Towards Regional Ocean Management in the Arctic: From Co-existence to Cooperation

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"Current of Change" describes international relations in the Arctic. While the strategic importance of Arctic waters has fostered a frigid coexistence between the superpowers, an era of international cooperation is dawning as Arctic states begin to understand the transboundary implications of industrial developments and the movements of living resources. The potential melting of the polar ice pack caused by the "greenhouse effect" calls for a global response; numerous regional initiatives at cooperation are described. The Inuit Circumpolar Conference is developing an Arctic policy and regional conservation strategy. Scientists have proposed the formation of an international Arctic science committee. Intergovernmental initiatives include the recent Canada-United States Agreement on Arctic Cooperation and the Regional Agreement on the Conservation of Polar Bears. Future cooperative arrangements may also be needed to control land-based pollution and ocean dumping, regulate Arctic shipping, manage transboundary species, and designate a network of special protected areas.

"Current of Change" décrit les relations internationales dans l'Arctique. Bien que l'importance stratégique des eaux de l'Arctique ait donn naissance une coopération plutt froide entre les superpuissances, une re de coopération se dessine mesure que les états liés par l'Arctique commence saisir les répercussions transfrontires du développement industriel et des déplacements des ressources vivantes. Les risques de fonte de la calotte glaciaire attribués "l'effet de serre" nécessitent une intervention globale; de nombreuses initiatives de coopration régionale sont décrites. La Conférence circumpolaire inuit procéde l'élaboration d'une politique sur l'Arctique et d'une stratégie de conservation régionale.

Des scientistes ont proposé la formation d'un comité international des sciences sur l'Arctique. Quant aux initiatives intergouvernementales, il y a notamment l'Accord entre le gouvernement du Canada et le gouvernement des Etats-Unis d'Amérique sur la coopération dans l'Arctique et l'Accord sur la conservation des ours blancs. Devront probablement faire l'objet de futures initiatives de coopération: la lutte contre la pollution terrestre et maritime, la reglementation de la navigation dans l'Arctique, la gestion des especes transfrontires et la mise sur place d'un réseau de zones protégées spéciales.

Certain facets of international relations in the Arctic might best be described as icy co-existence. The Soviet Union and the United States view the Arctic Ocean as an arena of extreme strategic importance. A circumpolar route offers the shortest trajectory for inter-continental ballistic missiles and the Arctic ice offers a cover for submarine operations.[1] Despite a recent agreement on Arctic cooperation, Canada and the United States continue to disagree about the status of the Northwest Passage.[2] In January 1986 Canada formally claimed complete sovereignty over its waters by drawing straight baselines around the Arctic Archipelago, while the United States maintains that the Northwest Passage is an international strait subject to the right of transit passage.[3] At least seven Arctic Ocean boundary disputes remain unresolved. The Soviet Union and the United States disagree over their maritime boundary line in the Bering Sea.[4] Canada and the United States disagree over the location of the Beaufort Sea boundary, the United States arguing for an equidistant line and Canada arguing for an offshore extension of the land boundary between Alaska and Yukon.[5] Norway and the Soviet Union disagree over Norway's claim to exclusive control over the resources of Svalbard's continental shelf and over the location of the continental shelf boundary line in the Barents Sea. Denmark, which is responsible for the foreign relations of Greenland, has not delimited the continental shelf in the Lincoln Sea between

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[1]E. Young, "The Arctic: Prospects for an International Regime" in R.B. Byers, ed., *The Denuclearization of the Oceans (New York: St. Martin's Press, 1986) 134 at 135.*

[2]The agreement signed 11 January 1988 requires Canadian consent for US icebreakers to travel through the Northwest Passage but stops short of recognizing Canadian claims to soverignty over these waters:*Canada-United States Agreement on Arctic Cooperation, 11 January 1988 in* Canadian Department of External Affairs News Release No. 010.

[3]For a comprehensive overview of the Canadian and US positions, see D. Pharand, *The Waters of the Canadian Arctic Archipelago in International Law* (Cambridge: Cambridge University Press, 1988).

[4]C.M. Antinori, "The Bering Sea: A Maritime Delimitation Dispute between the United States and the Soviet Union" (1987) 18 *Ocean Development and Int'l L.* 1.

[5]See K.L. Lawson, "Delimiting Continental Shelf Boundaries in the Arctic: The United States-Canada Beaufort Boundary" (1981) 22 *Virginia J. of Int'l L.* 221.

Greenland and northern Ellesmere Island in Canada, and has disputes with Norway and Iceland as to the extent of fishing zones off eastern Greenland.[6] Norway and Iceland also dispute the extent of each other's fisheries jurisdiction off eastern Greenland.

The number of these icy relationships may increase in the future because of many uncertainties regarding the legal status of Arctic waters. Article 234 of the 1982 Law of the Sea Treaty[7] [hereafter UNCLOS II] gives coastal states the right to adopt and enforce special laws and regulations to control shipping pollution in ice-covered waters within the limits of the 200 nautical mile exclusive economic zone. However, the extent of such powers is inadequately addressed.[8] Do they include the right to impose unilaterally the vessel design, equipment and crewing requirements which Article 21(2) would deny to a coastal state for its territorial sea? Canada has already imposed unilaterally vessel design, equipment and crewing requirements for a 100 nautical mile pollution prevention zone around her Arctic islands.[9] Will Canada eventually extend the special zone to 200 nautical miles? Will the United States follow suit and impose special shipping restrictions if Canada chooses to ship hydrocarbons from the Beaufort Sea around the coast of Alaska? How are the geographical limits of ice-covered waters to be defined? Does ice-covered mean 100 % coverage or something less, and which period of record should be used for a determination, a single heavy ice year or an average of ice years?

There are at least three possible solutions to the question of the legal status of the Arctic seabed extending beyond national jurisdiction (see Figure 1), although this area is unlikely to contain extensive mineral resources.[10] First, the Arctic seabed could be considered the common heritage of mankind and thus be subject to the deep seabed provisions of UNCLOS II. Pursuant to the convention, the International Seabed Authority can regulate the environmental consequences of any future seabed activities, limit the level of mineral production, and ensure an equitable sharing of financial benefits. Marine scientific research would remain open to all states. Second, the deep seabed could be considered part of the high seas and thus remain open to exploration and development by any state having the technological and financial capabilities. Third, the five littoral Arctic states might establish a separate regional seabed regime, based on principles of proximity and special Arctic circumstances.[11]

Non-renewable resource development may also fuel international conflicts. For example, the Beaufort Sea/Mackenzie Delta offshore region in the Canadian Western

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[6]For discussions of the various boundary disputes, see K.M. Shusterich, "International Jurisdictional Issues in the Arctic Ocean" (1984) 14 *Ocean Development and International Law* 235 and W. Ostreng, "Delimitation Arrangements in Arctic Seas: Cases of Precedence or Securing of Strategic/Economic Interests" (April 1986) 10 *Marine Policy J.* 132.

[7]U.N. Doc. A /Conf. 62 /122, 7 October 1982; reprinted in 21 I.L.M. 1261-1354, not yet in force.

[8]For a detailed discussion of the uncertain scope of Art. 234, see D. McRae & D. Goundrey, "Environmental Jurisdiction in Arctic Waters: The Extent of Article 234" (1982) 16 *UBC L. Rev.* 197.

[9]See the *Arctic Waters Pollution Prevention Act*, R.S.C. 1970, c. 2 (1st Supp.).

[10]D. Pharand, "The Legal Regime of the Arctic: Some Outstanding Issues" (1984) vol. 39, no. 4 *Int'l J.* 742.

[11]D. VanderZwaag & C. Lamson, "Ocean Development and Management in the Arctic: Issues in American and Canadian Relations" (1986) 39 *Arctic J.* 327 at 330-31.

Arctic is estimated to contain 8.25 billion barrels of recoverable oil. Gulf Canada Ltd. proposes to develop one of its major finds there. This may involve oil tankers passing from Canada around the coast of Alaska. The United States proposes to explore for oil and gas on the Arctic Wildlife Range adjacent to marine waters of the north slope of Alaska. This could affect the Porcupine caribou herd which migrates between Alaska, Yukon and the Northwest Territories, and Canada has filed an official note of protest with the US State Department.

Fortunately, there are a growing number of ecological, legal and political factors which may propel Arctic nations towards the firmer "floes" of international cooperation. Section 1 of this article describes the ecosystem and resource realities of the Arctic Ocean region with special focus on those aspects requiring greater cooperation in international scientific research and resource management. Section 2 reviews the existing patchwork of bilateral and multilateral agreements and arrangements promoting marine management and scientific cooperation in the Arctic. Section 3 discusses Canadian initiatives at the national and international level, and those of the Inuit Circumpolar Conference (ICC) at the international level to develop an Arctic conservation strategy as a basis for comprehensive protection of its cultural heritage and environment. Section 4 briefly explores the strategic barrier to broader international cooperation in the Arctic. Section 5 suggests areas where regional cooperation might be increased by, for example, establishment of a network of protected marine areas.

Ecosystem and Resource Realities

Given the Arctic Ocean's extremes of climate and low primary productivity compared to other marine regions of the world, one might conclude that it is a bleak and rather lifeless sea of little international concern. The Arctic Ocean produces a mere 0.5-0.6 grams of carbon per square meter per year compared with 127 in the Seto Inland Sea, Japan, 100-160 off New York, 73-182 in the Indian Ocean and 175.2 in the Gulf of Mexico.[12] However, the highly concentrated seasonal productivity of the Arctic waters attracts numerous migratory species and creates transboundary relationships giving rise to the need for international cooperation.[13] During the northern spring and summer (May-September) whales and seabirds make extensive migrations to take advantage of open waters and the high density of feed attracted to the phytoplankton blooms at the ice-edge. Ocean currents raise the potential for pollutants being transported from one country to the waters of another. The Arctic Ocean has a critical role in controlling global climate and is a "sink" for long-range air pollutants. Offshore hydrocarbon deposits and coastal mineral deposits in the Arctic are substantial. Future exploration and exploitation could raise international tensions because of the potential impacts on marine habitats. The shipping of hazardous cargoes, such as liquified natural gas or oil, through ice-infested waters would create appreciable risks. As well, various diversions and dams have been proposed for northward flowing rivers which raise issues of regional and international concern.

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[12]N.W.T., *The Present Status and Future Management of Arctic Marine Mammals in Canada* by R.A. Davis, K.J. Finley & W.J. Richardson (Yellowknife: Dept. of Information, Gov. of N.W.T., 1980) 6.

[13]M.J. Dunbar, "Arctic Marine Ecosystems" (1986) vol. 29, no. 1 *Oceanus* 37-38.

Figure 1. High Seas Area in the Arctic
Source: J.R. V. Prescott, *The Maritime Political Boundaries of the World* (1985), p. 122.

