before returning to Europe with return cargo, in a single round trip. The synergy effects are substantial, including reductions in sailing time, cost and overall environmental impact.

Norway leads the DROMSHIP project, in which only Belgium and Norway are active members today. Most of the programmes/stations in Dronning Maud Land have their own logistical systems and ice-class research vessels to support their particular needs (Japan, Russia, South Africa, Germany). Other countries, especially those sharing port facilities, have bilateral cooperative agreements (India and Russia, Germany, South Africa, Sweden and Finland). Several countries have built or will be building their own ice-strengthened vessels, which cover most of their logistical needs (South Africa, the United Kingdom, Japan).

effects both economically and environmentally. Norway is keen to develop this potential.

9.5 Troll: Future hub in Dronning Maud Land with high environmental and safety standards

Troll is strategically located in relation to other stations in Dronning Maud Land, and is one of two stations in the area with an airstrip. Troll Airfield has better weather and is less subject to thaws than the Russian station, Novolazarevskaya, which lies nearer the coast. As the airfield's owner and the operator of Troll, Norway has an opportunity to provide effective and safe logistical services to national and international programmes in the area, and to develop Troll as a research platform and hub in Dronning Maud Land. In this way Norway can help increase the efficiency of Dronning Maud Land's combined research infrastructure and reduce its collective environmental effects.

In recent years there has been interest from Sweden, Denmark, Finland and the United Kingdom in using Troll for periods of varying length. Interest from other countries is expected to increase in the years ahead.

The new ice-class research vessel *Prince Haakon* will be an important tool for Norwegian environmental observation and climate research in both the Arctic and the Antarctic. The vessel will be owned by the Norwegian Polar Institute and operated by the Institute of Marine Research. Its use is essentially to be divided between those two institutes and the University of Tromsø, but the vessel will be a national resource available to other research institutions as well.

The vessel is designed to operate independently in polar waters all year round. It is equipped for all relevant scientific disciplines, including oceanography, marine biology, geology and geophysics. Its equipment will permit seafloor mapping, seismic surveys, helicopter operations, logistical support services and the use of remotely operated underwater vehicles (ROVs) and autonomous underwater vehicles (AUVs).

The Government will:

- Use the Norwegian Polar Institute's management authority at Troll to ensure that the area's overall activity level as well as future infrastructure and land-use developments remain within a framework that satisfies scientific, environmental, logistical and basic infrastructure capacity needs in an appropriate manner.
- Continue developing Troll as a green station with ambitious environmental goals, and stimulate work towards energy-friendly solutions.
- Foster Troll's development as a logistical hub, and strengthen cooperation with other countries to implement efficient new transport solutions with positive economic and environmental effects.

9.6 Search and rescue in the Antarctic

Search and rescue (SAR) operations in the Antarctic must overcome major obstacles. The Antarctic continent is large, with highly scattered activity and poorly developed infrastructure. Though some of the research stations are located near each other, the distances between them are generally very great, and the distance to other continents is enormous. A similar sense of remoteness prevails in the surrounding ocean. The climate, of course, is extremely challenging.

Another special aspect of the Antarctic is that governments have not provided a dedicated emergency service with the resources to conduct search and rescue operations, whether on land or at sea. Nor has any rescue infrastructure been developed on land. People staying in the Antarctic must not expect that the authorities of Norway or other countries will be able to help in case of an accident. SAR in this area is a matter of practical solutions; all who are active there must take responsibility for their own logistics, including safety. Research programmes and other actors must therefore take measures to be able to handle emergencies on their own. This is also the case for activities in the Norwegian dependencies, including Dronning Maud Land.

Binding resolutions have been adopted within the Antarctic Treaty System on insurance, contingency planning and other topics to ensure that Antarctic activities – tourism, for example – are carried out both safely and self-sufficiently. Norwegian activities in the Antarctic are subject to a special set of regulations on safety and environmental protection; see chapter 5.3 of this white paper for more detailed discussion of these.

With regard to air evacuations or SAR operations, national research programmes have entered into a number of agreements, some bilateral and some multilateral. In practice, whichever national programme has organised an activity or programme is responsible for any SAR needs that

may arise due to accident or misfortune. Within DROMLAN – the multilateral air logistics network in Dronning Maud Land (see chapter 9.4) – an agreement has been reached on the use of available air transport capacity for evacuation if necessary due to illness or injury. The Norwegian Polar Institute has also arranged to hire in aircraft operators should they be required.

