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THE ARCTIC ENVIRONMENTAL PROTECTION STRATEGY, ARCTIC COUNCIL AND MULTILATERAL ENVIRONMENTAL INITIATIVES:

Tinkering while the Arctic Marine Environment Totters[†]

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INTRODUCTION

The Arctic marine environment is not pristine, as commonly imagined, but is facing numerous pressures,[1] the most serious arguably coming from outside the region. Melting of sea ice, linked to global warming, threatens the long-term survival of various species including polar bears[2] and has potential to seriously disrupt ocean currents.[3]

[†] This is an expanded version of a chapter published in THE LAW OF THE SEA AND POLAR MARITIME DELIMITATION AND JURISDICTION (A. Oude Elferink & D. Rothwell eds., 2001).

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1. For a review of various "internal" environmental pressures, such as offshore oil and gas developments, disposal of radioactive wastes, increasing shipping traffic and land-based pollution sources, *see* WORKING GROUP ON THE PROTECTION OF THE ARCTIC MARINE ENVIRONMENT, *Report to the Third Ministerial Conference on the Protection of the Arctic Environment, 20-21 March 1996, Inuvik, Canada* (1996) [hereinafter PAME 1996 Report].

2. Polar bears seriously may be impacted by loss of feeding areas through reduction in coastal sea ice. *See* Pål Prestrud and Ian Stirling, *The International Polar Bear Agreement and the Current Status of Polar Bear Conservation*, 20.3 AQUATIC MAMMALS 113, 120 (1994).

3. Higher temperatures and lower salinity of surface waters threaten to slow down the sinking of cold ocean water which helps to drive global ocean currents; colder climates in Scandinavia and Northwest Russia might result. *See* ARCTIC MONITORING AND ASSESSMENT PROGRAMME, *Arctic Pollution Issues: A State of the Arctic Environment Report* 12, 161 (1997), *available at* http://www.amap.no/assess/soaer-cn.htm (last visited

Persistent organic pollutants (POPs), including pesticides, industrial compounds and combustion by-products, are transported via air and water currents from regions outside the Arctic and become concentrated in the fatty tissues of animals.[4] The pollutants threaten not only the well being of wildlife but the health of northern residents heavily dependent on country foods.[5] Heavy metals, such as mercury, lead and cadmium, coming from various transboundary sources, including fossil fuel combustion and waste incineration, are also contaminating the Arctic marine environment.[6] Most Arctic bird species are migratory and during the winter months may accumulate various contaminants from industrialized locations further south and pass along pollutants to other Arctic animals when the birds become prey.[7] Ozone holes over the Arctic, while smaller in size and of shorter duration than in the Antarctic, raise concerns with negative effects on marine phytoplankton production[8] and human health effects such as skin cancer.[9]

Given the potentially serious consequences of transboundary environmental issues in the Arctic, international responses to date appear sluggish and weak.[10] At the regional level, the Arctic Environmental Protection Strategy (AEPS), adopted by the eight Arctic-rim States in 1991,[11] and the subsequent amalgamation of the AEPS into the work of the Arctic Council, established in 1996,[12] have largely involved studying and talking about environmental problems with little concrete action.[13] Limited responses have been made to hazardous substance pollution through: the recently concluded global convention

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Jan. 4, 2002) [hereinafter ARCTIC MONITORING AND ASSESSMENT PROGRAMME].

4. *See* ARCTIC MONITORING AND ASSESSMENT PROGRAMME, *supra* note 3, at 72.

5. *See id.* at 172-173.

6. *Id.* at 92-109.

7. Only about 10 bird species live in the Arctic throughout the year of the millions of birds that breed in the Arctic. *See* KATHLEEN CRANE & JENNIFER LEE GALASSO, ARCTIC ENVIRONMENTAL ATLAS 16 (1999).

8. *See id.* at 119.

9. *See id.* at 180.

10. The regulatory exception is in the area of ozone depletion where countries through the Montreal Protocol have continued tightening controls over ozone depleting substances including the phase out of the most damaging substances, such as fifteen CFCs. A review of the global ozone control efforts is beyond the scope of this chapter. For a review of the quite successful ozone management regime, *see* Katya Jestin, *International Efforts to Abate the Depletion of the Ozone Layer*, 7 GEO. INT'L ENVTL. L. REV. 829 (1995).

11. *See* Arctic Environmental Protection Strategy, Jan. 14, 1991, 30 I.L.M. 1624.

12. *See* Joint Communique and Declaration on the Establishment of the Arctic Council, Sept. 19, 1996, 35 I.L.M. 1382.

13. For a recent critique, see David VanderZwaag, *Regionalism and Arctic Marine Environmental Protection: Drifting Between Blurry Boundaries and Hazy Horizons*, *in* ORDER FOR THE OCEANS AT THE TURN OF THE CENTURY 236 (Davor Vidas & Willy Østreng eds., 1999).

on POPs;[14] the 1998 Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade;[15] the United Nations Economic Commission for Europe (UN ECE) Protocols on POPs and Heavy Metals;[16] The North American Sound Management of Chemicals Initiative; and the Convention for the Protection of the Marine Environment of the Northeast Atlantic.[17]

A comprehensive inventory of heavy metal pollution sources around the world has yet to be undertaken and global controls on heavy metals are non-existent with no global heavy metals negotiations yet proposed and no global land-based marine pollution convention on the immediate horizon.[18] Addressing global climate change has been glacial and complicated with the Kyoto Protocol[19] laden with practical implementation questions and minimal greenhouse gas reduction commitments.

This article, in a four-part format, highlights how the present regional and multilateral legal and institutional responses might be described as tinkering in light of severe environmental threats facing the Arctic. The discussion begins with a summary describing how the Arctic environment might be pictured as "tottering" given the special

14. The Draft Stockholm Convention on Persistent Organic Pollutants, agreed to on December 10, 2000, was adopted by a Conference of Plenipotentiaries in Stockholm, Sweden May 22-23, 2001. The final text at 40 I.L.M. 532 [hereinafter Stockholm POPs Convention].

15. *See* Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, Sept. 11, 1998, 38 I.L.M. 1 [hereinafter Convention on PIC Procedure].

16. *See* Protocol to the 1979 Convention on Long-range Transboundary Air Pollution on Persistent Organic Pollutants, June 24, 1998, 21 INT'L ENVT REPORTER 5001 [hereinafter POPs Protocol]; Protocol to the 1979 Convention on Long-range Transboundary Air Pollution on Heavy Metals, June 24, 1998, 21 INT'L ENVT REPORTER 4951 [hereinafter Heavy Metals Protocol].

17. *See* Convention for the Protection of the Marine Environment for the North-East Atlantic, Sept. 22, 1992, 32 I.L.M. 1069.

18. The "soft" Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities makes rather general pleas for national and regional actions on heavy metals and implementation efforts have been constrained by numerous factors including lack of financing. *See* David L. VanderZwaag, Peter G. Wells & John Karau, *The Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities: A Myriad of Sounds, Will the World Listen?*, 13 OCEAN YEARBOOK 183 (1998). General estimates do exist on continental contributions of various heavy metals, for example, Asian countries are thought to be responsible for almost 50 percent of total mercury emissions. *See* ARCTIC MONITORING AND ASSESSMENT PROGRAMME, AMAP REPORT 2000:4, *AMAP Report on Issues of Concern: Updated Information on Human Health, Persistent Organic Pollutants, Radioactivity, and Mercury in the Arctic* , 62-63 (2000) *available at* http://www.amap.no/ol-docs/pcb-es.pdf (last visited September 2002).

19. *See* Conference of the Parties to the Framework Convention on Climate Change: Kyoto Protocol, Dec. 10, 1997, 37 I.L.M. 22.

sensitivities and the emerging combined stresses of persistent organic pollutants, heavy metals, climate change and ozone depletion. This is followed by an evaluation of the roles of the AEPS and Arctic Council in responding to environmental threats. The article continues by critiquing the adequacy of multilateral responses to date including global efforts to control hazardous substances and climate change, UN ECE Protocols on POPs and Heavy Metals, and North American and Northeast Atlantic initiatives. Concluding remarks then suggest future directions for further action to address transboundary environmental issues such as the need for a more comprehensive approach to managing toxic chemicals in light of developing rights, such as the rights of children and indigenous peoples to a healthy environment, and the precautionary approach.

THE ARCTIC ENVIRONMENT: TOTTERING

The Arctic environment is especially sensitive. The low levels of solar energy received in the North encourage natural processes yet the region's cold temperatures slow rates of photosynthesis and decomposition.[20] Biodiversity in the region involves short and simple food chains that have little or no possibility of species substitution.[21]

Since Arctic species are naturally under constant stress to survive within the harsh environment of the North, they are especially vulnerable to any additional sources of stress, both natural and human induced.[22] The combining forces of POPs, heavy metals, ozone depletion and climate change raise major concerns.

Persistent Organic Pollutants (POPs)

Persistent organic pollutants exhibit a combination of particularly dangerous properties. In particular, "they are toxic; they are persistent in the environment, resisting normal processes that break down contaminants; they accumulate in the body fat of people, marine mammals and other animals and are passed from mother to fetus; and they can travel great distances."[23] POPs fall into three categories.

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20. *See* S.E. Hobbie, *Direct and Indirect Effects of Plant Species on Biogeochemical Processes in Arctic Ecosystems*, *in* ARCTIC AND ALPINE BIODIVERSITY: PATTERNS, CAUSES AND ECOSYSTEM CONSEQUENCES 213 (F. Stuart Chapin III & Christian Körner eds., 1995).

21. For example, the lichen-caribou-human chain in Arctic Canada. *See* UNITED NATIONS ENVIRONMENT PROGRAMME, *Global Environment Outlook 2000*, 180 (1999), *available at* http://www.unep.org/geo2000/english/0119.htm (last visited Dec. 8, 2001).

22. *See id.* at 177.

23. SIERRA CLUB, Toxics: Stockholm Convention on Persistent Organic Pollutants Signed, Sierra Club Environmental Update (2001), *at* http://www.sierraclub.org/toxics/resources/treaty.asp (last visited Dec. 7, 2001).