Transboundary Living Resources

Many migrations of marine-related species in the Arctic occur between Canadian waters and coastal areas and those of other nations. At least six major marine mammal migrations take place between Canadian and Greenlandic waters. Beluga whales, narwhals, bowhead whales and Atlantic walruses winter in the Davis Strait between Canada and Greenland and migrate in the spring along western Greenland into Canadian Arctic waters such as Lancaster Sound. Harp seals produce their pups in the Gulf of St. Lawrence and off the coast of Newfoundland in March, and then migrate in May to summer feeding grounds along the coasts of west Greenland and eastern and northern Baffin Island in Canada. Hooded seals from Newfoundland waters breed and whelp in April, then migrate to the coastal waters of southwest Greenland. Some continue on to the Denmark Strait between the east coast of Greenland and Iceland.[14]

Canada and Greenland share numerous wildlife species. Five major species of commercially valuable fish — Greenland halibut, northern shrimp, roundnose grenadier, cod and salmon — move back and forth across the boundary in Baffin Bay and Davis Strait.[15] Large numbers of ducks — oldsquaws, king and common eiders, and guillemots — summer along Baffin Island in Canada and winter along the ice-free southwest coast of Greenland.[16] Polar bear in the Narres Strait area are hunted on both sides of the border by the Thule Inuit.

As well, Canada and the United States share many wildlife species in the Beaufort Sea region. The endangered bowhead and beluga whales migrate from their winter grounds in the Bering Sea eastward along the Alaskan north slope and into the southern Beaufort Sea and the Amundsen Gulf region in Canada.[17] The gray whale winters in Baja California and migrates north in the spring through the Bering Strait to the Chukchi and Beaufort Seas.[18] About eight percent of polar bears tagged in the Canadian Beaufort region have been killed in Alaskan waters, generally in the vicinity of Point Barrow. In late spring, Porcupine caribou calve in the foothills and coastal plain along the Yukon and Alaskan coasts. In August, the caribou migrate eastward through the Yukon and disperse through the Richardson Mountain/Driftwood River region, and eventually head westward to winter on the north slope of Alaska.[19] Many bird species make seasonal transboundary migrations. King and common eiders winter

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[14]Dome Petroleum Ltd., Esso Resources Canada Ltd. and Gulf Canada Resources Inc., *Beaufort Sea-Mackenzie Delta Environmental Impact Statement*, (1982) vol. 3-B, 2.3-2.15.

[15]D. VanderZwaag, "Canadian Marine Resource Development in the Arctic" in C. Archer & D. Scrivener, eds, *Northern Waters: Security and Resource Issues* (London: Croom Helm, 1986) 125 at 134.

[16]Dome Petroleum *et al.*, *supra*, note 14 at 2.22.

[17]M.A. Fraker, "Spring Migration of Bowhead (Balaena mysticetus) and White Whales (Delphinapterus leucas) in the Beaufort Sea," *Fisheries and Marine Service Tech. Report*, No. 859 (Ottawa: Dept. of Supply and Services, December 1979).

[18]W.Y. Brown, "Arctic Environmental Quality" in W.E. Westermeyer & K.M. Shusterich, eds, *United States Arctic Interests: The 1980s and 1990s* (New York: Springer-Verlag, 1984) 181.

[19]C. Lamson & D. VanderZwaag, "Arctic Waters: Needs and Options for Canadian-American Cooperation" (1987) 18 *Ocean Development & Int'l Law* 49 at 55-56.

primarily in the Bering Sea off Alaska, then nest throughout the Beaufort-Chukchi Sea region. Brant, the most northerly-nesting goose species, winter along the coast of Baja California and the adjacent coast of Mexico and migrate in the spring to the Beaufort-Chukchi Sea area. Snow geese migrate to the region from winter grounds in California.[20] Indeed, most shorebird species in the western hemisphere are migratory and many breed in the Arctic. Of 49 North American shorebird species, 31 fly annually between the Arctic and South America, with many birds making a round-trip of more than 12,000 km. The major migration corridors pass along the Pacific and Atlantic coasts and through the Great Plains of North America.[21]

Transboundary Ocean Currents

Knowledge of Arctic oceanography is still rudimentary. Surface currents show great variability depending on such factors as wind direction, strength of freshwater outflows and variations in atmospheric pressure. A general impression of the transboundary nature of ocean currents in the Arctic and the potential for transboundary impacts from offshore developments can be gained from looking at figures 2 to 6 below. Figure 2 provides an overview of ice movements in the Arctic Basin and illustrates the interconnection of all Arctic littoral nations. Above the Bering Strait in the Chukchi Sea region, waters from the East Siberian Sea flow easterly into the US exclusive economic zone, and Bering Sea water flows westerly from the United States into the Soviet maritime zone (Figure 3). In the Beaufort Sea surface currents in the nearshore zone appear to be largely wind-driven. However, the Beaufort Gyre — a clockwise rotation of surface waters — dominates the circulations offshore and carries waters between Canada and Alaska (Figure 4). In the Baffin Bay-Davis Strait region, the west Greenland current flows along the coast of Greenland but eventually turns westward to join the cold Baffin current flowing along the Canadian coastline (Figure 5). In the Nordic Seas ocean currents move between the boundaries of Norway and the USSR in the Barents Sea, between Iceland and Norway in the Norwegian Sea and between Greenland and Iceland in the Greenland Sea (Figure 6).

Climate Change and Air Pollution

Arctic marine waters display more than regional or sub-regional transboundary ecosystem relationships. The Arctic Ocean is a global "heat sink" and scientists predict world-wide climatic changes within the next 45 to 70 years in which the Arctic will play a critical role. The increased burning of fossil fuels and wood threatens to blanket the globe with increased levels of carbon dioxide and other trace gases, which could produce a "green-house effect" by trapping solar radiation near the Earth's surface.[22] A doubling of CO2 levels could cause an average temperature increase of 5°C. Climatologists suggest temperature changes in the Arctic could be three to four times

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[20]Dome Petroleum *et al.*, *supra*, note 14 at vol. 3-A, 4.29-4.43.

[21]J.P. Meyers *et al.*, "Conservation Strategy for Migratory Species" (Jan.-Feb. 1987) 75 *American Scientist* 19.

[22]World Commission on Environment and Development, *Our Common Future* (Oxford: Oxford University Press, 1987) 33; Environment Canada, Atmospheric Environment Service, *Summary and Recommendations: Impact of Climatic Change on the Canadian Arctic* (Downsview: Canadian Climate Centre, 1986) (From a Canadian Climate Program Workshop, 3-5 March 1986 in Orillia, Ontario) 7.

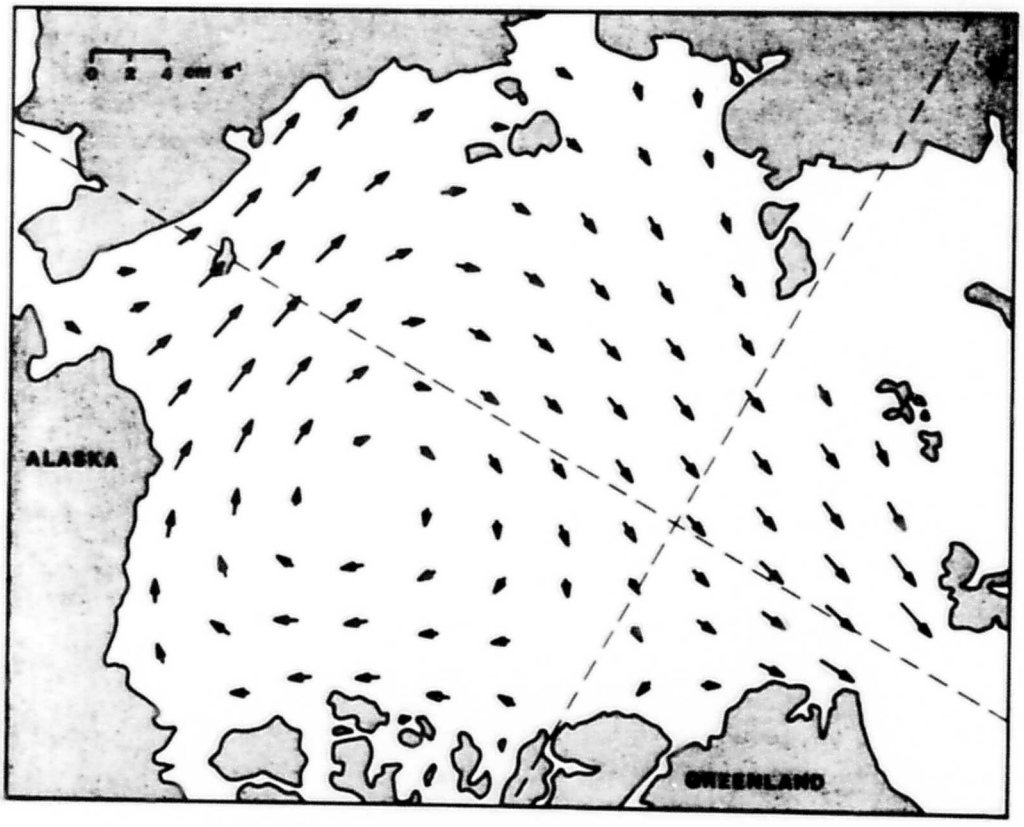

Figure 2. Ice Drift in the Arctic Basin
Source: N. Untersteiner, "Glaciology—A Primer on Ice," Vol. 29 *Oceanus* (Spring, 1986), p. 22.

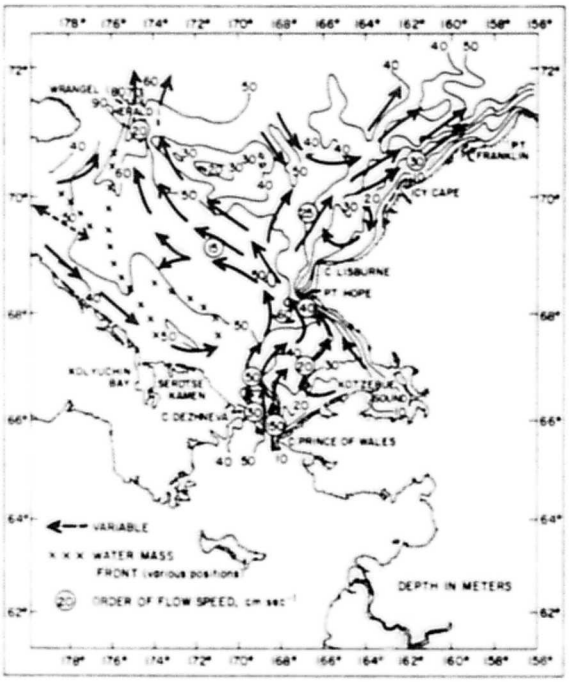

Figure 3. Upper Layer Flow in the Chukchi Sea
Source: L.K. Coachman, K. Aagard, R.B. Tripp, *Bering Strait: The Regional Physical Oceanography* (1975), p. 142.