In practice, all available resources are made available when trouble occurs. This applies to mishaps involving research as well as other forms of activity, including cruise tourism and various kinds of private expeditions. For an individual station, rendering such assistance can strain both material and human resources. The same is true for all ships in the vicinity of an emergency situation that have a duty to assist under Article 98 of the UN Convention on the Law of the Sea (UNCLOS). Norwegian fishing vessels, for example, have taken part in several rescue operations in recent years. One challenge posed by the growing level of activity in the Antarctic is a corresponding rise in the potential for accidents. The situation is especially acute on the Antarctic Peninsula, where most of the tourism is centred.

International search and rescue cooperation is regulated by a number of conventions, among them UNCLOS (Article 98), the 1974 International Convention for the Safety of Life at Sea (the SOLAS Convention), the 1979 International Convention on Maritime Search and Rescue (the SAR Convention) and Annex 12 to the 1944 Convention on International Civil Aviation (the Chicago Convention). Convention obligations are operationalised through the International Aeronautical and Maritime Search and Rescue Manual, known as the IAMSAR manual. Sea and air rescue services are required to follow extensive and detailed international procedures. Through the International Maritime Organization (IMO) and the International Civil Aviation Organization (ICAO), the UN has divided all of the world's seas and airspace into rescue zones, and assigned all countries their own sectors of responsibility. No such division of responsibility exists on land, and Antarctica is no exception.

If an aircraft crashes on the Antarctic continent, the state responsible for coordinating a response is determined by the airspace Flight Information Region (FIR) involved. Norway does

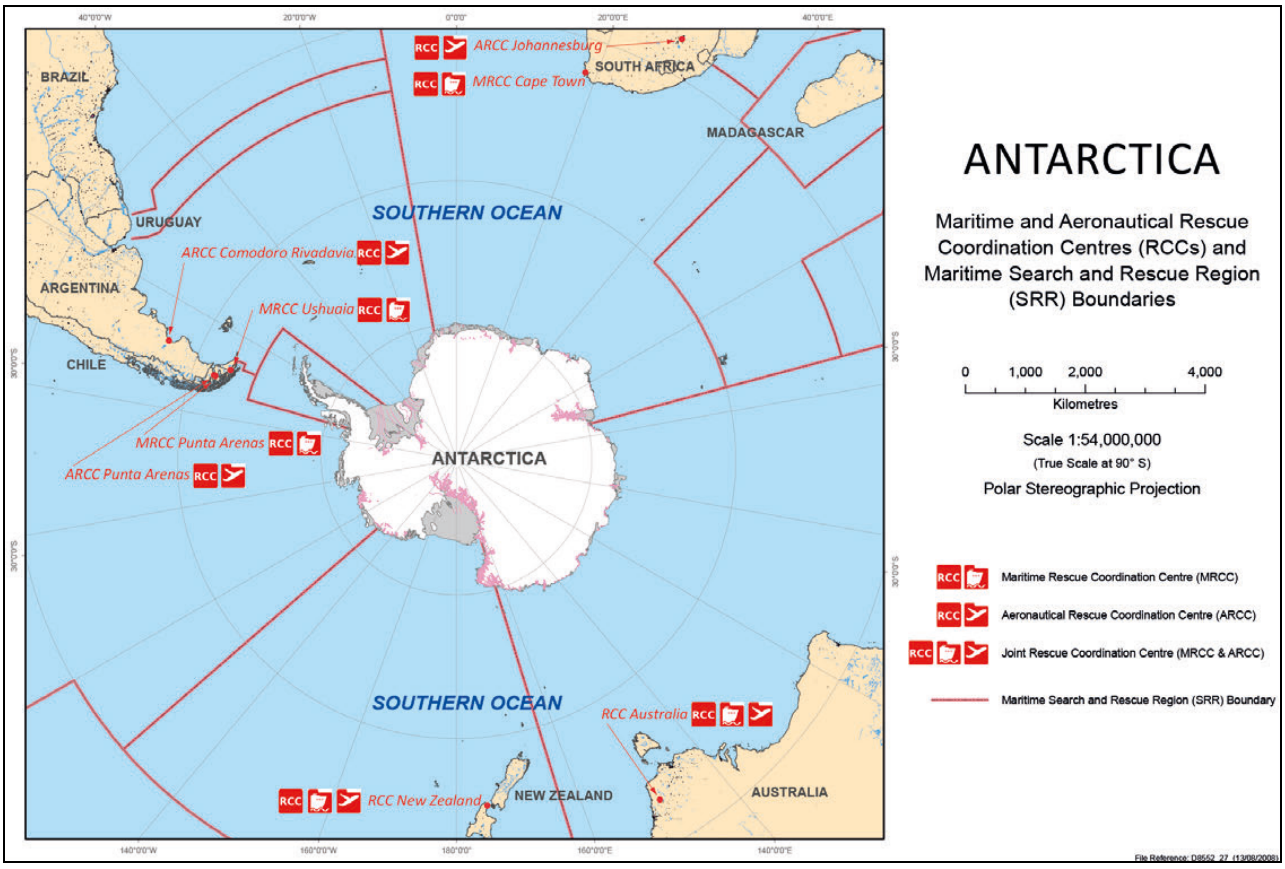

Figure 9.2 Search and rescue map – SSRs and RCCs.