Pesticides, among others, include dieldrin, DDT, toxaphene, chlordane and lindane.[24] Industrial compounds include polychlorinated biphenyls (PCBs), hexachlorobenzene (HCB) and short-chained chlorinated paraffins.[25] Combustion by-products include dioxins and furans.[26]

Since most POPs are not used in the Arctic, it is clear that these chemicals are transported to the North by long-range pathways. Research studies have explored the potential of contaminant transport in drifting ice[27] and species migration,[28] including birds. But, the most prevalent sources of the toxic chemicals found in the North are through atmospheric and ocean circulation patterns.[29] Air pollution in Russia and Eastern Europe may be carried across the Arctic Ocean to Alaska and Canada in only two weeks.[30]

A recent modeling study of the sources of airborne dioxin in North America and rates of deposition in the Canadian polar territory of Nunavut demonstrates how numerous pollution sources may be and how specific point sources may be identified.[31] This study, carried out by the Center for the Biology of Natural Systems, Queens College, City University of New York on behalf of the North American Commission for Environmental Cooperation, estimated the amount of dioxin emitted from each of 44,091 North American sources that is deposited at each of 16 Nunavut receptor sites.[32] The study, noting that the sources include 5,343 individual facilities such as waste incinerators and 38,748 area sources such as backyard trash burning, found three activities - municipal waste incinerators, backyard trash burning and cement kilns burning hazardous wastes - account for two-thirds of the total dioxin emissions. U.S. sources were estimated to contribute the most dioxin deposition in Nunavut (70-82 percent depending on receptor) with Canadian sources contributing 11-25 percent and Mexican sources five

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24. SIERRA CLUB, Toxics: Stockholm Convention on Persistent Organic Pollutants Signed, Sierra Club Environmental Update (2001), *at* http://www.sierraclub.org/toxics/resources/treaty.asp (last visited Dec. 7, 2001).

25. *Id.*

26. *See* ARCTIC MONITORING AND ASSESSMENT PROGRAMME, *supra* note 3, at 74-75.

27. *See* Edward R. Landa, et al., *Transport of ^{137}Cs and $^{239,240}Pu$ with Ice-rafted Debris in the Arctic Ocean*, 51 ARCTIC 27 (1998).

28. *See* Göran Ewald, et al., *Biotransport of Organic Pollutants to an Island Alaska Lake by Migrating Sockeye Salmon (Oncorhynchus nerka)*, 51 ARCTIC 40 (1998).

29. Environment Canada, *Toxics*, Environment Canada Science and Environment Bulletin (1997), http://www.ec.gc.ca/science/issues/oct97/toxic.htm (last visited Dec. 8, 2001).

30. Environmental Defense, *Large-Scale Pollution Revealed Throughout the Arctic*, ENVIRONMENTAL DEFENSE NEWSLETTER Vol. XXIV, No.5. (1993) , http://www.edf.org/pubs/Newsletter/1993/sep/c_largepoll.html (last visited Dec. 7, 2001).

31. *See* BARRY COMMONER, ET AL., LONG-RANGE AIR TRANSPORT OF DIOXIN FROM NORTH AMERICAN SOURCES TO ECOLOGICALLY VULNERABLE RECEPTORS IN NUNAVUT, ARCTIC CANADA (2000).

32. *See id.*

to ten percent.[33] The amount of dioxin originating from sources outside North America was estimated to be between two percent and twenty percent of the total deposition in Nunavut.[34]

The study was also able to identify individual sources and estimate their deposition contribution. For example, the largest individual contributors of dioxin deposition at the Coral Harbour receptor were identified as the following ten facilities: three municipal waste incinerators in Minnesota, Iowa and Pennsylvania; three cement kilns burning hazardous wastes in Michigan, Missouri and Nebraska; two iron sintering plants in Indiana; a secondary copper smelter in Illinois; and a Canadian municipal waste incinerator in Quebec.[35]

The effects of POPs in the Arctic are not yet fully understood. Many species at the bottom of Arctic food webs are contaminated and pollutants are therefore passed on to their predators through consumption.[36] Chemicals proceed through the food web as they bioaccumulate in the fatty tissues of animals[37] and increase in concentration "as much as 10-fold from one 'link' to the next".[38] Polar bears, at the top of their food chain,[39] are therefore especially susceptible to the contaminants found in the many species below. Fatty ringed seals, the polar bear's food of choice, can pass along a significant amount of concentrated POPs.[40] These chemicals will remain in the polar bear's fat reserves until they are used during off-season periods of fasting when the chemicals relocate from the polar bear's fat tissue to their target organs.[41] The same pollutants have been known to effect animal immune systems, reproduction success and rates of development.[42]

Many research projects are currently working to understand and

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33. COMMONER, *supra* note 31, at xi.

34. *Id.* at x.

35. *Id.* at 77.

36. *See* Norman Davis, *The Arctic wasteland: a perspective on Arctic pollution* 32:182 POLAR RECORD, 237 (1996).

37. *See* Final Act of the Conference of Plenipotentiaries on the Stockholm Convention on Persistent Organic Pollutants , *supra* note 4, at 185.

38. Lisa Mastny, *Coming to Terms with the Arctic*, 13:1 WORLD WATCH 24, 29 (2000).

39. For example, ice algae – zooplankton – arctic cod – ringed seal – polar bear. *See Greenpeace, Climate Press Release, Polar Bears Threatened by Dramatic Arctic Warming* (Nov. 2, 1998), *at* http://www.greenpeace.org/pressreleases/arctic/1998nov2.html (last visited Dec. 7, 2001).

40. *See Environment Canada, Polar Bears at the Top of POPs*, 18 SCI. & ENV'T BULL. 5 (2000), http://www.ec.gc.ca/science/sandemay00/article4_e.html (last visited Dec. 7, 2001).

41. *See* ENVIRONMENT CANADA, CANADIAN WILDLIFE SERVICE RESEARCH PROGRAM, *Assessment of Arctic Ecosystem Stress: Trends and Effects of Contaminants in Polar Bears* (1999), *at* http://www.cws-scf.ec.gc.ca/nwrc/norstrm1.htm (last visited Dec. 7, 2001).

42. ARCTIC MONITORING AND ASSESSMENT PROGRAMME, *supra* note 3, at 72-73.

assess the effects of pollutants on the Arctic.[43] International efforts have been directed towards identifying the sources of Arctic contaminants, their methods of transport to the Arctic, measuring the levels and charting the spatial and temporal distribution of pollutants and understanding the effects of toxic chemicals on Arctic wildlife and human health.[44]

Heavy Metals

While some heavy metals are required by organisms in very small amounts such as arsenic, copper and zinc,[45] three non-essential and potentially toxic heavy metals are of special concern in the Arctic. Mercury, cadmium and lead are present in some regions of the Arctic at levels that may pose risks to the environment and human health.[46] Globally, approximately 3,600 tons of mercury are emitted from human sources per year, primarily from coal-burning, waste incineration and nonferrous smelting and refining operations.[47] Total worldwide atmospheric emissions of cadmium are estimated to be 9,000 tons per year with only 1,400 tons coming from natural sources and the primary human sources being the nonferrous metal industry, waste incineration and inputs from fossil fuel production.[48] Global lead emissions, primarily from the burning of leaded gasoline, have reached over 300,000 tons/year[49] and lead concentrations in mothers' blood in northern populations have been reported to vary from 82.9 to 12.4 micrograms (per liter whole blood).[50]

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43. *See* THE POLAR ENVIRONMENTAL CENTRE, ECO-TOXICOLOGY PROGRAMME, *at* http:// www.polarenvironment.no1/Polarms.nsf/AlleSideDok/E2.6?OpenDocument (last visited Oct. 3, 200); INDIAN AND NORTHERN AFFAIRS CANADA, *Description of the Northern Contaminants Program* (1999), *at* http://www.ainc-inac.gc.ca/ncp/abt/des _e.html (last visited Dec. 7, 2001); NORDIC ARCTIC RESEARCH PROGRAMME, *Changing Patterns of Biomagnified Pollutants in the Northern Marine Environment* (2001), *at* http://thule.oulu.fi/narp/pages/projects.htm (last visited Dec. 7, 2001).

44. For a summary of results from AMAP's Human Health Monitoring Program *see* ARCTIC MONITORING AND ASSESSMENT PROGRAMME, *supra* note 3, at 171-186.

45. CRANE & GALASSO, *supra* note 7, at 95.

46. *See* ARCTIC MONITORING AND ASSESSMENT PROGRAMME, *supra* note 3, at 94.

47. CRANE & GALASSO, *supra* note 7, at 95.

48. *Id.* at 102.

49. *See* ARCTIC MONITORING AND ASSESSMENT PROGRAMME, *supra* note 3, at 97. However, more recent estimates than the 1983 emissions data used in the 1997 AMAP Assessment indicate a substantial worldwide emission reduction in lead to about 119, 259 tons/year in 1995. ARCTIC MONITORING AND ASSESSMENT PROGRAMME, AMAP REPORT 2000:4 , *supra* note 18, at 61-62.

50. The highest level is recorded for Nunavik (Northern Quebec) Canada and the lowest for Northern Norway but the lead levels, according to AMAP's State of the Arctic Environment Report, do not pose a significant threat to the health of Arctic people. *See* ARCTIC MONITORING AND ASSESSMENT PROGRAMME, *supra* note 3, at 179.

Ozone Depletion

Although ozone depletion is more prevalent in the Antarctic, recent measurements of Arctic ozone have revealed notable reductions in ozone levels.[51] A large-scale research project[52] was launched to measure ozone and other atmospheric gases in the Arctic during the 1999/2000 winter and observations indicated that ozone levels were 60% less than usual, the greatest amount of Arctic ozone loss to date.[53]

Little is known about the potential effects of increased UV-B radiation on Arctic plants and animals. The United Nations Environment Programme has predicted that, ". . .Arctic plants are more likely to be affected by increased UV-B radiation than plants at lower latitudes."[54] Studies concerned with the impacts of UV-B radiation on the environment have focused on the reaction of animal immune systems, the damage done to forests and amphibian eggs, the sensitivity of plants and fish and the possibility of decreasing yields in specific crops and commercial tree species. Perhaps more relevant to the Arctic ecosystem are those studies that indicate the vulnerability of phytoplankton and zooplankton to intense UV-B radiation.[55]

Although the Montreal Protocol of 1987 was implemented in an international effort to phase-out the use of ozone-depleting chemicals to restore the ozone layer, the reparation of the ozone layer will likely be delayed. According to NASA climate models, Arctic ozone depletion will continue to worsen, with the possibility of peak losses occurring between 2010 and 2019.[56] "Based on the maximum predicted emissions of ozone-depleting chemicals allowed under the Montreal Protocol, it

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51. During March of 1996, ozone values in the high Arctic were as much as 30% below normal while a decrease of as much as 45% was measured in March of 1997. *See* ANGUS FERGUSSON & DAVID I. WARDLE, ARCTIC OZONE: THE SENSITIVITY OF THE OZONE LAYER TO CHEMICAL DEPLETION AND CLIMATE CHANGE 3 (1998).