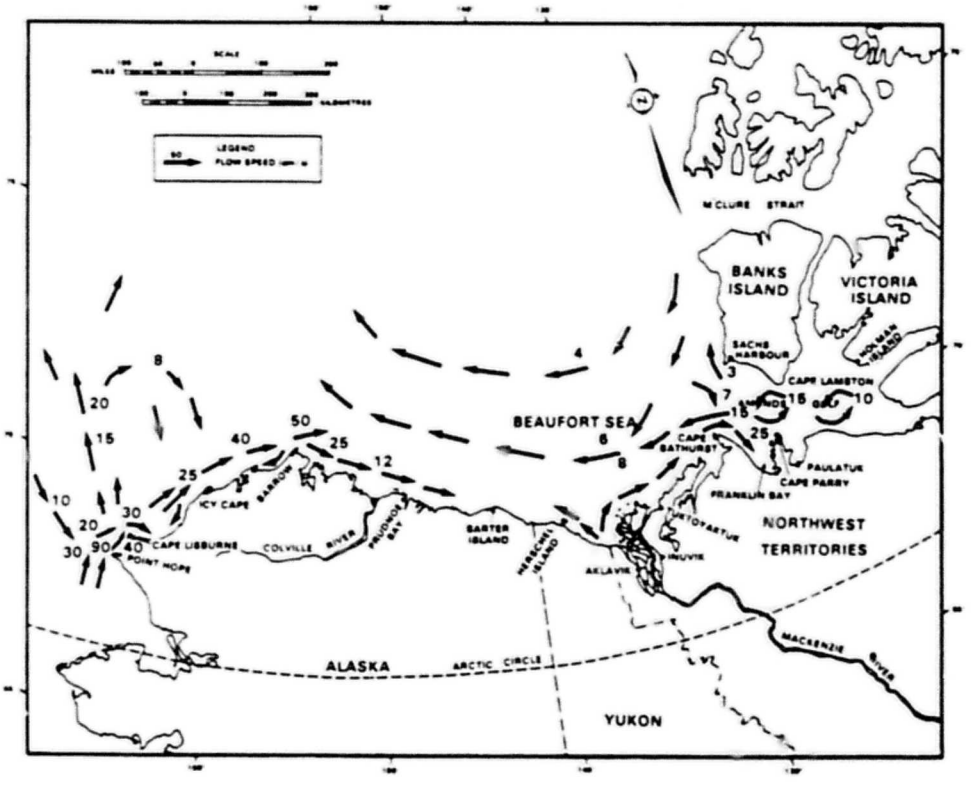

Figure 4. General Summer Circulation of Surface Waters in the Beaufort Sea.
Source: *Beaufort Sea-MacKenzie Delta Environmental Impact Statement*, Vol. 3A (1982), p. 1.40.

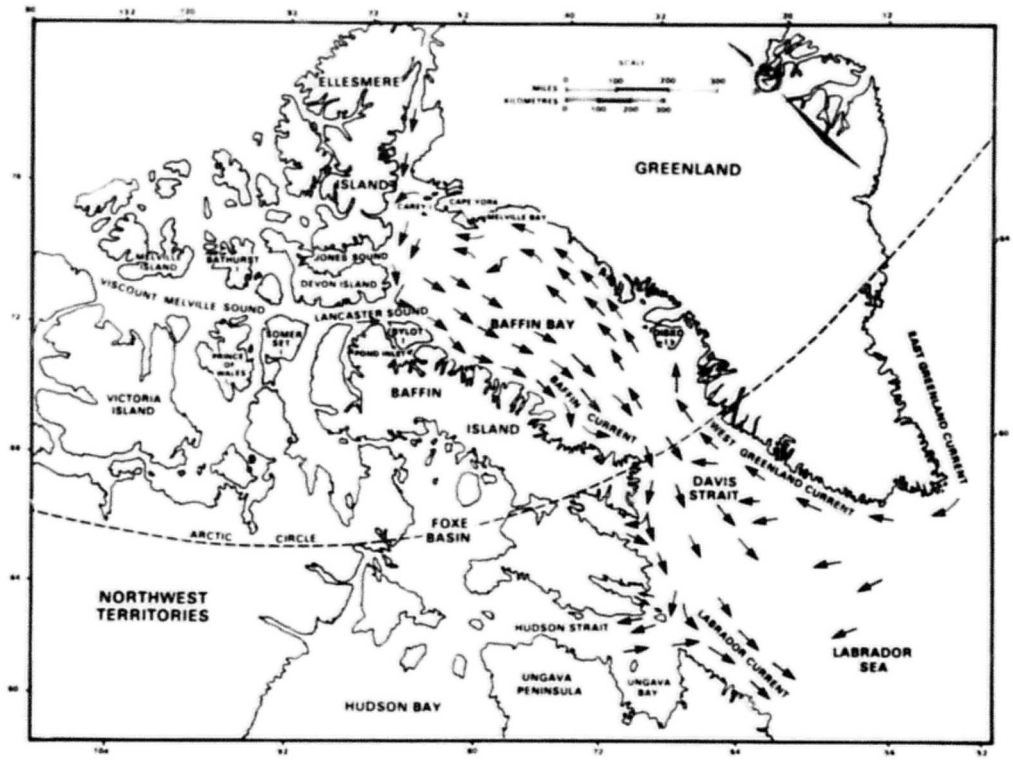

Figure 5. Near-Surface Circulation of the Baffin Bay-Davis Strait Region.
Source: *Beaufort Sea-MacKenzie Delta Environmental Impact Statement*, Vol. 3B (1982), p. 1.47.

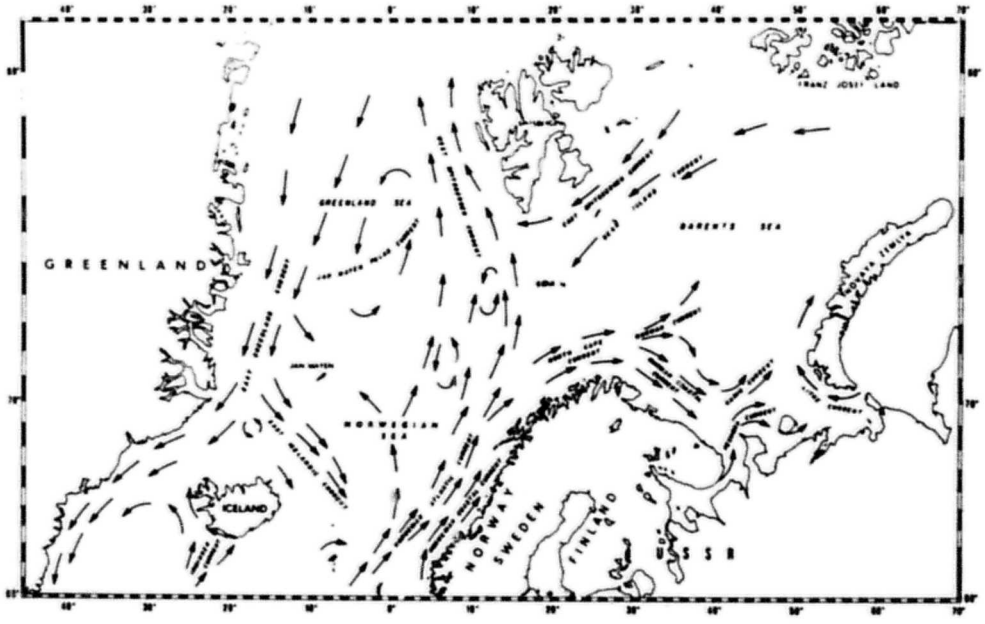

Figure 6. Major Currents in the Nordic Seas
Source: D.M. Johannessen, "Brief Overview of the Physical Oceanography," in B.G. Hurdel (ed.), *The Nordic Seas* (1986), p. 106.

the mean global increase because of a strong surface inversion of air masses in the Arctic and because melting ice would reflect less and absorb greater amounts of solar energy.[23] An Arctic winter warming of 5-15°C and a summer warming of 2-4°C could occur. This would have regional and global effects. In the Arctic region itself, precipitation in the winter months could increase by 50%, ice-cover would be reduced in fresh and saltwater bodies, glaciers would recede and permafrost could undergo gradual degradation. The treeline might extend north, and plant diversity and productivity might increase.[24] The routes and season of marine transportation might be extended. But, on a global scale, substantial melting of the polar ice-pack could cause major flooding and the inundation of many coastal cities and river deltas.[25] Because the science of climatic prediction is as yet inexact, it is impossible to predict with any certainty the probability of such events occurring.[26]

Although the Soviet Union has temporarily shelved plans to divert some 20 cubic kilometers of water per year from rivers in European Russia that flow into the Arctic Ocean and to divert some 27 cubic kilometers of water from western Siberia into Kazakhstan and central Asia, major water diversions cannot be ruled out in the future. Many Soviet water managers and specialists view the Siberian transfers as imperative because of the deteriorating water supply problem in southern regions of the USSR.[27] Experts disagree over the environmental effects of major diversions of these Soviet rivers. It is argued that a three-fold increase in the maximum planned amount of water diversion from four Soviet rivers (the Ob, Yenesei, Dvina and Pechora) would have only minor effects on climate and the extent of ice-cover in the Arctic.[28] Others forecast a drastic alteration in climate caused by a reduction in freshwater inflows, a concomitant increase in surface salinity, and a consequent shrinking of the Arctic pack-ice.[29]

Atmospheric studies demonstrate that the Arctic is not isolated from the long-range transport of air pollutants. In the 1940s, observers on weather reconnaissance flights noticed a reddish brown haze over the Arctic from approximately November through April. It has now been established that "arctic haze" is the result of industrial pollution, primarily from the Soviet Union and Europe, with some contribution from the northeastern United States. It extends from Alaska eastward to Norway (roughly half the circumference of the Arctic) and probably further. The haze ranges from ground-level to 18,000-25,000 feet. Measurements show that it contains every pollutant found

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[23]E.F. LeDrew, "Sensitivity of the Arctic Climate: A Factor in Developing Planning Strategies for Our Arctic Heritage" (Autumn 1986) 13 *Environmental Conservation* 217.

[24]Environment Canada, *supra*, note 22 at 9-12.

[25]World Commission on Environment and Development, *supra*, note 22 at 33. A rise of 1.2 to 1.4 metres is anticipated by the year 2050: Environment Canada, Atmospheric Environment Service, *The Impacts of Global Warming* (Fact Sheet) (Ottawa: Supply and Services, 1986) 3.

[26]E.F. LeDrew, *supra*, note 23 at 223.

[27]P.R. Ryan, "Soviets Shelve Plan on Diverting Rivers in Arctic Regions" (Spring 1986) vol. 29, no. 1 *Oceanus* 78-79.

[28]A.J. Semtner Jr., "The Climatic Response of the Arctic Ocean to Soviet River Diversions" (1984) 6 *Climatic Change* 127-29.