Source: COMNAP 2008.

not have responsibility for any of the Antarctic FIR divisions.

In the Antarctic, responsibility for sea and air rescue missions is divided in such a way that Australia, New Zealand, South Africa, Chile and Argentina each have responsibility for an area. Each area has its own Rescue Coordination Centre (RCC). In case of emergency these countries are duty-bound to commence rescue operations in their areas. While the RCCs are responsible for coordinating search and rescue efforts, they have no obligation to develop a special rescue service in the area where they have coordinating responsibility. The distribution of these areas of responsibility has no bearing on underlying jurisdictional areas.

Within the framework of the Antarctic Treaty, there is a great deal of focus on search and rescue operations. The goal is to improve coordination of SAR issues, including the way parties in the field interact and communicate, both with one another and with the RCCs. The main body pursuing such improvements is the Council of Managers of National Antarctic Programs (COMNAP). Search and rescue is a recurring topic on the agenda of the annual Antarctic Treaty Consultative Meeting (ATCM). During the 2013 ATCM, a resolution was adopted[1] that strongly emphasises cooperation and information exchange between all the relevant participants, including the ICAO and the IMO. The RCCs are encouraged to hold exercises among themselves and with the involvement of relevant actors such as national Antarctic programmes, experts and travel industry representatives. COMNAP's overview of available SAR resources in the Antarctic is important to the RCCs and to the other organisations active in the region.

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[1] Resolution 4 (2013) – Improved Collaboration on Search and Rescue (SAR) in Antarctica.

10 Financial and administrative implications

The measures and the policy discussed in this white paper are based on existing budgetary frameworks. To the extent this white paper addresses circumstances indicating a need for follow-up action in the form of policy or programme changes, the Government may consider these in conjunction with its annual budget proposal.

The Ministry of Foreign Affairs

r e c o m m e n d s :

that the recommendations of the Ministry of Foreign Affairs dated 12 June 2015 on Norwegian interests and policy in the Antarctic be submitted to the Storting.

Appendix 1

Abbreviations

ACAP	Agreement on the Conservation of Albatrosses and Petrels
ARK	Association of Responsible Krill Harvesting Companies
ATCM	Antarctic Treaty Consultative Meeting
CBD	Convention on Biological Diversity
CAMLR Convention	Convention on the Conservation of Antarctic Marine Living Resources, 1982
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources
CCAS	Convention for the Conservation of Antarctic Seals, 1972
CEMP	CCAMLR Ecosystem Monitoring Program
CEP	Committee for Environmental Protection
COMNAP	Council of Managers of National Antarctic Programs
CRAMRA	Convention on the Regulation of Antarctic Mineral Resources Activities, signed 1988 but never ratified
DML	Dronning Maud Land
DROMLAN	Dronning Maud Land Air Network
DROMSHIP	Dronning Maud Land Shipping Network
ESA	European Space Agency
EUMETSAT	European Organisation for the Exploitation of Meteorological Satellites
IAATO	International Association of Antarctica Tour Operators
ICAO	International Civil Aviation Organization
ICRW	International Convention for the Regulation of Whaling, 1946
IGY	International Geophysical Year, 1957–58
IMO	International Maritime Organization
INTERPOL	International criminal police organisation
IWC	International Whaling Commission
KSAT	Kongsberg Satellite Services
MARPOL	International Convention for the Prevention of Pollution from Ships, 1973
NARE	Norwegian Antarctic Research Expeditions, 1976–77 and later
NASA	National Aeronautics and Space Administration (US)
NOAA	National Oceanic and Atmospheric Administration (US)
NPI	Norwegian Polar Institute
SANAE	South African National Antarctic Expedition
SAR	Search and Rescue
SCAR	Scientific Committee on Antarctic Research
SOLAS	Convention International Convention for the Safety of Life at Sea, 1974

Published by:
Norwegian Ministry of Foreign Affairs

Internet address:
www.government.no

Cover illustration:
Norwegian Polar Institute

Printed by:
07 Aurskog AS 05/2016