52. NASA-sponsored SAGE III Ozone Loss and Validation Experiment (SOLVE) conducted jointly with the European Commission-sponsored Third European Stratospheric Experiment on Ozone (THESEO 2000). *See* EUROPEAN COMMISSION, *Press Release, Ozone Loss of European Arctic: EU and US join forces in the biggest field study yet.* (Nov. 18, 1999), *at* http://europa.eu.int/comm/research/press/1999/pr1811en.html (last visited Nov. 6, 2001).

53. *See* NASA, *News Release 00-36, NASA-European Campaign Observes Significant Arctic Ozone Loss* (Apr. 5, 2000), *at* http://trc.dfrc.nasa.gov/EAO/PressReleases/2000/00-36.html (last visited Nov. 6, 2001).

54. UNITED NATIONS ENVIRONMENT PROGRAMME, *Global Environment Outlook 2000, supra* note 21, at 185.

55. *See* UNITED NATIONS ENVIRONMENT PROGRAMME, *Environmental Effects of Ozone Depletion: 1998 Assessment* (1998).

56. *See* FRIENDS OF THE EARTH, *Fact Sheet, Re-ignite the Effort: Halon Recovery to Protect the Earth's Ozone Layer* (1999), *at* http://www.foe.org/ptp/atmosphere/halons/page3.html (last visited Nov. 6, 2001).

will be at least the year 2050 before the ozone layer recovers."[57]

Climate Change

Climate change and its effects in the Arctic may be the most serious environmental issue threatening the Arctic environment. Average annual temperatures in the Arctic have increased by approximately 1°C in the last century, approximately double the increase in global average temperatures.[58] This Arctic warming has contributed to increases in lake temperatures[59], permafrost thawing, increased stress on plant and animal populations[60] and the melting of glaciers[61] and sea ice.[62] Research has revealed decreases in both sea ice extent[63] and cover.[64]

The Intergovernmental Panel on Climate Change in January 2001 released a third assessment report on the scientific basis of climate change which solidified the link between greenhouse gas emissions and Arctic environmental effects.[65] The report concluded "It is likely that there has been about a 40% decline in Arctic sea ice thickness during late summer to early autumn in recent decades and a considerably slower decline in winter sea ice thickness."[66] The Panel, predicting temperature rises of between 1.4 to 5.8°C over the period from 1990 to 2100 and a global mean sea level rise of .09 to .88 meters, was quite conclusive as to human activities being the main climate change culprit:

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57. *See* Robinson Shaw, ENVIRONMENTAL NEWS NETWORK, *Press Release, Ozone Layer Could Heal by 2050* (Dec. 4, 1999), *at* http://www.enn.com/enn-news-archive/1999/12/120499/csiroozone_7907.asp (last visited Nov. 6, 2001).

58. UNION OF CONCERNED SCIENTISTS, *Fact Sheet, Early Signs of Global Warming: Arctic and Antarctic Warming*, *at* http://www.ucsusa.org/warming/gw_arctic.html (last visited Nov. 7, 2001).

59. *See* RAINFOREST ACTION NETWORK, *Fact Sheet 4A, Rainforests and Global Warming* (1996), *at* http://www.ran.org/ran/info_center/factsheets/04a.html (last visited Nov. 7, 2001).

60. *See* PATRICK MAZZA & RHYS ROTH, GLOBAL WARMING IS HERE: THE SCIENTIFIC EVIDENCE (1999), http://climatesolutions.org/global_warming_is_here/ (last visited Nov. 7, 2001).

61. *See* Lisa Mastny, WORLDWATCH INSTITUTE, *News Brief, Melting of Earth's Ice Cover Reaches New High* (Mar. 6, 2000), *at* http://www.worldwatch.org/alerts/000306.html (last visited Nov. 7, 2001).

62. *See* R. Monastersky, *Icy Signs of Warming Emerge in Arctic*, 153 SCI. NEWS 116 (1998).

63. *See* Konstantin Y. Vinnikov, et al., *Global Warming and Northern Hemisphere Sea Ice Extent*, 286 SCI. 1934 (1999).

64. *See* O.M. Johannessen, et al., *Satellite Evidence for an Arctic Sea Ice Cover in Transformation*, 286 SCI. 1937 (1999).

65. *See* CLIMATE CHANGE 2001: THE SCIENTIFIC BASIS: CONTRIBUTION OF WORKING GROUP I TO THE THIRD ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (John T. Houghton, et al., eds., 2001).

66. *Id.* at 2.

> In the light of new evidence and taking into account the remaining uncertainties, most of the observed warming over the last 50 years is likely to have been due to the increase in greenhouse gas concentrations.[67]

However, there are still skeptics holding a variety of views concerning climate change. While some oppose the idea that temperatures are rising, others concede that global warming is occurring but question the cause; natural or human induced?[68] Those who attribute the Earth's increased surface temperatures to its natural processes look to the environment as the cause through such phenomena as Arctic Oscillation,[69] El Niño,[70] strong tides,[71] and fluctuating solar activity.[72]

Skeptics also remain unsure of the predictions made by computer models. Despite the precise numbers and realistic pictures produced, critics dwell on the assumptions and simplifications used to run the models.[73] These simplifications are necessary since without them there is not enough data or computing power available to create a computer-generated climatic simulation.[74] Since the expected impacts of global warming are based largely on the predictions of climate models, the environmental issues surrounding climate change have been described as "driven solely by the imagination of a computer."[75] Since the quality of output is dependent on the quality of the data used, climate models are vulnerable to poor data collection[76] and they are also limited by the amount, scale and type of data available.[77] Models often cannot

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67. CLIMATE CHANGE 2001: THE SCIENTIFIC BASIS: CONTRIBUTION OF WORKING GROUP I TO THE THIRD ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (John T. Houghton, et al., eds., 2001) at 6.

68. *See* W.K. Stevens, *Global Warming: The Contrarian View*, THE N.Y. TIMES, Feb. 29, 2000, at F1.

69. *See* Richard A. Kerr, *A New Force in High-Latitude Climate*, 284 SCI. 241 (1999).

70. *See A Heated Controversy. Change and Decay*, ECONOMIST, Aug. 15, 1998, at 66.

71. *See* T. Hesman, *It's High Tide for Ice Age Climate Change*, 157 SCI. NEWS 246 (2000).

72. *See* Willie Soon, et al., *Environmental Effects of Increased Atmospheric Carbon Dioxide*, 13 CLIMATE RES. 149 (1998).

73. *See* COOLER HEADS COALITION, *Global Warming Information Page Science Article, Climate Model Uncertainties* (2000), *at* http://www.globalwarming.org/sciup/sci2-25-00.html (last visited Nov. 7, 2001).

74. CENTER FOR THE STUDY OF CARBON DIOXIDE AND GLOBAL CHANGE, *Subject Index, Climate Models: Approximations and Limits*, *at* http://www.co2science.org/subject/other/climate_models.htm (last visited Nov. 7, 2001).

75. P.J. Michaels, *Computer Models, the Kyoto Protocol, and Reality*, ENV'T & CLIMATE NEWS, Mar. 2000, http://www.heartland.org/environment/mar00/reality.htm (last visited Nov. 7, 2001).

76. Jan Cienski, *Global Warming Theories Criticized Models Faulty: Scientists*, NAT'L POST, May 31, 2000.

77. *See* Jennifer Couzin, *Landscape Changes Make Regional Climate Run Hot and Cold*, 283 SCI. 317 (1999).

incorporate all of the factors that are environmentally important including cloud characteristics, solar variability, atmospheric circulation fluctuations, surface albedo changes[78] and land use change.[79]

Nevertheless, some scientists are now warning that climate change could be a leading cause of biodiversity loss.[80] Entire ecosystems are at risk as climate change is likely to create conditions that are unsuitable for species in their natural habitat, which results in considerable threat for immobile species like vegetation. Entire forests can be lost as well as the wildlife dependent on them.[81] Studies have shown that the effects of climate change will be felt in all types of environments, altering terrestrial plant species composition,[82] exposing aquatic life to ultraviolet radiation[83] and making coastal regions more vulnerable to shoreline erosion.[84]

Various Arctic wildlife populations already have been forced to adapt to changes in their habitats. Polar bears live on sea ice while hunting their prey and reductions in sea ice due to warming have resulted in shorter feeding periods and decreased accessibility to the seals that they hunt.[85] The Peary caribou of the high Canadian Arctic suffered a dramatic decrease in population during a period of unusually warm winters.[86] They were not able to reach the tundra vegetation that they feed on as it was covered by a layer of crusty snow and ice that formed as a result of warming.[87] Walrus populations are also suffering from the retreat of the sea ice and changes in food supply as is evident by their recently low juvenile survival rates.[88] Killer whales have been

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78. S. Fred Singer, *Human Contribution to Climate Change Remains Questionable*, 80:16 EOS TRANSACTIONS 183 (1999).

79. *See* COOLER HEADS COALITION, *Global Warming Information Page Science Article, Climate Change Uncertainty Overstated* (2000), *at* http://www.globalwarming.org/sciup/sci2-1-00.html (last visited Nov. 7, 2001).

80. ENVIRONMENTAL DEFENSE, *Climate Change Could Be a Leading Cause of Biodiversity Loss*, Environmental Defense Newsletter Vol. XXXI, No. 2 (2000), *at* http://www.environmentaldefense.org/pubs/newsletter/2000/Jun/k_climat.html (last visited Nov. 7, 2001).

81. *See* GREENPEACE, *Fact Sheet, Climate Change and the Northern Forests* (1998), *at* http://www.greenpeace.org/~climate/arctic99/html/content/factsheets/oldreports/forests.html (last visited Nov. 7, 2001).

82. *See* Jerry M. Melillo, *Warm, Warm on the Range*, 283 SCI. 183 (1999).

83. P. Calamai, *North's Lakes Under Threat as Climate Warms Up*, TORONTO STAR, Mar. 30, 2000.

84. *See* John Shaw, et al., *Potential Impacts of Global Sea-Level Rise on Canadian Coasts*, 42 CAN. GEOGRAPHER 365 (1998).

85. *See* Ian Stirling, et al., *Long-term Trends in the Population Ecology of Polar Bears in Western Hudson Bay in Relation to Climate Change*, 52 ARCTIC 294 (1999).

86. *See* GREENPEACE, *Fact Sheet, Climate Change and Arctic Wildlife* (Feb. 2000), *at* http://www.greenpeace.org/~climate/arctic99/reports/html/content/factsheets/arcticwildlife.html (last visited Nov. 7, 2001).