[29]F. Golden & E. Amfitheotrof, "Making Rivers Run Backward" *Time* (14 June 1982) 80.

at mid-latitudes, and some readings are very high. For example, lead 210, a natural radionuclide, reaches record-high concentrations in the Arctic and sulfate readings in Barrow, Alaska have been higher than those usually seen in the northeastern United States during winter.[30]

Coastal and Marine Non-Renewable Resource Potential

Reliable estimates of hydrocarbon resources in the Arctic are difficult to obtain because the geological information used for such assessments is often considered confidential and, in any case, the opinions of petroleum engineers often vary.[31] Still, the Arctic is a significant storehouse of oil and gas. Estimates of potentially recoverable reserves of crude oil range between 100 and 200 billion barrels compared to OPEC's proven reserves of crude oil approaching 440 billion barrels. Recoverable natural gas deposits may reach 2,000 trillion cubic feet compared to American gas reserves (excluding Alaska) of 492 trillion cubic feet.[32]

Exploration activities undertaken by all Arctic littoral states reveal substantial development potential. In the United States, onshore discoveries at the north slope of Alaska (Prudhoe Bay and Kuparuk fields) indicate that there may be 10 billion barrels of recoverable crude oil and 35 trillion cubic feet of natural gas directly adjacent to coastal areas in the Beaufort Sea.[33] Almost half of the US continental shelf lies adjacent to Alaska and offshore oil and gas resource estimates for Alaska have ranged from 3.3 to 12.2 billion barrels of oil and from 13.85 to 64.6 trillion cubic feet of gas.[34] The coastal plain of the Alaska National Wildlife Refuge in the northeast corner of Alaska may contain 13.8 billion barrels of oil and 32.3 trillion feet of gas.[35] In the Soviet Union, the shelves of the Laptev, the East Siberian and the Chukchi Sea may contain two to five times as much petroleum as the mainland.[36] At least two-thirds of the Kara Sea is known to be an extension of the West Siberian basin which contains the largest onshore gas fields in the world.[37] Siberian gas reserves could reach 500 trillion cubic feet.[38] The southern and eastern Barents Sea, including the Pechora Sea, is one of the

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[30]K.A. Rahn, "Who's Polluting the Arctic?" (May 1984) vol. 93, no. 5 *Natural History* 30-33. See also K.A. Rahn & D.H. Lowenthal, "Who's Polluting the Arctic? Why Is It So Important to Know? An American Perspective" in B. Stonehouse, ed., *Arctic Air Pollution* (Cambridge: Cambridge University Press, 1986) 85-95.

[31]*Oil and Gas Technologies for the Arctic and Deepwater* (Washington, D.C.: US Congress, Office of Technology Assessment, OTA-0-270, May 1985).

[32]O.R. Young, "The Age of the Arctic" (Spring 1986) vol. 29, no. 1 *Oceanus* 13.

[33]*Oil and Gas Technologies for the Arctic and Deepwater*, *supra*, note 31 at 42.

[34]*Ibid.* at 27,31.

[35]W.Y. Brown, "Observations Concerning Arctic Environmental Quality" in *The Polar Regions* (Proceedings from the Eleventh Annual Seminar, Center for Oceans Law and Policy, University of Virginia School of Law, Charlottesville, Virginia, 26-28 March 1987) 102.

[36]W. Ostreng, "Oil Strategy and Ocean Law in the Arctic: A Scenario for the 21st Century," in B.C. Gerwick, ed., *Arctic Ocean Engineering for the 21st Century* (Washington D.C.: Marine Technology Society, 1985) (Proceedings of the First Spilhaus Symposium, Williamsburg, Virginia, 14-18 October 1984) 99 at 102.

[37]T. Scanlan, "Resource Endowment and Exploitation" in C. Archer & D. Scrivener, eds, *Northern Waters: Security and Resource Issues* (London: Croom Helm, 1986) 48.

[38]M.A. Conant, "Resources of the North Polar Region" in *The Polar Regions*, *supra*, note 35 at 99.

largest basins with hydrocarbon potential in the world; the onshore part of the basin is currently producing approximately 500,000 barrels of oil per day as well as some commercial gas.[39]

In Canada hydrocarbon deposits in the Beaufort Sea-Mackenzie Delta region and Arctic Islands could comprise approximately 43 % of Canada's oil and gas resources. The Beaufort Sea-Mackenzie area is estimated to contain 8.25 billion barrels of recoverable oil and 1,865 billion cubic metres of recoverable gas. Hydrocarbon deposits in the Arctic Islands are estimated to include 4.2 billion barrels of recoverable oil and 2,257 billion cubic metres of recoverable gas.[40] In Greenland hydrocarbon exploration has taken place both on and offshore since 1969. Offshore drilling in the Davis Strait up to the fall of 1978 failed to show any potential. Onshore investigations in Jameson Land (east Greenland) have shown very promising results. In Norway long-term agreements were concluded in 1986 with European buyers to permit the development of the giant Troll field (52 trillion cubic feet of gas) offshore at approximately 61°N.[41] Troll gas will have to be accommodated within European markets before plans to develop an offshore gas find much further north at 71°N can be advanced.[42]

Development of offshore oil and gas fields in Arctic areas such as the Beaufort Sea may be based on several transportation options. Hydrocarbons can be pipelined to the nearest shore location; they can be transported via ice-strengthened tankers with icebreaker support or via icebreaking tankers or supertankers.[43] The marine shipping option would probably raise the greatest international concern. When Canada proposed in the early 1980s to ship liquified natural gas from the high Arctic through the Northwest Passage and off the coast Greenland, Inuit in Greenland, Canada and Alaska were united in opposition, given the potential risks to their traditional marine hunting grounds. If Canada were to begin regular shipments of oil from the Beaufort Sea and around the coast of Alaska, the United States might find itself with a "Canadian shoe on its foot." How should the US protect its vulnerable Arctic shores from the dangers of foreign shipping traversing its exclusive economic zone?

Two small-scale pilot projects involving the shipment of hydrocarbons are already underway in the Canadian Arctic. The Bent Horn Project was proposed in 1984 by Panarctic Oils Ltd. and has resulted in several shipments of oil south from its Cameron Island base from 1985 onward. The project, as now constituted, consists of a single well and storage facilities intended to produce 100,000 barrels of crude per year for shipment to Montreal. Ice conditions in Byam Martin Channel and Barrow Strait west of Cornwallis Island are unpredictable. The project will test the feasibility of the

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[39]T. Scanlan, *supra*, note 37 at 48.

[40]D. VasnderZwaag, *supra*, note 15 at 125.

[41]M.A. Conant, *supra*, note 38 at 5.

[42]T. Scanlan, *supra*, note 37 at 51.

[43]*International Petroleum Encyclopedia*, vol. 19 (1986) 231.

seasonal shipping of crude oil from the high Arctic in ice-reinforced tankers. This was the first commercial oil shipping venture approved by regulatory agencies for the high Arctic.

The second project was proposed by Gulf Canada subsequent to discovery of the Amauligak field in the Canadian Beaufort Sea — the first major find in the Beaufort with reserves estimated at up to 800 million barrels of recoverable oil. Despite its size, capital costs for full-scale development and an associated Mackenzie Valley pipeline are estimated at 5 billion dollars. At this time, current oil prices do not warrant full-scale development. A seasonal production proposal was advanced based on the drilling of two wells — initially to delineate the Amauligak field — which are estimated by Gulf to be capable of producing 20-40,000 barrels per day for up to 150 days per year. Production would be loaded on two Arctic Class 4 shuttle barges which would move the crude from Amauligak to a tanker trans-shipment point west of Point Barrow, Alaska. The length of this route would vary, depending on ice conditions, from 1450 to over 2000 nautical miles and could take approximately 20 days roundtrip. The final stage of shipment would be by tanker from northwest Alaska to market. This proposal is still undergoing regulatory reviews and Gulf Canada is continuing its assessment of the shipping component.[44] No firm commitments regarding marine transportation have yet been made.

The nonfuel mineral reserves of the Arctic are also extensive and involve international transportation and trade. For example, two lead-zinc mines operate adjacent to Canadian Arctic waters. The Nanisivik mine on northern Baffin Island ships about six loads of lead, zinc and silver concentrates to European markets per year and the Polaris Mine on Little Cornwallis Island ships nine. In 1984 the Marmorilik mine in west Greenland was estimated to have produced 122,000 tons of zinc, 26,000 tons of lead and 10 tons of silver concentrates. Other mineral deposits of iron and uranium have been located in west Greenland but have not been commercially exploited. Iron ore deposits on the Melville Peninsula in Canada's eastern Arctic are estimated at 4.3 billion tonnes.[45] Similar deposits in Scandinavia and of the Kola Peninsula in the Soviet Union have been exploited for some time. Alaska's Red Dog lead-zinc deposit, 180 miles north of Nome, contains an estimated 85 million tons of ore with an in-ground value estimated at $11 billion dollars.[46] Northern Alaska coal resources may amount to 400 trillion tons and even 10 percent of that maximum estimate (400 billion tons) would equal almost 500 times the estimated 1982 U.S. coal production of 911 million tons.[47]

River Diversions and Dams

Canada has considered a number of large-scale hydro-projects and water diversions, in addition to the potential Soviet river diversions discussed above. In the early 1980s

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[44]Gulf Canada Corporation, "Project Brief: Amauligak Seasonal Production" in *Frontier Development* (January 1987)

[45]D. VanderZwaag, *supra*, note 15 at 130..

[46]O.R. Young, *supra*, note 32 at 13.

[47]T.P. Miller, "Mineral Resources: Arctic Alaska" in W.E. Westermeyer & K.M. Shusterich, *supra*, note 18 at 63.

Alberta and British Columbia proposed large hydroelectric dams on the Slave and Liard rivers respectively. These rivers are important tributaries of the Mackenzie River and dam construction might have affected significantly the Mackenzie River ecosystem and delta. However, these proposed developments have been shelved because of a projected decrease in the demand for electricity. At this time Manitoba is pursuing its Limestone Project on the Churchill-Nelson system while Quebec has announced phase two of its massive James Bay project. The most significant proposal is the GRAND Canal scheme.[48] The Great Recycling and Northern Development project, which proposes to "fix the plumbing system of the continent," would be effected by construction of a 160 kilometer dyke across the mouth of James Bay, thus creating a fresh water lake from which water could then be pumped back into the Great Lakes and exported. At an estimated cost of $130 billion this project is currently impractical. But it is still being studied seriously despite a federal government policy opposing water exports. Norway recently has established a large-scale hydroelectric project at Alta/Kautokeino in northern Norway, much to the regret of the local Sami population. Small hydroelectric projects are a priority for the home-rule government of Greenland, which has been investigating a number of sites since 1979.

Existing International Agreements and Arrangements

General Cooperation

Significant elements of a framework for regional cooperation in the Arctic exist already. The circumpolar nations are parties to a number of conventions and agreements at the global, international and bilateral levels, many of which have environmental and renewable resource management and protection as their focus. All Arctic countries except Canada are parties to the International Convention on the Regulation of Whaling.[49] Canada withdrew in 1982 after a complete cessation of its commercial whaling activities, and has allowed only Inuit hunts of belugas and narwhals. The United States limits whaling off the Alaskan coast to traditional hunts by native people. The Convention on Wetlands of International Importance Especially Waterfowl Habitat (also called the RAMSAR Convention) is adhered to by all polar states.[50] World-wide, 40 nations have acceded to the treaty, which provides a framework for international cooperation in the conservation of wetland habitats. Parties to the convention have obligations to include wetland conservation in national land-use planning and to designate wetlands for inclusion in the international list. By 1985 over 300 sites had been designated.[51] Canada has designated over 10 million hectares, the USSR over 1.2 million. In 1987 Greenland designated eleven sites with a total area of 1.04 million hectares.

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[48]D.J. Gamble, "Of Gigawatts and GRAND Designs" (October 1987) vol. 15, no. 3 *Northern Perspectives* 1-8.

[49]161 U.N.T.S. 72; 4 Bevans 248, in force 10 November 1948.

[50][1976] U.K.T.S. 34; 11 I.L.M. 963, in force 21 December 1975.

[51]For a summary of sites, see *Directory of Wetlands of International Importance* (IUCN: Gland, Switzerland & Cambridge, U.K., May 1987).

Another global treaty, the Convention on International Trade in Endangered Species (CITES) limits the trade and transportation of some Arctic wildlife and wildlife products.[52] All Arctic nations are parties to this convention which lists wildlife on three schedules according to how seriously each species population is threatened. Permits are required for transportation of these species or species products through the party states. No permits are possible for commercial trade of species which are most seriously threatened. The parties to this convention actively review the status of listed species, updating the schedules biennially. Several Arctic species are listed, for example, gyrfalcons and narwhals.

The Agreement on the Conservation of Polar Bears, the only existing regional treaty among all five Arctic littoral states, limits the taking of polar bears to traditional hunting or scientific purposes and binds all parties to the protection the ecosystems and habitats on which polar bears depend.[53] All Arctic countries have taken measures to protect important habitat areas. For example, the Soviet Union has designated important polar bear denning areas on Wrangel and Herald Islands as state reserves. Canada's Polar Bear Provincial Park was established on the Hudson Bay coast of northeastern Ontario.[54] Denmark has proclaimed the largest national park in the world in northeast Greenland (700,000 square kilometers) and all identified denning areas[55] in Greenland now receive treaty protection up to 12 miles out to sea. The International Union for the Conservation of Nature (IUCN), Polar Bear Specialists Group of the Survival Services Commission, has met every two years to discuss coordination of polar bear research and management.[56] An excerpt from the preamble to the treaty expresses the cooperative relationship which exists among Arctic nations on matters of circumpolar conservation:

> Recognizing the special responsibilities and special interests of the States of the Arctic Region in relation to the protection of the flora and fauna of the Arctic Region;
>
> Recognizing that the polar bear is a significant resource of the Arctic Region which requires additional protection;
>
> Having decided that such protection should be achieved through coordinated national measures taken by the States of the Arctic Region;

At a subregional level, Denmark, Finland, Iceland, Norway and Sweden, have cooperated since 1952 through the formal Nordic Council. This body consists of national parliamentary representatives, and has included representatives from the three

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[52] 27 U.S.T. 1087; 12 I.L.M. 1085, in force 1 July 1975.

[53] 27 U.S.T. 3918; 13 I.L.M. 13, in force 26 May 1976.

[54] I. Stirling, "Research and Management of Polar Bears Ursus Maritimus" (1986) 23 *Polar Record* 172.

[55] S. Lyster, *International Wildlife Law* (Cambridge: Grotius Publications Limited, 1985) 60.

[56] I. Stirling, *supra*, note 54 at 169-172.

home rules areas: the Faroe Islands, Greenland and the Aland Islands since 1983.[57] The Nordic Council of Ministers, composed of national cabinet representatives, has been a forum for consultation since 1971.[58] On their recommendation, the Nordic Convention on the Protection of the Environment was signed in 1974.[59] The convention guarantees equal access to the courts and administrative tribunals of any contracting state to persons suffering from or threatened by environmental harm.[60]

Regional cooperation has been particularly strong in the area of satellite technologies. For example, SARSAT, a satellite-aided search and rescue system, is an experimental and cooperative venture undertaken by Canada, the United States, France, Denmark, Norway and Sweden and is dedicated to reducing the time required to locate distressed vessels and aircraft. In 1980 SARSAT members signed an agreement with the Soviet Union to test the compatibility of SARSAT with their COSPAS system.[61]

Many bilateral agreements and arrangements exist to prmote cooperation among Arctic states. Examples of American-Canadian cooperation include a Joint Marine Pollution Contingency Plan for the Beaufort Sea and the Migratory Birds Convention which establishes closed seasons for migratory birds such as wild ducks, geese, swans and other shorebirds. In a March 1982 memorandum of understanding, the US Coast Guard and the Canadian Department of the Environment agreed to cooperate in pollution control research on the behavior of oil spilled in the Arctic and on the development of pollution clean-up equipment. In 1985 Transport Canada and the US Department of Transportation agreed to undertake cooperative research in the development of Arctic ship designs and regulatory criteria to improve the safety of Arctic shipping operations.[62] On 17 July 1987 Canada and the United States entered into an Agreement on the Conservation of the Porcupine Caribou Herd to coordinate management of the herd. The countries agreed to establish the International Porcupine Caribou Management Board to recommend appropriate harvest limits and national allocations, to advise on sensitive habitats deserving special consideration and to consult on activities likely to cause a significant long-term impact on the porcupine caribou herd or its habitat.

Since 1972, when President Nixon and President Podgorney signed a bilateral environmental agreement, the United States and the Soviet Union have held annual meetings on the prevention and control of marine shipping pollution. Although meetings were discontinued in late 1979 following Soviet intervention in Afghanistan, the Joint United States-Soviet Socialist Republics Task Group on the Prevention and

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[57]The Nordic Council was established in 1952 by parallel legislation of the parliament of Denmark, Iceland, Norway and Sweden. Finland joined the Council in 1955. The international arrangement took the form of a treaty (the *Helsinki Agreement*) in 1962. B.A. Sundelius, *Nordic Cooperation: A Dynamic Integration Process* (Ph.D. Thesis: University of Denver, 1976) 231.

[58]*Ibid.* at 240.

[59]For the text of the agreement, see 13 I.L.M. 591.

[60]F. Wendt, *Cooperation in the Nordic Countries* (Stockholm: Almquist & Wiksell Int'l, 1981) 238.

[61]C. Lamson & D. VanderZwaag, *supra*, note 19 at 71.

[62]*Ibid.* at 74-75.

Cleanup of Pollution of the Marine Environment from Shipping met again in October 1986. Six Soviet marine pollution specialists visited the United States and agreed to improve their capability of joint action in the event of a large oil spill or chemical release of mutual concern. The most recent meeting was held in the summer of 1987 in the Soviet Union.[63] The US and USSR have also cooperated in the study of marine mammals through the US-USSR Marine Mammal Project, another spin-off of the bilateral environmental protection agreement. In 1983 Soviet scientists visited the US and reviewed research on such topics as the distribution of bowhead whales in the Chukchi Sea and [illegible]age and sex composition of walrus herds.[64]

Perhaps the most comprehensive bilateral agreement concerning the Arctic to date is the Marine Environment Cooperation Agreement between Canada and Denmark, signed on 26 August 1983. The agreement established contingency plans to combat pollution incidents from shipping or offshore hydrocarbon exploration and development in the Baffin Bay-Davis Strait region. It included bilateral commitments in seven key areas:

1 To investigate alleged violations of pollution legislation;

2 To consult over a reasonable period of time with the other Party concerning works or undertakings having potential to create a significant risk of pollution to that Party's waters;

3 To design and operate offshore installations so the risk of marine pollution is minimized;

4 To cooperate in the exchange of scientific and regulatory information;

5 To cooperate in identifying and monitoring vessel routing areas outside territorial waters;

6 To develop adequate compensation schemes for damage caused by seabed exploration/exploitation activities; and

7 To resolve disputes, concerning the interpretation or application of the Agreement through negotiation or submission to an ad hoc tribunal.[65]

Scientific Cooperation in the Arctic

While there is not a regional science centre in the Arctic or a comprehensive framework agreement to coordinate scientific endeavours, the unity of Arctic ecosystems and the

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[63] US Coast Guard, "Saving the Waters: A Superpowers Mutual Concern" (30 January 1987) 3-87 *Commandant's Bulletin* 14.

[64] US Dept. of Commerce (NOAA), *Marine Mammal Protection Act of 1972 Annual Report* (June 1984) 25.

[65] For the text of the agreement, see 23 I.L.M. 269.

high costs of research have spawned many international cooperative efforts. "Big science" projects in the Arctic were originally undertaken in 1882-83 and 1932-33, the first and second International Polar Years. Research focused primarily on meteorological and atmospheric processes but a few ice studies were undertaken. Under the auspices of the International Council of Scientific Unions (ICSU) 1957-58 was designated as the International Geophysical Year (IGY) and the oceanographic project, involving more than one hundred ships, studyed such phenomena as deepwater circulation and the mixing of cold and warmer water masses at the polar fronts.[66] In the 1970s Canada and the United States initiated the Arctic Ice Dynamics Joint Experiment (AIDJEX) to explore the dynamics of sea ice in the Beaufort Sea.[67] In 1973 ships and aircraft from the Soviet Union and the United States carried out joint oceanographic studies in the Bering Sea Experiment (BESEX).[68] In 1983 and 1984 biologists from various countries studied productivity and physical interactions at the ice edge through the Marginal Ice Zone Experiment (MIZEX).[69] Scientific experts have also met under the umbrella of POAC (Port and Ocean Engineering under Arctic Conditions). The World Meteorological Organization (WMO)/International Council of Scientific Unions (ICSU) World Climate Research Program (WCRP), a successor of the Global Atmospheric Research Program (GARP), has established a Sea Ice and Climate Working Group to address the relation of polar and global climates.[70] An international Arctic Aerosol Sampling Network (Alaska, Canada, Greenland, Iceland, Norway and Finland) monitors the movement of industrial-source pollutants across high Arctic latitudes.[71] Scientific institutions in China, Japan and the United States have been informally cooperating in the study of long-range aerosol transport to the Pacific and Arctic.[72]

At least three major institutional mechanisms have been created to enhance international cooperation in Arctic science. The Comité Artique International is a non-governmental organization of members from industry, government and universities and private life. It has promoted Arctic research primarily through sponsorship of conferences and the publication of proceedings.[73] The Northern Science Network of

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[66]C. Lamson, "The History of Arctic Marine Science in Canada," in C. Lamson & D. VanderZwaag, eds, *The Challenge of Arctic Shipping: Science, Environmental Assessment and Human Values* (McGill-Queen's University Press: Montréal) [in press]. See also H.U. Roll, *A Focus for Ocean Research: Intergovernmental Oceanographic Commission History, Functions Achievements*, Intergovernmental Oceanographic Commission Tech. Series No. 20 (UNESCO, 1979) 7-8.

[67]G. Weller, "The United States and the Role of Science in the Arctic" in W.E. Westermeyer & K.M. Shusterich, *supra*, note 18 at 166.

[68]*Ibid.* at 175.

[69]See D.A. Horn & G.L. Johnson, "MIZEX East: Past Operations and Future Plans" (Spring 1986) vol. 29, no. 1 *Oceanus* 66-72.

[70]Arctic Ocean Sciences Board, Greenland Sea Project (Washington, D.C.: National Academy Press, 1987) 4.

[71]W.P. Adams *et al.*, *Canada and Polar Science* (Ottawa: Department of Indian Affairs and Northern Development, 1987) 33.

[72] J.W. Winchester *et al.*, "Cooperation of China, Japan and the United States in the Study of Long Range Aerosol Transport to the Pacific and Arctic" in B. Stonehouse, ed., *Arctic Air Pollution* (Cambridge: Cambridge University Press, 1986) 281-87.