87. *Id.*

88. *See* GREENPEACE, *Climate Press Release, Greenpeace Expedition Finds New*

reported as feeding on sea otters since their prey of choice, sea lions and harbor seals, have followed changes in fish migration patterns and moved out of the killer whales' habitat range.[89]

REGIONAL TINKERINGS: THE AEPS AND ARCTIC COUNCIL

The Arctic was one of the last areas of the world to develop as a political region. Prior to World War II, it was seen as a cold and forbidding area that was sparsely inhabited by "Eskimos."[90] Except for the whaling industry that was over-exploited by the 1930s, it was seen as an area of little economic or political benefits. The severe nature of the climate meant that few southerners were willing to take the risk in traveling to this area. The end of World War II ushered in the beginning of the Cold War, which fundamentally altered how the Arctic was viewed. With the invention of nuclear weapons international relations became frozen. The corresponding development of long-range bombers and ballistic missiles as delivery systems for these weapons turned the North into a primary theater of operations.[91] Given the importance that both sides gave to maintaining their strategic nuclear capabilities, it was not surprising that there was little movement towards international cooperation in the region.

The endeavor to create an Arctic specific international arrangement that included all of the Arctic States was not implemented until the end of the 1980s. This endeavor ultimately led to the creation of the Arctic Environmental Protection Strategy (AEPS), which was then transformed into the Arctic Council.[92] These regional initiatives are significant developments in responding to the environmental problems facing the North, and they also represent important first steps in the development of regional cooperation. However, there is concern that these initiators may be incapable of responding to the environmental problems in the Arctic. The main concern stems from the fact that these efforts operate on a soft law basis. Both the AEPS and the Arctic Council are founded on the basis of non-binding documents,

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Evidence of Climate Change Impacts in the Arctic (Aug. 5, 1999), *at* http://greenpeace.org/pressreleases/arctic/1999aug5.html (last visited Nov. 7, 2001).

89. *See* David Suzuki Foundation, Fact Sheet, Climate Change: Imperiled Ecosystems (1999), *at* http://www.davidsuzuki.org/campaigns_and_Programs/Climate_change/Climate_Science/Climate-Damage/Imperilled_Ecosystems.asp (last visited Nov. 7, 2001).

90. The term that was used by most southerners in reference to the Inuit.

91. For a good overview of the security problem as it has evolved see NATIONAL SECURITY AND INTERNATIONAL ENVIRONMENTAL COOPERATION IN THE ARCTIC - THE CASE OF NORTHERN SEA ROUTE 1-354 (Willy Østreng ed., 1997). *Also see* Rob Huebert, *Canadian Arctic Security Issues: Transformation in the Post-Cold War Era*, 54:2 INT'L J. 203-229 (1999).

92. Alan Saunders, *Pondering an Arctic Council*, 19:2 N. PERSP. 1 (1991), *available at* http://www.carc.org/pubs/v19no2/1.htm (last visited Jan. 14, 2002).

not a treaty. Was this the best that could be achieved given the varied interests and capabilities of the northern States or does the lack of treaty law miss an important opportunity for dealing with the problems faced by the region? To address this question, it is necessary to examine how the AEPS and Arctic Council were created and to then consider what functions they perform.

Creation of AEPS

Limited cooperation in the Arctic began to change when Mikhail Gorbachev made his Murmansk speech in October 1987.[93] While the western response to the speech was originally cool, Gorbachev's effort represented the first step by an Arctic State to further northern cooperation since the Cold War began. In his speech, Gorbachev called upon Arctic States to, "set aside their differences and to join in a zone of peace and fruitful co-operation."[94] However, since Gorbachev had defined his Arctic zone of peace to exclude the Soviet naval base of Murmansk, most leaders of the other Arctic States viewed his proposals with a large degree of skepticism. Nevertheless, the speech was significant in that it was the first time in which either an American or Soviet leader had actually suggested that broad cooperative behavior might be possible in the Arctic.[95] Any doubts that the NATO States may have harbored were quickly overcome by events in the USSR. Gorbachev's reforms unleashed forces that soon overtook his government and saw the breakup of the Soviet empire and the fall of the Communist government. As these processes occurred, several Arctic groups and States saw the opportunity to initiate discussions for cooperative action in the Arctic.

The two most important initiatives are the AEPS and the Arctic Council.[96] To a large degree, the AEPS was the result of the initiative of the Finnish Government led by Ambassador Esko Rajakoski at the end of the 1980s.[97] He has listed four main reasons why his government believed that the time had arrived for the conduct of international discussions regarding environmental problems in the Arctic.[98]

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93. *See* DAVID SCRIVENER, GORBACHEV'S MURMANSK SPEECH: THE SOVIET INITIATIVE AND WESTERN RESPONSES 1-75 (1989).

94. *Pondering an Arctic Council*, *supra* note 92.

95. GORBACHEV'S MURMANSK SPEECH: THE SOVIET INITIATIVE AND WESTERN RESPONSES, *supra* note 93 at 1-75.

96. For a discussion into the creation of both see Rob Huebert, *New Directions in Circumpolar Cooperation: Canada, The Arctic Environmental Protection Strategy, the Arctic Council and Canada*, 5:2 CAN. FOREIGN POL'Y 37-58 (1998); and DAVID SCRIVENER, ENVIRONMENTAL COOPERATION IN THE ARCTIC: FROM STRATEGY TO COUNCIL 1-35 (1996).

97. Esko Rajakoski, *Multilateral Cooperation to Protect the Arctic Environment: The Finnish Initiative*, *in* THE ARCTIC: CHOICES FOR PEACE AND SECURITY 54-55 (1989).

98. *Id.*

Specifically these were: the improved relations between the East and the West; the lack of existing international legal instruments; the need to improve scientific research in the Arctic; and, most importantly, the awareness of the deterioration of the Arctic environment.

Finland initiated negotiations in October 1988 with the other seven Arctic States.[99] Receiving positive feedback to their initial discussions, they officially launched a proposal to create a multilateral body on January 12, 1989.[100] Several more meetings were held up to June 1991. At that time the eight Arctic States - the United States, Russia, Canada, Finland, Sweden, Iceland, Norway and Denmark for Greenland - met at Rovaniemi to sign the Declaration on the Protection of the Arctic Environment and the accompanying Strategy.[101] The Strategy consisted of: a set of objectives and principles;[102] identification of six main types of pollutants – persistent organic contaminants, oil pollution, heavy metals, noise, radioactivity and acidification;[103] identification of the existing mechanisms for the protection of the Arctic environment;[104] and a section on the actions to be taken to counter the pollutants.[105]

An interesting innovation that was associated in the creation of the AEPS was the inclusion of three northern indigenous organizations to represent their people. These included the Inuit Circumpolar Conference (ICC), the Saami Council and the Association of Indigenous Minorities of the North, Siberia and the Far East of the Russian Federation (now known as the Russian Association of Indigenous Peoples of the North).[106] While they were not accorded completely equal status to the State members, they were allowed to participate in almost all of the AEPS discussions and have subsequently been granted the status of Permanent Participants.[107]

Structure of AEPS

The AEPS was created pursuant to "soft international law."[108] Rather than commit to the establishment of an international treaty, the members of the AEPS would participate in the AEPS activities on a voluntary basis. To a certain degree, this was the result of the United

99. Rajakoski, *supra* note 97, at 54-55.
100. *Id.* at 56.
101. *Id.*
102. *See* Arctic Environmental Protection Strategy, *supra* note 11, at 1631-1633.
103. *See id.* at 1633-1643.
104. *See id.* at 1644-1649.
105. *See id.* at 1649-1655.
106. *See* Arctic Environmental Protection Strategy, *supra* note 11, at 1655-1664.
107. *Id.*
108. *See* ORAN YOUNG, CREATING REGIMES: ARCTIC ACCORDS AND INTERNATIONAL GOVERNANCE, 3 n.7 (1998).

States' reluctance at the time to participate in any new multilateral organizations and to enter into any new international financial commitments. One of the most difficult challenges that the founders of the AEPS faced was the development of a structure and work plan for the Strategy.

The plan to implement the Strategy had three main focal points. First, the commitment was made to continue to meet at the ministerial level on a regular basis. This was intended to ensure that the AEPS continued as an ongoing process.[109] The second commitment was to involve the indigenous northern peoples in the process in a meaningful manner.[110] The third commitment was the establishment of working groups in four areas: Arctic Monitoring and Assessment Program (AMAP); Protection of the Arctic Marine Environment (PAME); Emergency Prevention, Preparedness and Response (EPPR); and Conservation of Arctic Flora and Fauna (CAFF).[111]

Following the first meeting at Rovaniemi, the second ministerial meeting was held in Nuuk, Greenland in September 1993.[112] Much of what had been agreed to at the first meeting was reaffirmed. However, since the 1992 United Nations Conference on the Environment and Development (UNCED) had been held in Rio,[113] attention was also turned to the concept of sustainable development.[114] This is reflected in the title of the official declaration, "The Nuuk Declaration on Environment and Development in the Arctic" as well as in the decision to create a fifth working group - the Task Force on Sustainable Development.[115] It was also decided that there was a need to improve the involvement of northern indigenous peoples in the process. Even though the classification as Permanent Participant meant that these groups were officially included in the deliberations of the AEPS, many

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109. *See* ARCTIC ENVIRONMENTAL PROTECTION STRATEGY, *supra* note 11, at 1655-1664.

110. *Id.*

111. *See id.* at 1655-1664.

112. *See* The Arctic Environment: Second Ministerial Conference, 16 September 1993 – Nuuk, Greenland (1993), http://eppr.arctic-council.org/reports/930916.html (last visited Dec. 31, 2001).

113. *See* UNITED NATIONS ENVIRONMENT PROGRAMME, *Rio Declaration on Environment and Development*, UNITED NATIONS CONFERENCE ON ENVIRONMENT AND DEVELOPMENT (1992), http://www.unep.org/Documents/Default.asp?DocumentID=78&ArticleID=1163 (last visited Dec. 31, 2001).

114. *See* Nigel Bankes, et al., *Toward Sustainable Development in Canada's Arctic: Policies and International Relations, in* CANADA AMONG NATIONS 1993-1994: GLOBAL JEOPARDY 180 (Fen Osler Hampson & Christopher Maule, eds. 1993).