[73]See e.g. L. Rey, ed., *Arctic Energy Resources* (Proceedings of the Comité Artique International Conference on Arctic Energy Resources, Veritas Centre, Oslo, Norway, 22-24 September 1982).

the Man and the Biosphere Program (MAB) was designed to facilitate communication among scientists with an interest in the northern environment. The Arctic Ocean Sciences Board (AOSB), formed in May 1984, is a voluntary organization of representatives from major research institutes and government agencies that promotes international cooperative programs for Arctic Ocean studies. Membership is open to all nations participating in Arctic Ocean research, and includes representatives from the Federal Republic of Germany, the United States, Canada, Sweden, the United Kingdom, Finland, Norway, Denmark, Iceland and the Netherlands. The board is promoting the Greenland Sea Project, which began in 1987 and is expected to continue for five years. At least nine countries will study the interactions of ice, atmosphere and marine waters and the marine biology of the Greenland Sea region.[74]

Recently a number of Arctic nations have taken initiatives to organize better national approaches to coordinated scientific research. In the United States the Arctic Research and Policy Act of 1984 established an Arctic Research Commission and an Interagency Arctic Research Policy Committee to cooperate in establishing a five-year national Arctic research plan.[75] The Interagency Committee is required to "coordinate and promote cooperative Arctic scientific research programs with other nations, subject to the foreign policy guidance of the Secretary of State."[76] In Canada a study group appointed by the Minister of Indian Affairs and Northern Development recommended in March 1987 the establishment of a Canadian Polar Research Commission to provide policy advice to the federal government and the establishment of a national "Polar House" in Ottawa to coordinate communication regarding northern Canada and the polar regions.[77] The study group referred specifically to the crucial role such a commission should play in the promotion of international scientific cooperation. One of the commission's mandates would be:

> To promote cooperation between Canadian scientists and scientific agencies and the scientists and institutions of other countries by: providing a Canadian point of contact; facilitating scientific liaison and exchange of information; and serving as host or coordinator of activities to promote, arrange and assess Canadian participation in international scientific programmes in polar regions.[78]

A study group in Denmark appointed by the Minister for Greenlandic Affairs recommended in 1985 the establishment of an interdisciplinary polar institute including several existing institutions such as the Institut for Eskimologi, Arktisk Institut, and

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[74]Arctic Ocean Sciences Board, *supra*, note 70 at 1-3, 40-41

[75]P.L. 98-373; 15 U.S.C., ss 4101-4111.

[76]*Ibid.*, s. 4107(a)(7).

[77]W.P. Adams *et al.*, *supra*, note 71 at 114-15.

[78]*Ibid.* at 105.

Kommissionen for Videnskabelige Undersdgelser in Gronland.[79] A final decision on this recommendation is pending.

Many formal international agreements exist to facilitate cooperative scientific research. The US Arctic Research Commission compiled a catalogue of Arctic Cooperative Research Agreements and Major Arctic-rim Research Organizations and found 19 bilateral and six multilateral US agreements in scientific research; five bilateral and five multinational non-US agreements; and 18 bilateral and 19 multinational non-governmental scientific research organizations or programs concerned with the Arctic.[80]

Canada and the Soviet Union signed a General Exchange Agreement on 20 October 1971 to foster scientific cooperation between the two countries. In April 1984 a protocol was signed in furtherance and partial implementation of that prior agreement. The protocol established a detailed scientific exchange program in four major areas: geoscience and Arctic petroleum, northern environment, northern construction, and ethnography and education. Twelve Canadian and Soviet delegations were exchanged and more than 40 scientists and specialists from each country exchanged information on such subjects as the prevention of oil spills, caribou management, and the design of water supply and sewage disposal systems in the North. In February 1987 another protocol extended the program for two years and adopted as new topics of study: the dynamics and migrations of snowgeese, diffusion of hydrocarbons and other pollutants in Arctic waters, geological identification of prospective coal and natural gas areas and the preservation and expansion of traditional occupations.[81] As well, Canada and Norway on 5 December 1986 entered into a framework agreement to promote cooperation between Canadian and Norwegian institutions and governmental agencies in all sectors of science and technology.

An Emerging Arctic Conservation Strategy

The Convergent Models of the World Conservation Strategy and the Law of the Sea Convention

In late 1980 the International Union for the Conservation of Nature (IUCN) released the World Conservation Strategy calling urgently for all nations to realign their thinking and actions towards the goal of achieving "living resource conservation for sustainable development."[82] By 1981 this landmark document had been endorsed by 34 nations including the USA, Canada, Denmark and Norway.[83] The World Conser-

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[79]Commission for Scientific Research in Greenland (16 November 1986) No. 14 *Newsletter* 2.

[80]US Arctic Research Commission, *The United States: An Arctic Nation* (Los Angeles: US Arctic Research Commission, 1987) 25.

[81] For an excellent summary of the exchanges, see W. Slipchenko, "Co-operation in Arctic Science" (May-June 1987) vol. 15, no. 2 *Northern Perspectives* 12-13.

[82]IUCN in co-operation with United Nations Environment Programme, World Wildlife Fund and in collaboration with Food and Agriculture Organization of the UN and United Nations Educational, Scientific and Cultural Organization, Gland: Switzerland.

[83]Environment Canada, *World Conservation Strategy-Canada* (Ottawa: Supply and Services, 1986) *iii*.

vation Strategy outlined three objectives for living resource conservation: to maintain essential ecological processes and life support systems, to preserve genetic diversity, and to ensure the sustainable utilization of species and ecosystems. Conservation was defined as "the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations."[84]

This scientific and ecological approach to conservation in both letter and spirit has been embodied in the living resource and environmental protection provisions of UNCLOS II. The convention makes conservation measures a "duty" (Arts 117-118) in the hope that international co-operation and management on the high seas will occur. It ensures a management system (Art. 119) based on the sustainable yield concept promoted by the World Conservation Strategy. The convention defines enclosed or semi-enclosed seas (Art 122) in terms which, it has been suggested, are met by the Arctic Ocean.[85] It urges states bordering enclosed or semi-enclosed areas to cooperate directly or through an appropriate regional organization in scientific research, living resource management and conservation and in marine environmental protection (Art. 123). Regional management regimes have been established elsewhere under the auspices of UNEP's Regional Seas Programme and such an approach remains a possibility for the Arctic.[86]

Similarly, the regime prescribed in the convention regarding state management of living resources within an exclusive economic zone (Arts 61-67), is based on the concept of limiting catches to ensure optimum sustainable utilization. Its marine environmental management provisions (Arts 192-212) emphasize monitoring, impact assessment, co-operation, contingency planning and call for strengthening legal regimes for controlling marine pollution; including pollution from land-based sources, activities on the seabed, from the Area, from dumping, from vessels and from the atmosphere. The convention therefore represents a comprehensive system for the protection of "essential ecological processes and life support systems." Thus there is a unity of concept, purpose and approach in the 1982 Convention and the World Conservation Strategy.

The Emerging Canadian Arctic Conservation Strategy

In 1982 the Department of Indian and Northern Affair published a discussion paper entitled A Comprehensive Conservation Policy and Strategy for the Northwest Territories and Yukon and convened a workshop in the north to discuss a follow-up to the World Conservation Strategy and the need for a northern conservation policy. The

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[84] *Ibid.* at 1.

[85] D.M. Johnston, ed. *Arctic Ocean Issues in the 1980's* (Hawaii: Law of the Sea Institute, 1982) (Workshop Proceedings, Macknoc Island, June 1981) 3; and B.A. Boczek, "Global and Regional Approaches to the Protection of the Marine Environment" (1984) 16 *Case Western Reserve Int'l L. J.* 39.

[86] See J.C. Nelson & R.D. Needham, "The Arctic as a Regional Sea" (Spring 1985) 12 *Environmental Conservation* 7-15. For a discription of UNEP's 11 regional seas programs, see L.D. Neuman, "The United Nations Regional Seas Programme" (1987) 19 *Marine Technology Society Journal* 46-52.

Task Force on Northern Conservation, a group representing industry, government, conservation and native interests subsequently proposed a strategy. The Northern Conservation Task Force Report[87] has been endorsed by the federal and territorial governments. The Task Force adopted with minor changes the WCS definition of conservation, embracing the development and protection of natural resources.[88] The Northern Conservation Strategy is regional in its approach, and provides that its "projected benefits should meet the needs and values of the people of the North, as expressed through participation in the conservation and development processes."[89] The Northern Conservation Strategy (NCS) promotes the integration of resource management and the establishment of a comprehensive network of protected areas. Regarding Arctic marine policy and conservation, the Task Force recommended: "Acceptance and implementation by the Department of Fisheries and Oceans of its legitimate responsibility as the lead agency for Arctic marine conservation."[90]

The Canadian federal cabinet endorsed this role in January 1986. The Minister of Fisheries and Oceans published in late 1987 a discussion paper titled the Arctic Marine Conservation Strategy (AMCS). Its stated purpose is:

> To ensure the future health and well-being of Arctic marine ecosystems thereby enabling Canada to fulfill its national responsibilities in the Arctic and to provide for the sustained utilization of Arctic marine resources, in particular, use by Arctic peoples.

Guiding principles were also adopted, including:

- Canada's sovereign rights and responsibilities in Arctic marine areas should be exercised;
- An ecosystem approach which integrates renewable and non-renewable resource management should be adopted;
- Inuit are the primary traditional and current users of Arctic marine areas and resources and have particular rights and responsibilities now being defined through constitutional and aboriginal claims negotiations;
- Implementation of the strategy should recognize regional seas as broad management units, as well as the need for international co-operation; and
- Existing institutions and processes should be used wherever possible in implementing the strategy.[91]

The AMCS will enhance functional jurisdiction in the Arctic and will improve opportunities for regional co-operation in living resource and environmental management if adopted as federal policy. By emphasizing linkages with the Territorial

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[87] *Northern Conservation Task Force Report* (Agency Press: Vancouver, 1984).

[88] Environment Canada, *supra*, note 83 at 35.

[89] *Northern Conservation Task Force Report*, *supra*, note 87 at 14.

[90] *Ibid.* at 38.

[91] Fisheries and Oceans Canada, *Canadian Arctic Marine Conservation Strategy* (Ottawa: Supply and Services, 1987) at 8.

Governments, the Inuit Circumpolar Conference and the World Conservation Strategy, the Department of Fisheries and Oceans has ensured that the AMCS can be coordinated with and be acceptable to both regional and international organizations.

Land claims settlements between the Canadian government and the Inuit hold the promise of further development of a framework for Arctic marine conservation. In a 1984 land claims settlement involving the Western Arctic (Beaufort Sea area), the Inuvialuit gained preferential rights to all wildlife and exclusive rights to some species, including polar bears.[92] They have a right to compensation for actual harvest losses. They can seek arbitration to identify remedial measures necessary to reduce the risk of future losses of wildlife resulting from development. The new federal land claims policy recognizes that traditional uses of the offshore are a proper subject for discussion in future land claims negotiations, such as those with the Tungavik Federation of Nunavut (TFN) involving Inuit claims in the central and eastern Canadian Arctic:

> In many cases, the areas traditionally used by aboriginal groups to pursue their way of life include offshore areas. In such cases, negotiations concerning harvesting rights in offshore areas will be conducted, to the extent possible, in accordance with the same principles as those which apply to terrestrial areas. Participation in environmental management regimes and resource revenue-sharing arrangements may also be negotiated with respect to offshore areas.[93]

Both the Western Arctic Settlement Agreement and Agreements-in-Principle between the TFN and the federal government would establish a regime for living resource management and environmental protection generally consistent with the World Conservation Strategy and UNCLOS II. Significantly, these delegate authority to the north and would involve residents in decision-making with respect to Arctic marine conservation. These land claims agreements cover the major functions identified in the 1982 Convention, including provisions for environmental impact assessment and monitoring (Arts 204 & 206), provisions for allocation of living resources on a sustainable yield basis (Arts 61-67 & 117-120) and environmental protection (Arts 197-201). Of equal importance to Canada, they represent a significant evolution to functional jurisdiction at the regional level. By transferring greater authority to the region, they may enhance the potential for a more comprehensive regional framework for conservation. The likelihood of circumpolar conservation arrangements being established in a positive, progressive manner is particularly strong because the aboriginal claimant groups are closely linked to the Inuit Circumpolar Conference Conservation Strategy initiative and are recognized as primary players in the Department of Fisheries and Oceans' Arctic Marine Conservation Strategy.