115. *See* THE ARCTIC ENVIRONMENT: SECOND MINISTERIAL CONFERENCE, THE NUUK DECLARATION ON ENVIRONMENT AND DEVELOPMENT IN THE ARCTIC, NUUK, GREENLAND, SEPTEMBER 1993 3-4 (1993), *available at* http://www.arctic-council.org/nuuk_report.asp (last visited Dec. 22, 2001).

believed that there had not been enough effort dedicated to this action. In order to provide the three indigenous groups with logistical assistance, the Government of Denmark and the Greenland home rule office established the Indigenous Peoples Secretariat in Copenhagen in 1994.[116] Its primary task is to act as a coordinating body for the three indigenous organizations.[117]

The third ministerial meeting was held in Inuvik, Canada in March 1996.[118] To a certain degree, the operating procedure developed at the last two ministerial meetings was maintained. Consideration had been given to the elimination of one of the working groups (PAME) but the ministers decided against this course of action and the four working groups were maintained. The ministers also directed that the task force on sustainable development and utilization be transformed into a working group.

The AEPS and Its Working Groups and Task Force

The most significant contributions of the AEPS in responding to environmental degradation of the Arctic region have been through the work of its working groups and task force. For the most part, these working groups and task force have two main objectives: to determine the nature and extent of the specific environmental problems; and to examine options to remedy them through cooperative action.

Arctic Monitoring and Assessment Program (AMAP)

AMAP is the cornerstone of the AEPS. Its primary function is to determine the levels of anthropogenic pollutants in the Arctic.[119] The focus of AMAP is to build as much as possible on pre-existing programs to allow for better comparative analysis and to be more cost-effective.[120] Nevertheless, AMAP has begun to develop programs to fill in gaps that have been discovered through the monitoring of contaminants. AMAP published two assessment reports on the state of the Arctic environment in 1997 and 1998. The first, summary report provided policymakers with a review of the major findings.[121] The second AMAP

116. THE ARCTIC ENVIRONMENT: SECOND MINISTERIAL CONFERENCE, THE NUUK DECLARATION ON ENVIRONMENT AND DEVELOPMENT IN THE ARCTIC, NUUK, GREENLAND, SEPTEMBER 1993 16 (1993), *available at* http://www.arctic-council.org/nuuk_report.asp (last visited Dec. 22, 2001).

117. *Id.*

118. *See* PAME 1996 Report, *supra* note 1, at 1.

119. *See* ARCTIC MONITORING AND ASSESSMENT PROGRAMME, *About AMAP*, *at* http://www.amap.no/about.htm (last visited Dec. 31, 2001).

120. ARCTIC MONITORING AND ASSESSMENT PROGRAMME, *About AMAP*, *at* http://www.amap.no/about.htm (last visited Dec. 31, 2001).

121. *See* ARCTIC MONITORING AND ASSESSMENT PROGRAMME, *supra* note 3, at 3.

report was a comprehensive technical and scientifically presented assessment of all validated data on the status of the Arctic environment relative to the AMAP mandate. This report was over 850 pages.[122] AMAP then developed a new strategic plan covering the years 1998-2003.[123] At the fourth AEPS ministerial meeting in Alta, June 1997, the Ministers, "endorsed continuation of [AMAP] activities for monitoring, data collection, exchange of data on impacts and assessment of the effects of contaminants and their pathways, increased UV-B radiation due to stratospheric ozone depletion, and climate change on Arctic ecosystems."[124] To guide the efforts of the working group, five priorities were established. These included the continued examination and assessment of: 1) contaminants levels, trends and effects in human populations and in the environment; 2) effects due to changes in climate and UV radiation; 3) source-receptor relationships; 4) human health; and 5) to provide for the full and complete communication of information.[125]

Since the release of the *State of the Arctic Environment Report*, the main focus of AMAP has been directed to examining the linkage between human health and Arctic pollutants,[126] and further examination of specific pollutants such as PCBs.[127]

Although AMAP has emerged as one of the most important international bodies assessing the levels of contaminants in the Arctic, the body has been provided with a very modest budget. For example, between 1994 and 1996, AMAP was allocated only $3,875,200.[128] Lack of resources is the most significant problem facing AMAP. The work that is accomplished is of a very high caliber. But the amounts that are allocated to it will only allow for AMAP to coordinate the study of Arctic

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122. *See* ARCTIC MONITORING AND ASSESSMENT PROGRAMME, *AMAP Assessment Report: Arctic Pollution Issues* (1998).

123. *See* ARCTIC MONITORING AND ASSESSMENT PROGRAMME, *AMAP Strategic Plan: 1998-2003, AMAP Report 99:6, available at* http://www.amap.no/ol-docs/str-plan.pdf (last visited Jan. 2, 2002); AMAP STRATEGIC PLAN: 1998-2003, AMAP REPORT 99:6, *available at* http://www.amap.no/ol-docs/str-plan.pdf (last visited Jan. 2, 2002).

124. *See* ARTIC COUNCIL, The Alta Declaration on the Arctic Environmental Protection Strategy (1997), http://www.arctic-council.org/alta.asp (last visited Jan. 2, 2002).

125. *See* ARCTIC MONITORING AND ASSESSMENT PROGRAMME, *AMAP Report 99:6, AMAP Strategic Plan:* 1998-2003 1-17, *available at* http://www.amap.no/ol-docs/str-plan.pdf (last visited Jan. 2, 2002).

126. *See* ARCTIC MONITORING AND ASSESSMENT PROGRAMME, *AMAP Report 2000:1, Workshop on Persistent Organic Pollutants (POPs) in the Arctic: Human Health and Environmental Concerns (2000) available at* http://www.anap.no/ol-docs/wsphh-rep.pdf (last visited Jan. 2, 2002); and ARCTIC MONITORING AND ASSESSMENT PROGRAMME AMAP REPORT 2000:4, *supra* note 18, 1-71.

127. *See* ARCTIC MONITORING AND ASSESSMENT PROGRAMME, *AMAP Report 2000:3, PCB in the Russian Federation: Inventory and Proposals for Priority Remedial Actions 1-30* (2000), *available at* http://www.amap.no/ol-docs/pcb-es.doc (last visited Jan. 2, 2002).

128. AMAP *Report to the Ministers* (Alta: 1997)

contaminants, it will not allow for substantial new science, nor will it allow for efforts to remedy the problems. Unfortunately, there is no indication in the most recent reports to suggest this will change in the future.

Emergency Prevention, Preparedness and Response (EPPR)

Of the working groups of the AEPS, the EPPR has likely been the least active. The major mandate of this group is to develop a cooperative approach to emergency responses caused by environmental accidents.[129] It is not mandated as a response organization. The major focus of the organization has been on the development of risk assessment of threats to the Arctic and the development of a guide on emergency prevention, preparedness and response in the Arctic.[130] As stated in its *Strategic Plan of Action*:

> [t]he Arctic countries and permanent participants meet within the working group to coordinate, cooperate and exchange information, and undertake projects with the aim of improving the capability to prevent, prepare for, and respond to pollution incidents in Arctic areas. The EPPR working group is an expert's forum focusing on enhancing best practices, and although the EPPR working group does not provide direct response to emergencies it can be a mechanism to provide advice or assistance as appropriate during a major emergency. The EPPR working group deals with accidental releases and events and not with chronic discharges. Pure natural disasters are not at this moment a part of the working group's plan and although nuclear questions are part of the work plan, currently no initiative focuses specifically on nuclear issues.[131]

The EPPR has been criticized for its inability to respond to environmental disasters when they have occurred. To illustrate; the EPPR has been dormant despite incidences of major oil spills in the Russian north as a result of pipeline breaks.[132] The reason is resources and concerns over sovereignty. The members of the AEPS are not willing to provide the organization with the capability to respond

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129. *See* ARCTIC COUNCIL, Rovaniemi Declaration Signed by the Eight Arctic Nations, June 14, 1991, http://www.arctic-council.org/rovaniem.asp (last visited Jan. 2, 2002).

130. *See* PAME 1996 Report, *supra* note 1, at 2-3; EMERGENCY PREVENTION, PREPAREDNESS AND RESPONSE, *Report of the 1999 Emergency Prevention, Preparedness and Response (EPPR) Working Group Meeting* (1999), *available at* http://www.artic-council.org/reports/990908.html (last visited Jan. 2, 2002).

131. EMERGENCY PREVENTION, PREPAREDNESS & RESPONSE, *STRATEGIC PLAN OF ACTION FOR THE ARCTIC EMERGENCY PREVENTION, PREPAREDNESS & RESPONSE WORKING GROUP* (18 Aug. 1998) at 5, *available at* http://eppr.arctic-council.org/strat-plan.html (last visited May 3, 2002).

132. *Strategic Plan of Action for the Arctic Emergency Prevention, Preparedness and Response Working Group*, *supra* note 130.

independently due to the significant cost incurred by such a capability. Nor are States willing to allow other States unfettered access to their territory in the face of a environmental disaster. Essentially, EPPR's primary function when an environmental emergency occurs is to develop guidelines to assist member States to deal with the emergency.[133] It does not have the mandate or the ability to act personally. However, when a State is responding to an emergency, it is primarily focused on responding to the crisis and obtaining immediate assistance. Thus, the EPPR is of limited use in the context of an actual environmental emergency.

Currently, the EPPR continues to act only as a coordinator for the member States to develop and coordinate a common emergency response policy. In its most recent report, the body's activities included the development of an EPPR web-site and brochure.[134] The most substantial project has been the creation of a circumpolar map of resources that are at risk from oil spills in the Arctic.[135] This serves to illustrate that the organization has demonstrated little potential to develop beyond its initial limited mandate.

Protection of the Arctic Marine Environment (PAME)

This working group was created to, "describe the environmental threats to the Arctic marine environment and review the adequacy of existing international instruments pertaining to the Arctic marine environment."[136] Of the bodies that exist under the AEPS and Arctic Council, PAME has been the one whose mandate that has been the most focused on maritime environmental issues. Specifically,

> [t]he PAME working group addresses policy and non-emergency pollution prevention and control measures related to the protection of the Arctic marine environment from land and sea-based activities.[137]

PAME's first course of action was the review of land-based and marine-based sources of pollution and the existing international instruments.

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133. *Strategic Plan of Action for the Arctic Emergency Prevention, Preparedness and Response Working Group*, *supra* note 130..

134. *See* EMERGENCY PREVENTION, PREPAREDNESS AND RESPONSE, *REPORT OF THE 13-15 JUNE 2000 EMERGENCY PREVENTION, PREPAREDNESS AND RESPONSE (EPPR) WORKING GROUP MEETING 9 (2000), available at* http://www.artic-council.org/reports/990908.html (last visited Jan. 2, 2002).

135. *See id.* at 6.

136. PROTECTION OF THE ARCTIC MARINE ENVIRONMENT, *Work Plan for the Protection of the Arctic Marine Environment* 2000-2002 1 (2000), *available at* http:www.grida.no/pame/PAME_ work%20_plan_2000-2002.doc (last visited Jan. 2, 2002).

137. PROTECTION OF THE ARCTIC MARINE ENVIRONMENT, *Work Plan for the Protection of the Arctic Marine Environment*, *supra* note 136.

> This review determined that no single instrument completely addresses the problems associated with land-based sources of pollution in the Arctic.[138]

Participants at the 1998 Iqaluit Ministerial meeting established five objectives for the working group: 1) to prevent marine pollution from land-based activities; 2) to prevent marine pollution from offshore oil and gas activities; 3) to prevent marine pollution from shipping activities; 4) to implement international agreements and to assess the need for further actions or measures and; 5) to develop and promote integrated and cost-effective action.[139]

The working group's main efforts are now focused on the implementation of the Regional Programme of Action for the Protection of the Arctic Marine Environment from Land-based Activities.[140] PAME has sponsored conferences and studies on various marine issues. It has also attempted to assist the Russian Government through cooperation with the Advisory Committee on the Protection of the Sea (ACOPS).[141]

At the same time, PAME's efforts to deal with offshore sources of pollutants have tended to be limited to the study and survey of current activities relating to shipping and offshore oil and gas. A principal action has been to monitor and observe the efforts of the IMO in the development of the Guidelines for Ships Operating in Arctic Ice-Covered Waters.[142]

Conservation of Arctic Fauna and Flora (CAFF)

The Conservation of Arctic Fauna and Flora (CAFF) working group was created through the intervention of the Canadian Wildlife Service of Environment Canada during the negotiations of AEPS.[143] The original objectives of CAFF were: 1) to conserve Arctic flora and fauna, their diversity and their habitats; 2) to protect the Arctic ecosystem from threats; 3) to improve conservation management laws, regulations and practices for the Arctic; and 4) to integrate Arctic interests into

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138. *See* PAME 1996 Report, *supra* note 1, at 10.

139. *See* PROTECTION OF THE ARCTIC MARINE ENVIRONMENT, WORK PLAN FOR THE PROTECTION OF THE ARCTIC MARINE ENVIRONMENT 2000-2002 *supra* note 136, at 3-7.

140. *See* ARCTIC COUNCIL, The Iqaluit Declaration: The First Ministerial Meeting of the Arctic Council, Iqaluit, Canada, September 17-18, 1998, art. 24, *available at* http://arctic-council.org/iqaluit.asp (last visited Jan. 13, 2002).

141. *See* PROTECTION OF THE ARCTIC MARINE ENVIRONMENT, *Working Group Meeting Report, June 5-8, 2000, Copenhagen, Denmark* 8 (2000).

142. For a discussion regarding the Guidelines *see* Lawson W. Brigham, *The Emerging International Polar Navigation Code: Bi-polar Relevance?*, *in* PROTECTING THE POLAR MARINE ENVIRONMENT: LAW AND POLICY FOR POLLUTION PREVENTION 244 (D. Vidas, ed. 2000).

143. *See* CONSERVATION OF ARCTIC FLORA AND FAUNA, *About CAFF*, *at* http://www.grida.no/caff/about.htm (last visited Jan. 13, 2002).

global conservation fora.[144]

However, CAFF's plans were quickly modified when it was recognized that the initial program was overly ambitious. In 1998, CAFF submitted its strategic work plan for 1999-2000.[145] Five specific actions were agreed upon at the ministerial meeting in Iqaluit:.

> 1) Enhance efforts to monitor Arctic biological diversity, paying particular attention to species, populations, habitats and ecosystems, which are of greatest ecological, cultural and social value.
>
> 2) Support and implement measures for the conservation of Arctic genetic resources, species and their habitats.
>
> 3) Establish protected areas in the Arctic where they contribute to the conservation of ecosystems, habitats and species.
>
> 4) Manage activities outside protected areas in order to maintain the ecological integrity of protected areas and to ensure the conservation of biodiversity.
>
> 5) Enhance integration of biodiversity conservation and sustainable use objectives into sectorial and cross-sectoral plans and policies. Identify approaches and develop strategies by which information on the conservation of Arctic biological diversity can be made available in an appropriate manner to those making socio-economic decisions. [146]

As with the other working groups, CAFF has accomplished important work in the sharing of information regarding the particulars of its area of study. However, most of its effectiveness depends entirely on the domestic policies of the various Arctic States involved. Protection of most habitat areas will take place only if States are willing to invoke the necessary legislation to offer protection.[147] Since it often happens that the habitat areas in question also contain economic resources such as oil and gas, States have been slow to fill in the gaps in protected area designation. As documented in a *Summary of Legal Instruments and National Frameworks for Arctic Marine Conservation* (CAFF Habitat Conservation Report No. 8), issued in July 2000, marine conservation

144. CONSERVATION OF ARCTIC FLORA AND FAUNA, *About CAFF*, *at* http://www.grida.no/caff/about.htm (last visited Jan. 13, 2002).

145. *See* CONSERVATION OF ARCTIC FLORA AND FAUNA, *The CAFF Work Plan 1999-2000*, *at* http://www.grida.no/caff/workplan.htm (last visited Jan. 13, 2002).

146. *Id.*

147. *See generally Conservation of Arctic Flora and Fauna, Caff Habitat Conservation Report No. 8: A Summary of Legal Instruments and National Frameworks for Arctic Marine Conservation (2000)*, http://www.grida.no/caff/MarinePaper-final.htm (last visited Jan. 14, 2002).

legislation is not always implemented and adequately enforced.[148]

Sustainable Development and Utilization (SDU)

The SDU began its existence as a task group and not a working group when it was created at the second ministerial meeting in Nuuk.[149] The specific distinction has not always been made clear in official terms, however, in practical terms there has been a tendency to treat a task group as a more informal organization than is the case with the working groups.

As previously mentioned, the impetus for the creation of the Task Force for Sustainable Development and Utilization (TFSDU) came as a result of UNCED. Participants at the Nuuk meeting reached a general recognition that the AEPS needed to consider issues of sustainability and not only environmental protection.[150] As with the working groups, the first task given to the TFSDU was to develop a proposed course of action to be presented to Ministers for approval.[151] In accomplishing this task it became apparent that there were substantial differences among the various States and Permanent Participants as to what constituted sustainable development. Nevertheless, the TFSDU was able to identify five major issue areas: 1) trade policies, opportunities and barriers (which focused on the harvesting of marine mammals and fur bearing animals); 2) case studies of sustainable renewable resource use; 3) environmental impact assessment; 4) communication and education strategy; and 5) regional applications of Agenda 21.[152] Following the Inuvik meeting, the status of the task force became somewhat confused. The ministers agreed in the Inuvik Declaration to transform the task group into a working group. However, during the negotiations for the creation of the Arctic Council, consideration was instead given to eliminating the task group.[153] Supporters of the Arctic Council wanted the new organization to focus on the issues of

148. *See Conservation of Arctic Flora and Fauna, Caff Habitat Conservation Report No. 8: A Summary of Legal Instruments and National Frameworks for Arctic Marine Conservation (2000)*, http://www.grida.no/caff/MarinePaper-final.htm (last visited Jan. 14, 2002) at 30.

149. *See* ARCTIC ENVIRONMENT, *The Arctic Environmental Protection Strategy, Global Agenda*, Vol. 3, No. 3, http://www.dfait-maeci.gc.ca/english/news/newsletr/global/globc2-e.htm (last visited Jan. 14, 2002).

150. *Id.*

151. *Id.*

152. TASK FORCE FOR SUSTAINABLE DEVELOPMENT AND UTILIZATION, *Report of the Task Force for Sustainable Development and Utilization and Working Papers in Progress* 3-5 (1996).

153. *See* ARCTIC COUNCIL, The Iqaluit Declaration: The First Ministerial Meeting of the Arctic Council, Iqaluit, Canada, September 17-18, 1998, art. 7-11, *available at* http://arctic-council.org/iqaluit.asp (last visited Jan. 13, 2002). [Hereinafter The Iqaluit Declaration: The First Ministerial Meeting of the Arctic Council].

sustainability. Therefore, it was reasoned, that if a working group on sustainability was created, it would duplicate the work of the Arctic Council and dilute the actions the Council. Thus, when the Declaration on the Establishment of an Arctic Council was agreed upon, it contained references to the four existing working groups, but no mention was made of the task group nor of the decision at Inuvik to transform it into a working group.[154] But, at the Iqualuit Ministerial meeting in September 1998, the decision was made to establish both a Sustainable Development Program and a Sustainable Development Working Group.[155]

Part of the difficult existence faced by the TFSDU can be attributed to the differences between American officials on the one hand, and Canadian officials and Permanent Participants on the other, regarding the harvesting of marine mammals. The Americans have continually opposed any form of trade in northern marine mammals.[156] President Clinton went on record as opposing Canadian efforts to address trade in marine mammal products within the Arctic Council.[157] However, Canadian Ambassador, Mary Simon, has repeatedly emphasized Canadian support of trade in these goods.[158] There are reports of heated discussions within meetings of the AEPS and Arctic Council as a result of these differences.

The first meeting of the Sustainable Development Working Group took place in Anchorage Alaska, 3-6 May, 1999.[159] At this meeting, it was clear that the efforts of Canadian officials to include the harvesting of marine mammals as an issue area had been defeated. There is no mention of marine mammals in any of the documents. Instead, the working group is focusing its attention on issues such as health, fisheries, eco-tourism and the health and well-being of Arctic children and youth.[160] Once again, the main focus is on understanding the nature of the issues within each of these subject areas, and as such it is too soon to see concrete results.

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154. The Iqaluit Declaration: The First Ministerial Meeting of the Arctic Council, *supra* note 153.

155. *Id.*

156. *Id.*

157. *See* Letter from Bill Clinton, President of the United States, to the Congress of the United States, (Feb. 10, 1997) (http://whale.wheelock.edu/archives/info97/0034.html).

158. Mary Simon, "Circumpolar Nations Tackle Big Jobs with Arctic Council", Speech to the Canadian Club of Toronto, Nov. 4, 1996, *Canadian Speeches*, Jan.-Feb. 1997, vol. 10, no. 9:26-30.

159. *See* ARCTIC COUNCIL, *Sustainable Development Working Group, Anchorage, Alaska, May 3-4, 1999*, http://www.arctic-council.org/pmeetings/sdwg_anc.asp (last visited Jan. 14, 2002).

160. ARCTIC COUNCIL, *Sustainable Development Working Group, Anchorage, Alaska, May 3-4, 1999*, http://www.arctic-council.org/pmeetings/sdwg_anc.asp (last visited Jan. 14, 2002).