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[92] *The Western Arctic Claim Final Agreement* (Ottawa: Department of Indian Affairs and Northern Development, 1985) ss 14(6) & 13(18).

[93] *Comprehensive Land Claims Policy* (Ottawa: Department of Indian Affairs and Northern Development, 1987) 13.

Emerging Arctic Conservation Strategy of the Inuit Circumpolar Conference[94]

The Inuit Circumpolar Conference (ICC) is a non-governmental organization representing Inuit in Alaska, Canada and Greenland. The ICC has taken a major innovative step towards development of a comprehensive arctic policy which addresses issues of peace and security, the environment, and social, cultural and economic development.[95] The ICC believes that such a policy is essential for the long-term protection of Inuit interests and the promotion of international understanding and co-operation in the Arctic.[96] Two of the goals and objectives of the proposed policy are:

— To encourage co-ordination of policy-making and decision-making in the international community, particularly in and among those Nation-States with Arctic jurisdictions and interests; and

— To protect the delicate Arctic environment, including the marine and other resources on which Inuit depend.[97]

The ICC clearly envisions using its policy to influence the law and policies of circumpolar nations.

The Inuit Circumpolar Conference Environmental Commission (ICCEC) was established in 1985 as a consequence of a series of resolutions concerning the Arctic environment passed by the ICC's general assembly in 1977, 1980 and 1983. The commission has developed a framework document, the Inuit Regional Conservation Strategy (IRCS), which builds on principles laid down in the 1980 World Conservation Strategy. Its purpose is expressed in the following points:

a. Achieve sustainable development through the integration of development and conservation.

b. Maintain the productivity, diversity and self-renewing capacity of natural resources and the environment, through achievement of the three components of conservation.

c. Obtain the fullest sustainable economic and cultural benefit from natural resources and the environment.

d. Secure people's natural and cultural heritage.

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[94]This section is largely drawn from M. Faeteborg, "A Strategy for Combatting Environmental Imbalance" (Paper presented at the 8th North-American Indian Workshop, Echternach, Luxembourg, April 1987) [unpublished].

[95]I.C.C., *Draft Principles for an Arctic Policy* (Presented in Kotzebue, Alaska by the Inuit Circumpolar Conference, July 1986) [unpublished].

[96]*Ibid.* at 1: Among the challenges to the Inuit interest identified by the ICC are the repercussions of the recent voyage of the *Polar Sea* and the lack of proper ocean management.

[97]*Ibid.* at 6.

e. Determine priorities among the many actions required to achieve conservation and sustainable development, and the most cost-effective ways of taking them.

f. Build a consensus on, and support for, the priority actions.[98]

To achieve these objectives the following are required:

a. an explanation of how the conservation of living resources can ensure continued survival and future development;

b. identification of the areas where conservation action is most urgently needed;

c. definition of the requirements of intervention; and effective means of achieving these objectives.[99]

The World Conservation Strategy recommends that individual countries develop both a national and/or a regional strategy. The IRCS is a pioneer undertaking as the first conservation strategy to be devised by a "fourth world" people and the first to involve several nations, and this at a time when only a few countries have developed — or are even developing — a national or regional conservation strategy.

It has been proposed that the world strategy be broadened to include the rights of fourth world peoples to land, water, culture and the basis for survival. Elucidation of fourth world problems is a prerequisite to the implementation of ICC's strategy in its entirety since the content of Inuit land and water rights is different in the three regions of Alaska, Canada and Greenland. Only Greenland has achieved some form of autonomy; home rule was introduced in 1979. The ICCEC plans to carry out its work in three phases. The first phase addresses three main points: (1) development of contacts with international organizations; (2) acquisition of working capital and (3) preparation of the framework document specifying the requirements of the Inuit conservation strategy. The results of the first phase were presented at the ICC general assembly in Kotzebue, Alaska in the summer of 1986. The general assembly gave top priority to the Environmental Commission's continuing work.

The second phase will involve the following main points: (1) continued fund-raising in Canada, Europe, the United States and possibly the rest of the world; (2) establishment of a secretariat and the appointment of regional coordinators; (3) completion of the framework document; and (4) continued development of contacts with relevant organizations. The second phase will conclude with the presentation of the final conservation strategy for ratification at the next ICC general assembly in 1989. In May 1987 the IRCS Steering Committee agreed on five categories of support projects to be included in the strategy as part of a two year program: (1) international and interjuris-

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[98] R. & C. Prescott-Allen, *Towards an Inuit Regional Conservation Strategy* (Victoria, BC, 1986) [unpublished] 3.

[99] *Ibid.* at 3-5.

dictional issues; (2) a manual of Inuit resource management; (3) assessment of wildlife domestication and habitat enhancement potential; (4) Inuit regional resource database; and (5) historical and ethnological studies of Greenlandic polar bear hunting in Canada. The third phase will concern the implementation of the policies recommended in the conservation strategy.

Future tasks will involve the collection of data from hunters, fishermen, production units and their respective local and national organizations. Contact will be made with politicians and administrators at all levels through the dissemination of information on the work and objectives of the Commission. The aim is to establish a complete knowledge of the types, locations and uses of plant and animal species important to the Inuit. Where does one catch, for example, shrimp, haddock, cod, salmon and caplin; in what quantities and in which periods? The same questions apply to birds and land and sea mammals. What is known of their behaviour patterns? What is known about ecological processes and changes? What threats are there to the environment? All this information must be collected and compared with the ideological platform that has developed. Then it should be possible to address all the problems created through the interaction of nature and culture at both a national and local level.

The ultimate objective of the ICC's conservation strategy is to ensure the cultural survival of the Inuit and to build the foundation for sustained development based on knowledge of the potential local consequences of any industrial enterprise. Development of the Arctic is necessary, but the costs of development should be minimized. Profitable, short-term commercial projects should not be given priority at the expense of traditional pursuits. The strategy will be an invaluable tool in international negotiations, for example, in debates within CITES and the International Whaling Commission. The Inuit will be able to participate in discussions with environmental organizations on a more profound and informed level than was previously possible.

The ICC's Arctic Policy and Conservation Strategy, when complete, may also significantly influence the law and policy of Arctic nations. In Canada aboriginal rights are constitutionally entrenched and aboriginal people are negotiating a role in decision-making processes which will be central to marine living resource and Arctic environmental management. In Alaska, where land claims have been settled and in Greenland, where native people represent 80% of the population and have "home rule" government, it is conceivable that Inuit involved in decision-making processes could use their Arctic policy as a basis to examine nationally or internationally conceived resource development proposals.[100] For example, Inuit from Greenland and Canada intervened in National Energy Board hearings to oppose the Arctic Pilot Project. The ICC policy could provide a basis for future interventions, when necessary.

The stage is set for an effective circumpolar initiative in conservation policy development, consistent with the living resource and environmental management provisions of UNCLOS II. In June 1986 Canada hosted an international meeting of nations to chart

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[100] Such a policy might also provide a basis for enhancing the somewhat narrow base for co-operation provided by the *1983 Canada/Denmark Marine Environment Co-operation Agreement*.

progress towards the goals of the World Conservation Strategy. One of the workshops focused specifically on the Arctic region and included representatives from all circumpolar governments. Its general recommendations were:

— For the establishment of a comprehensive regional circumpolar conservation strategy; and

— For the recognition of the rights of northern aboriginal people to self-determination and a renewable resource-based lifestyle.[101]

The Strategic Barrier to Regional Cooperation

The Arctic Ocean is one of the most important strategic areas in the world since both superpowers border the Arctic Basin and the shortest trajectory for submarine and air-launched missiles is across the North Pole.[102] More than 70% of the USSR's strategic submarines have their home base on the Kola Peninsula bordering northern marine waters.[103] The Soviet navy currently deploys more than 40 ballistic-missile submarines, about 40 nuclear and 50 diesel hunter killer submarines in its Northern Fleet.[104] In the summer of 1987 the United States Air Force completed a change-over to a modern phased array radar system in Thule, Greenland. Canada and the United States have agreed to change their 30 year old DEW Line to a modern North Warning System of at least 52 radar sites positioned on the 70th parallel. The US and Canada have also developed a new NORAD Master Plan which assigns at least six additional airborne warning and control system (AWACS) aircraft to northern defence.[105] As well, in early 1985 Iceland agreed to install two new American radar stations on the island to monitor Soviet sea and air traffic in the Arctic.[106]

The Canadian government has also published recently a White Paper on Defence Policy which promotes increased Canadian security capabilities in the north. The document recommends the construction of 10 to 12 nuclear-powered submarines, development of an underwater sonar system in the Canadian Arctic, and modernizing medium-range patrol aircraft.[107] The possibility of demilitarization in the Arctic appears remote.[108] Joe Clark, Secretary of State for External Affairs, in a recent address on Canada's foreign policy stated:

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[101] *Report of Workshop Resolutions No. 4, Regional Conservation Strategies Sustainable Development in the Northern Circumpolar Region*, (June 1986) [unpublished].

[102] O.R. Young, "The Age of the Arctic" (Winter 1985-86) 61 *Foreign Policy* 161-64.

[103] W. Ostreng, *The Soviet Union in Arctic Waters: Security Implications for the Northern Flank of NATO* (University of Hawaii: Honolulu, 1987) 6.

[104] C. Till, "Strategy in the Far North," in C. Archer & D. Scrivener, eds, *Northern Waters: Security and Resource Issues* (London: Croom Helm, 1986) 70.

[105] *Ibid.* at 165.

[106] O.R. Young, *supra*, note 102 at 167.

[107] Dept. of National Defence, *Challenge and Commitment: A Defence Policy for Canada* (Ottawa: Supply and Services, June 1987) at 49-57

[108] But Greenland reacted to strategic tensions in the Arctic in a perhaps hopeful fashion. It declared itself a nuclear free-zone in the fall of 1987, and appointed a board of parliamentarians to look into security matters and foreign policy..

> The government will strive to limit excessive militarization of the Arctic in the interest of strategic stability and in the context of our associated arms control and disarmament effort, and will seek out new ways of building trust in the circumpolar North. However, given the use of the northern seas by the Soviet fleet to reach the world's oceans and the size of the forces it has stationed in the Arctic, there seems no likelihood of the Soviet Union's cooperation at this time. Accordingly, singling out the Arctic for demilitarization does not seem practicable.[109]

Increases in military budgets could tangentially affect initiatives encouraging regional cooperation in the Arctic in at least three ways. First, strategic sensitivities might thwart cooperation in areas where jurisdiction and national sovereignty are at issue, for example, in the areas of maritime boundary resolution and Arctic shipping control. Second, the level of international cooperation may be affected. The Soviet Union might be hesitant to enter into comprehensive marine management arrangements at a regional level with four Arctic states — Canada, Denmark, Norway and the United States — who are members of NATO. Indeed, until now the Soviet Union has seemed to prefer exchanges at the bilateral level, the exception being the regional Polar Bear Agreement.