The AEPS and Arctic Council

On September 19, 1996, the eight Arctic States signed the Declaration on the Establishment of the Arctic Council[161] in Ottawa and the AEPS was thus placed within the Council. The creation of the Arctic Council was a Canadian initiative from its origins. Little consideration was given to the creation of such a body during the Cold War. It was only after relations had begun to warm between the Arctic States at the end of the 1980s that it became possible to even consider such an organization. Canadian Prime Minister Brian Mulroney proposed the idea of the Arctic Council during his visit to Leningrad in November 1989.[162] On November 28, 1990, the Canadian Secretary of State for External Affairs, Joe Clark, announced that he would bring the issue of the Arctic Council to the attention of the other States. Initially, American officials were very reluctant to support this initiative. However, following the change of administrations in the United States from a Republican president to a Democrat one, the Americans became more accepting.[163] Nevertheless, the Americans still made it clear that if they were to participate in such an organization, they had certain minimum requirements that needed to be met. First, the Arctic Council could not address security related issues.[164] Second, any actions that required financial assistance could only be taken on a voluntary basis.[165] In other words, the Arctic Council could not raise its own independent sources of revenue. Correspondingly, it was not to be allowed to create a large bureaucracy independent of the national agencies. Officials could be tasked, but they were to do so at the discretion of the State.

These requirements were met and tentative agreement was reached in 1995. Drawing directly from the AEPS, the Arctic Council would be comprised of the eight Arctic States and the three indigenous organizations, and would allow for the involvement of invited observers.[166] The Council would operate on the basis of consensus by the eight States.[167] It was also mandated to establish a small secretariat to be shared on a rotating basis every two years to oversee operations.[168]

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161. *See* ARCTIC COUNCIL, Declaration on the Establishment of the Arctic Council, Sept. 19, 1996, http://www.arctic-council.org/establ.asp (last visited Jan. 14, 2002).

162. Alan Saunders, *Pondering an Arctic Council*, 19:2 N. PERSP. 1 (1991), *available at* http://www.carc.org/pubs/v19no2/1.htm (last visited Jan. 14, 2002).

163. *Id.*

164. The Iqaluit Declaration: The First Ministerial Meeting of the Arctic Council, *supra* note 153, art. 1(a).

165. *Id*

166. *Id.* at art. 2-3.

167. *Id.* at art. 7.

168. *Id.* at art. 5.

The Arctic Council/AEPS has continued to meet as required. The ministerial meeting of the AEPS that took place in Alta, Norway in June 1997 was, in many respects, serving as a transition to the Arctic Council. The first official ministerial meeting of the Arctic Council took place on September 17 and 18, 1998, in Iqaluit, Canada.[169] The second ministerial meeting took place in Barrow, Alaska in October 2000.[170] The tenth Anniversary of the AEPS was celebrated by a meeting on June 11, 2001, when the members of the Arctic Council convened to discuss sustainable development in the Arctic context.[171]

In many regards, the Arctic Council meetings have not differed from the AEPS meetings. The same working groups have presented their work achievements and future plans. Three additional Permanent Participants, the Aleut International Association, the Arctic Athabaskan Council and the Gwich'in Council International have been granted membership to the Council.[172]

The primary difference between the Arctic Council and the AEPS is that the Arctic Council was specifically mandated to develop a sustainable development program and, "to disseminate information, encourage education and promote interest in Arctic related issues."[173] To this end, the Arctic Council has not only continued to support the work undertaken by AEPS but has also developed a Sustainable Development Framework Document and an Arctic Council Action Plan to Eliminate Pollution of the Arctic (ACAP).[174]

Soft Law to Hard Law?

While the examination of the impact of the AEPS is somewhat cursory, it is clear that this iniative has played a major role as a facilitator. The five working groups have been instrumental in bringing

169. *See* The Iqaluit Declaration: The First Ministerial Meeting of the Arctic Council, *supra* note 153.

170. *See* ARCTIC COUNCIL, Second Arctic Council Ministerial Meeting, Barrow, Alaska, U.S.A., October 12-13, 2000, http://www.arctic-council.org/barrow/barrow2000.asp (last visited Jan. 14, 2002).

171. *See* ARCTIC COUNCIL, The 10th Anniversary of the Arctic Environmental Cooperation (2001), http://www.arctic-council.org/pmeetings/aeps10/index.asp (last visited Jan. 14, 2002).

172. *See* ARCTIC COUNCIL, *Report of the Senior Arctic Officials to the Arctic Council, Iqaluit, Canada, September 17-18, 1998, Part I(C),* http://arctic-council.org/pmeetings/98rep.asp (last visited Jan. 13, 2002) [hereinafter *Report of the Senior Arctic Officials to the Arctic Council*]; ARCTIC COUNCIL, Barrow Declaration on the occasion of the Second Ministerial Meeting of the Arctic Council 6 (2000).

173. *See Report of the Senior Arctic Officials to the Arctic Council, supra* note 172, at Part I(A).

174. Both of these programs go beyond the scope of this paper. *See generally* ARCTIC COUNCIL, *Activities and Working Groups*, http://www.arctic-council.org/activities.asp (last visited Jan. 13, 2002) (detailing more information about these programs).

together the Arctic States to discuss common approaches to environmental challenges in the region. However, since the AEPS inception in 1989, there has been little evidence that it is evolving into something more than a means of shared communications. Individually, some of the working groups, such as AMAP, have successfully initiated new research on the part of the participating States, but this remains the exception and not the rule. There is no sign that the AEPS or the Arctic Council is having any impact on jurisdictional issues in this region. The participating States are willing to co-operate on the understanding that only limited resources are utilized. Insofar that there was a need to develop a joint understanding of the problems facing the Arctic region, the AEPS/Arctic Council has been a success. However, initiatives are still largely tinkering with a growing number of *ad hoc* projects but there is still no clear regulatory mandate or agenda.

GLOBAL AND EXTRA-REGIONAL TINKERINGS

Given the substantial transboundary environmental threats facing the Arctic, one might think firm and comprehensive regulatory and policy responses at the global and extra-regional levels would be forthcoming and pushed by Arctic-rim States in particular. However, international responses have been fragmented and weak.

Rather piddling responses to transboundary hazardous substance movements, discussed below, include: the global convention on POPs concluded in December 2000;[175] the 1998 Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade;[176] the UN ECE Protocols on Heavy Metals and POPs;[177] the North American Sound Management of Chemicals Initiative[178] and; the Convention for the Protection of the Marine Environment of the Northeast Atlantic.[179] Also summarized is

175. United Nations Environment Programme Global POPS Treaty, Dec. 2000, U.N. Doc. INC5/, http://www.ipen.org/handbook/pop_pap/paper10.pdf (last visited Jan. 13, 2002).

176. Convention on PIC Procedure, *supra* note 15.

177. Heavy Metals Protocol and POPs Protocol, *supra* notes 16 & 17.

178. COMMISSION FOR ENVIRONMENTAL COOPERATION, Sound Management of Chemicals Project *at* http://www.cec.org/programs_projects/pollutants_health/321/index.cfm?varlan=english (last visited Nov. 11, 2001).

179. Convention for the Protection of the Marine Environment of the Northeast Atlantic. The list, of course, is not exhaustive. For example, ministers responsible for the protection of the North Sea environment, at the Fourth International Conference on the Protection of the North Sea in 1995 adopted the Esbjerg Declaration pledging to move towards the cessation of emissions and losses of hazardous substances by the year 2020. *See* Esbjerg Declaration (1995), http://odin.dep.no/md/html/conf/declaration/esbjerg.html (last visited Nov. 23, 2001). The United States and Canada have adopted a Strategy for

the "Kyoto fiasco" where even Canada, a country facing the potential "polar punch" of climate change, has failed to push for strong and clear greenhouse gas reduction commitments.

Global Convention on POPs

At the fifth session of the Intergovernmental Negotiating Committee for an International Legally Binding Instrument for Implementing International Action on Certain Persistent Organic Pollutants, occurring in Johannesburg, South Africa in December 2000, representatives from 122 countries reached agreement on a global POPs treaty.[180] A diplomatic conference for adoption of the Convention took place in May 2001 in Stockholm.[181]

The new Convention has numerous positive points. It calls for the elimination of eight POPs pesticides (aldrin, endrin, dieldrin, chlordane, heptachlor, hexachlorobenzene (HCB), mirex and toxaphene).[182] PCB production will also be prohibited and countries are required to make determined efforts to phase out PCB containing equipment by 2025.[183] The precautionary principle is recognized as an objective[184] and a precautionary approach is to be applied in identifying and taking action

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the Virtual Elimination of Persistent Toxic Substances in the Great Lakes Basin, 7 April 1997. *See* 31 INT'L ENV'T REP. 1701-1708. Baltic States, through Annex I of the 1992 Helsinki Convention, have pledged to prohibit the use of various substances including DDT and it derivatives and PCBs (except in closed system equipment). *See* Peter Ehlers, *The Helsinki Convention, 1992: Improving the Baltic Sea 8 Environment,* 8 INT'L J. MARINE & COASTAL L. 191 (1993) (reviewing the Helsinki Convention).

180. *Summary of the Fifth Session of the Intergovernmental Negotiating Committee for an International Legally Binding Instrument for Implementing International Action of Certain Persistent Organic Pollutants*, EARTH NEGOTIATIONS BULL., Dec. 12, 2000, at 1, *at* http://www.iisd.ca/linkages/download/pdf/enb1554e.pdf (last visited Oct. 3, 2001).

181. *Report of the Conference Plenopotentiaries on the Stockholm Convention On Persistent Organic Pollutants*, EARTH NEGOTIATIONS BULL., May 25, 2001, at 1, *at* http://www.iisd.ca/chemical/popsd/ (last visited Nov. 17, 2001). *See also* THE INTERNATIONAL POPS ELIMINATION NETWORK, POPs: The Birth of a Public Health Treaty, http://www.ipen.org/treaty02.html (last visited Nov. 21, 2001); THE INTERNATIONAL POPS ELIMINATION NETWORK, Summary of Key Elements in the Global POPs Treaty, Dec. 14, 2000, http://www.ipen.org/treaty03.html (last visited Nov. 20, 2001).

182. Stockholm POPs Convention, *supra* note 14, at Annex A, Part I. For a description of the pesticides and other POPs included in the "dirty dozen" *see* Clive Tesar, *POPs: What They Are; How They Are Used; How They Are Transported,* 26 N. PERSP., 2 (2000). HCB is not only a fungicide but is also a by-product of the manufacture of certain industrial chemicals and exists as an impurity in several pesticide formulations. *Id.* at 4.