However, this may be changing in the era of Glasnost. In a major address in Murmansk in October 1987 Mikhail Gorbachev proposed a six-point program to reduce tensions and increase international cooperation in the Arctic. Included were proposals: for a single energy plan for the north of Europe; for coordination and exchange of scientific information on the region with the potential for creating a scientific council for the Arctic; for the development of a joint comprehensive plan for protecting the environment of the North; and finally, depending on how the process of normalizing relations proceeds, for opening up the Northern Sea Route from Europe to the Far East.[110]

A third potential relationship between security and international cooperation has already been raised at the global level by a UN study (the Thorsson Report) on the relationship between disarmament and development. The study raised the fundamental point that military expenditures may prevent resources from being used in more socially productive ways.[111] It can be argued that a substantial increase in military funding will exacerbate national fiscal problems and may place hidden budgetary constraints on international cooperative exchanges. The sail-away costs of a nuclear-powered submarine are at least Cdn $500 to $600 million per vessel, in addition to the extensive costs of operation and servicing.[112] The total costs of the proposed Canadian

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[109]External Affairs Canada, *Canada's International Relations: Response of the Government of Canada to the Report of the Special Joint Committee of the Senate and the House of Commons* (Ottawa: Supply and Services, 1986) 87.

[110]*Tass News Release*, 2 October 1987 (translation).

[111]United Nations, *The Relationship between Disarmament and Development* (New York: United Nations Centre forDisarmament, 1982).

[112]*Canadian House of Commons Debates* at 6836 (June 8, 1987) (Statement of Mr. Derek Blackburn, MP Brant); Defence department estimates have projected a cost of about $5 billion for the submarines with another $3 billion for shore support and infrastructure. The Canadian Centre for Arms Control and Disarmament has estimated costs over the life of the submarines (40 years) at $12.5 to $14.8 billion: *[Halifax] Chronicle-Herald* (30 March 1988) 2.

defence program are difficult to assess since the government policy paper suggested only a two percent per year increase in the defence budget over a 15 year period and failed to provide definite figures.[113] However, we can compare the relative priorities when we realize that the total budget proposed for the Government of the Northwest Territories in 1987-88 was approximately 790 million dollars.

The present strategic reality leaves the Arctic in a rather curious situation. On one side, Arctic states display extensive bilateral and regional cooperation in scientific research and marine environmental management. On the other, Arctic states are engaged in a process of strategic co-existence which may lead to other, but less productive, forms of international cooperation.[114]

Future Directions in Regional Cooperation

Although the Arctic has no comprehensive regional plan for the protection of the marine environment, Arctic nations have made progress towards regional cooperation in specific functional areas primarily at the bilateral level. Examples include the United States' contingency plan arrangements with the USSR and Canada and the Canada-Denmark Marine Environment Cooperation Agreement. In February 1987 the USSR submitted a draft Agreement on Cooperation on the Problems of the Arctic and of the North to the government of Canada which proposes wider cooperation in environmental protection, navigation safety and in the exchange of environmental and natural resource information. The agreement as proposed, would establish a Commission on Cooperation in the Arctic and Northern Regions which would coordinate a wide program of joint exchanges, research and cooperation.[115]

Since many pollutants are transported to the Arctic from outside via the atmosphere and marine currents, stronger international efforts will have to be pursued at the extra-regional level. For example, Arctic states might seek to strengthen national commitments to reduce atmospheric pollution through the existing Convention on Long-Range Transboundary Air Pollution.[116] While one might debate the urgency of further regional cooperative initiatives specific to the Arctic Ocean because of the low level of industrialization in such a vast coastal and marine area, a number of arrangements should be considered to provide a more comprehensive marine management regime.

Species Management

Arctic states should strive to create new institutional arrangements for assuring the long-term conservation of marine-related species. For example, Canada and Denmark/

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[113]Dept. of National Defence, *supra*, note 107 at 67.

[114]For example, Canada has bilateral agreements relating to research and development of defence equipment with the United Kingdom, the Federal Republic of Germany, the Netherlands, France, Italy, Denmark, Norway and Sweden: *Ibid.* at 75.

[115]"Draft Agreement between the Government of the Union of Soviet Socialist Republics and the Government of Canada on Cooperation on the Problems of the Arctic and of the North, February 1987" reprinted in (October 1987) vol. 15, no.3 *Northern Perspectives* 3-4.

[116]Reprinted in 18 I.L.M. 1442, in force 16 March 1983.

Greenland might consider establishing a small cetacean conservation commission to provide advice on harvest levels and habitat requirements for narwhals and beluga whales in the Baffin Bay-Davis Strait region. Canada, the United States and the Soviet Union might consider formalizing efforts at a regional level to protect marine mammals, such as: walrus, bowhead and beluga whales, which migrate through the Beaufort, Chukchi and Bering Seas.

Habitat Management

Arctic states should also consider creating a network of significant ecological areas in Arctic waters and following the model of the 1982 Protocol Concerning Mediterranean Specially Protected Areas.[117] The protocol requires the parties to develop common criteria for selecting and managing protected areas, to coordinate scientific research related to protected areas, to undertake public education programs concerning special areas and to examine the possibility of jointly designating special areas contiguous to an international boundary. Canada and Denmark/Greenland might, for example, consider designating the North Water, a large polynya (stretch of open water) which straddles the boundary between Greenland and Ellesmere Island, as a special ecological area requiring cooperative commitments on environmental protection. The North Water provides critical seasonal refuge to walruses, certain seals and polar bears.[118]

Marine Pollution Management

Arctic states should also consider the need to establish regional standards for control of ocean dumping, land-based pollution, and pollution from seabed exploration/exploitation. UNCLOS II (Arts 123, 197, 210, 207 & 208) envisages both global and regional approaches towards such forms of pollution. Only Arctic waters adjacent to the northeast Atlantic are subject to regional arrangements for controlling land-based pollution and ocean dumping through the Paris Convention for the Prevention of Marine Pollution from Land-Based Sources[119] and the Oslo Dumping Convention,[120] respectively.

Marine Transportation Management

If Article 234 of UNCLOS II does grant Arctic states the right to unilaterally regulate the design, construction, crew and equipment of foreign vessels crossing ice-covered waters, the potential exists for divergence in national regulatory approaches and a resultant interference with foreign shipping. From a marine transportation standpoint, harmonization of regulatory approaches would be desirable and could occur at various

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[117]Reprinted in K.R. Simmonds, ed. (1984) Booklet J. 20 (New Series) *New Directions in the Law of the Sea* (Dobbs Ferry, New York: Oceana Publications, Inc.).

[118]Environment Canada, *State of the Environment Report for Canada* (Ottawa: Supply and Services, 1986) 100.

[119]Reprinted in 13 I.L.M. 352, in force 6 May 1978.

[120]Reprinted in 11 I.L.M. 262, in force 7 April 1974.

levels — bilateral, regional or international (using standards agreed to under the auspices of the International Maritime Organization).[121]

Scientific Research Management

Arctic nations might also consider establishing a new arrangement, based on the Antarctic experience, to effectively facilitate scientific cooperation. The Scientific Committee on Antarctic Research (SCAR), a committee of the International Council of Scientific Unions (ICSU), is a non-governmental body made up of delegates from nations involved in Antarctic research and meets every two years to exchange information, identify scientific problems and to coordinate national research efforts. Working Groups have been established in eight areas of scientific interest: biology, glaciology, geodesy and cartography, human biology and medicine, logistics, solid earth geophysics, and upper atmosphere physics.[122]

Arctic-rim scientists have recently been exploring the need for an Arctic-type version of SCAR. On 13 February 1987 scientists from Canada, Denmark/Greenland, Finland, Iceland, Norway, the Soviet Union, Sweden and the United States met in Oslo to discuss the need for an international Arctic science organization to complement existing programs.[123] A discussion paper raised numerous questions for consideration such as: How should "Arctic" be defined for membership purposes? Should non-Arctic countries such as Germany, France, Japan and the UK be included? To what extent should social science research be included? How should the research needs of native peoples be incorporated? Who should represent the various countries, "pure" scientists or government administrators? Whether a more formalized approach to regional cooperation in scientific research will be initiated is a question that may be resolved in the near future. Scientists and scholars, assembled in Stockholm at the Royal Swedish Academy of Sciences in March 1988, unanimously agreed that the eight countries should establish an International Arctic Science Committee to promote and coordinate Arctic scientific research in both the natural and human sciences. The need for an International Arctic Forum to facilitate policy discussions was also raised at the meeting.[124]

Conclusion

Over the last fifteen years circumpolar nations have moved towards greater cooperative action. This trend has been given impetus by the recent actions of the Soviet Union, especially in living resource management, environmental protection and scientific research. It is the result of an acknowledgement of the ecosystem realities of the Arctic. Regional ocean currents, shared stocks of fish, marine mammals, birds and wildlife,

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[121] For a discussion of marine transportation issues in the Arctic, see C. Lamson, "Arctic Shipping Marine Safety and Environmental Protection" (1987) 11 *Marine Policy J.* 3.

[122] R.H. Rutford, "The Role of the Scientific Committee on Antarctic Research (SCAR) in Science and Policy in Antarctica: Past, Present and Future" in *The Polar Regions, supra*, note 35 at 156-61.

[123] The Commission for Scientific Research in Greenland (June 1987) no. 15 *Newsletter* 2.

[124] Personal communication, Dr. Fred Roots, Science Advisor: Environment Canada (5 May 1988).

and wind and weather patterns present the circumpolar nations with common environmental concerns. Arctic nations view both the on and offshore as a storehouse for future resources. This article has illustrated the economic and strategic significance of these resources and has identified a few of the implications of development. As industrial exploration and development increases in the Arctic, the critical need for greater cooperation in marine resource management and protection will grow. This trend will continue in uneasy juxtaposition with strategic tensions caused by the proximity of the superpowers and the increasing militarization across the Polar region.

Arctic nations are among the most highly developed in the world. Their national scientific, legal and governmental infrastructures provide significant resource management and environmental protection capabilities. They have undertaken scientific research and resource assessment both nationally and cooperatively in the region. A considerable array of regional agreements and arrangements for living resource management and environmental protection exists although the trend has been towards bilateral rather than circumpolar conventions. This piecemeal approach to regional cooperation is understandable in light of the strategic hurdle to broadly based agreements and the fact that the national scientific capabilities and infrastructures are so well developed. These nations do not need the developmental assistance which has characterized many of the UNEP Action Plans. Given these factors, it is unlikely that a comprehensive regional approach to ocean management will be taken in the foreseeable future. Marine regionalism will probably continue to evolve in an informal manner in the Arctic in spite of the fact that greater cooperation and integration of the interests and efforts of circumpolar nations can and must occur in the areas of marine environmental management and protection in the near future.[125]

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[125]For a further discussion of needs for regional cooperation in the Arctic, see J.E. Harders, "In Quest of an Arctic Legal Regime: Marine Regionalism - a Concept of International Law Evaluated" (1987) 11 *Marine Policy J.* 285.