183. Stockholm POPs Convention, *supra* note 14, at Annex A, Part II

184. *Id.* at art. 1. The Objective states: "Mindful of the precautionary approach as set forth in Principle 15 of the Rio Declaration on Environment and Development, the objective of this Convention is to protect human health and the environment from persistent organic pollutants." *Id.*

against additional POPs.[185] Developed country Parties will be required to provide new and additional financial resources to developing country Parties and Parties with economies in transition, and the Global Environment Facility (GEF) is named on an interim basis as a financial mechanism.[186]

However, various limitations stand out. While the ultimate goal for DDT is elimination, the treaty will allow continued use for disease vector control in accordance with World Health Organization guidelines.[187] The treaty adopts a very flexible approach to by-products, such as dioxins, by calling on Parties to take measures to reduce total releases "with the goal of their continuing minimization and, where feasible, ultimate elimination."[188] The Convention will require 50 ratifications before entry into force, which likely will delay effect at least 3-4 years until enough countries have accepted the Agreement.[189]

The new Convention might still be categorized as a case of tinkering. The Convention is not a comprehensive chemical treaty addressing the huge number of synthetic chemicals in commercial use, estimated between 50,000 and 100,000, with some 1,000 or more new compounds entering the economy each year.[190] The Convention establishes a rather complicated procedure for adding new POPs for control, which does not bode well for prompt and strong precautionary actions.[191] A chemical proposed by a Party for new listing would have to

185. Stockholm POPs Convention, *supra* note 14, at art. 8. A scientific POPs Review Committee is to be established to evaluate additional chemicals for inclusion based on the criteria of toxicity, persistence, bioaccumulation and long-range transport. Art. 8(7) states: "If, on the basis of the risk profile conducted in accordance with Annex E, the Committee decides . . . that the chemical is likely as a result of its long-range environmental transport to lead to significant adverse human health and/or environmental effects such that global action is warranted, the proposal shall proceed. Lack of full scientific certainty shall not prevent the proposal from proceeding." *Id.*

186. *Id.* at art. 14. Resolutions, prepared at the final negotiating session for consideration at the Stockholm diplomatic conference, set out various requests including: that the GEF establish a new focal area for POPs; that the GEF report to the first POPs Conference of Parties on measures to ensure the transparency of the project approval process; that procedures for accessing funds are simple, flexible and expeditious; and that donors to the GEF Trust Fund contribute adequate additional financial resources to enable the GEF to carry out its mandate under the POPs treaty. Conference of Plenipotentiaries on the Final Act of the Stockholm Convention on Persistent Prganic Pollutants, U.N. ENVIRONMENT PROGRAMME, U.N. DOC. UNEP/POPS/CONF/4(2001) at Appendix I.

187. Stockholm POPs Convention, *supra* note 14, at Annex B.

188. *Id.* at art. 5.

189. WORLD WILDLIFE FUND'S GLOBAL TOXIC CHEMICALS INITIATIVE, *Summary of Key Elements in the Global POPs Treaty* (2000), *at* http://www.worldwildlife.org/toxics/progareas/pop/global.htm (last visited Nov., 14, 2001).

190. *See* Anne Platt McGinn, *POPs Culture*, 13:2 WORLD WATCH 26, 26-36 (2000).

191. *See* Stockholm POPs Convention, *supra* note 14, at art. 8. For a recent general critique of risk assessment in environmental decision-making and the need for businesses and government to undertake alternative assessments in order to figure out options for

meet screening criteria set out in Annex D of the Convention, undergo a risk profile conducted in accordance with Annex E and a risk management evaluation in accord with Annex F.[192] The exact number of POPs remains uncertain but thousands of chemicals might qualify for the term.[193]

The 1998 Convention on the Prior Informed Consent (PIC) Procedure

The Convention on the PIC Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, adopted in Rotterdam on September 10, 1998, may also be described as tinkering with chemicals management.[194] The Convention does not prohibit trade in hazardous chemicals banned or severely restricted by a country but tries to facilitate trade subject to a prior informed consent procedure.[195] For chemicals listed in Annex III to the Convention, exporting States must ensure importing States receive notice of and consent to proposed chemical shipments.[196] As of October 2001, the Convention, being implemented on an interim basis until the Convention enters into force, only covered 31 chemicals, including 21 pesticides, five severely hazardous pesticide formulations and five industrial chemicals.[197] The Convention provides for a rather tedious process for adding additional hazardous substances to the PIC list. Before listing can occur, at least two countries from different Prior Informed Consent regions[198] must notify the Secretariat of final regulatory actions banning or severely restricting a chemical; a Chemical Review Committee must prepare a draft decision guidance document; the Committee must confirm that

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treating ecosystems and public health with utmost care *see* MARY O'BRIEN, MAKING BETTER ENVIRONMENTAL DECISIONS: AN ALTERNATIVE TO RISK ASSESSMENT (2000).

192. *See* Stockholm POPs Convention, *supra* note 14, at art. 8.

193. *See* McGinn, *supra* note 190, at 26-36.

194. *See Report of the Seventh Session of the INC for an International Legally Binding Instrument for the Application of the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade,* EARTH NEGOTIATIONS BULL., Nov. 6, 2000, *at* http://www.iisd.ca/chemicals/pic/pic7 (last visited Oct. 3, 2001) (reviewing the history of negotiations).

195. *See* Convention on PIC Procedure, *supra* note 15.

196. *See id.*

197. *See Eighth Session of the Intergovernmental Negotiating Committee for an International Legally Binding Instrument for the Application of the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade,* EARTH NEGOTIATIONS BULL., Oct. 8, 2001, *at* http://www.iisd.ca/chemical/pic/pic8 (last visited Oct. 9,2001).

198. *See* Convention onPIC Procedure, *supra* note 15, at art. 5. At the Sixth Session of the Intergovernmental Negotiating Committee in July 1999 in Rome, government representatives adopted provisional Prior Informed Consent regions (Africa, Europe, Asia, Latin America and the Caribbean, Near East, Southeast Pacific and North America), but the Convention leaves final regional delineation to the Conference of the Parties. *See PIC: Steady Progress at Latest Session,*29 ENVTL. POL'Y & L. 219, 220 (1999).

final regulatory actions were based upon scientific risk evaluation; and the Conference of the Parties must approve listing.

The Convention does not establish clear financial commitments by developed States to assist developing States in strengthening chemical management capacities. Article 16 provides only a general technical assistance pledge:

> The Parties shall, taking into account in particular the needs of developing countries and countries with economies in transition, cooperate in promoting technical assistance for the development of the infrastructure and the capacity necessary to manage chemicals to enable implementation of the Convention . . . .[199]

The Convention leaves compliance procedures to be worked out. Article 17 mandates the Conference of the Parties to, "as soon as practicable" develop and approve procedures and institutional mechanisms for determining non-compliance with the Convention and for treatment of non-complying Parties.[200]

The Convention has not yet entered into force. The Convention requires 50 ratifications before becoming binding.[201] As of September 1, 2001, the Convention had only been ratified by sixteen States (Bulgaria, Czech Republic, El Salvador, Germany, Guinea, Hungary, Kyrgyzstan, Mongolia, the Netherlands, Nigeria, Oman, Panama, Saudi Arabia, Senegal, Slovenia and Suriname).[202]

The UN ECE Protocols on POPs and Heavy Metals

Rather limited control efforts for managing persistent organic pollutants and heavy metals have been taken pursuant to Protocols under the Convention on Long-range Transboundary Air Pollution.[203] The POPs Protocol only initially targets sixteen substances for control. For the twelve substances scheduled for elimination, some major exceptions are allowed. For example, DDT production is not to be eliminated until within one year of consensus by the Parties that suitable alternatives to DDT are available for public health protection from diseases such as malaria and encephalitis.[204] Countries with

199. Convention on PIC Procedure, *supra* note 15.

200. *Id.*

201. *Id.* at art. 26. "This Convention shall enter into force on the ninetieth day after the date of deposit of the fiftieth instrument of ratification, acceptance, approval or accession." *Id.*

202. *See* Status of Signature and Ratification, Acceptance, Approval and Accession as of 12 November 2001, *at* http://www.pic.int/status_of_signature_and _ratifica.htm (last visited Nov. 24, 2001).

203. *See* Convention on Long Range Transboundary Air Pollution, Nov. 13, 1979, 1302 U.N.T.S. 217, *reprinted in* 18 I.L.M. 1442 (1979).

204. POPs Protocol, *supra* note 16, at Annex I.

economies in transition are given until December 31, 2015, to eliminate PCB production.[205] To reduce emissions of polycyclic aromatic hydrocarbons (PAHs), dioxins and furans and hexachlorobenzene, Parties are required to apply best available techniques (BAT), an approach which allows for considerable leeway to weigh economic factors.[206] Emission limitations on dioxins and furans for major stationary sources (specifically municipal and medical waste incinerators and hazardous waste incinerators) could be weakened for existing stationary sources through the loophole, "insofar as technically and economically feasible".[207] The Protocol is reactive in approach, allowing further substances be added one by one through amendments to the annexes.[208]

The UN ECE Heavy Metals Protocol also displays numerous weaknesses. Only three heavy metals, cadmium, lead and mercury, are initially subject to controls.[209] Specific percentage reductions are not required,[210] and Parties are obligated to apply best available techniques to various sources including: iron and steel plants; cement kilns and; fossil fuel combustion in power plants. While emissions limit values are established for various source categories,[211] such limits are weakened[212] for existing stationary sources with the qualification "insofar as technically and economically feasible," and an eight year delay in applicability is allowed from the Protocol's entry into force.[213]

The pace of ratifications for entry into force of the Protocols has been slow. Both protocols require 16 ratifications/acceptances before entry into force.[214] As of October 5, 2001, the POPs Protocol had been

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205. POPs Protocol, *supra* note 16, at Annex I.

206. *Id.* at art. 3(5).

207. *Id.* at art. 3(5)(iv).

208. For a review of the negotiation debates over the informational and procedural approaches to adding new chemicals to the Protocol regime and the further setting out of information requirements and procedures in Executive Body decision 1998/2, see Kirsten Hillman, *International Control of Persistent Organic Pollutants: The UN Economic Commission for Europe Convention on Long-range Transboundary Air Pollution, and Beyond,* 8 REV. EUR. COMMUN. & INT'L ENVTL. L. 105, 110 (1999).

209. Heavy Metals Protocol, *supra* note 16, at Annex I.

210. *See id.* at Art. 3(1). The Protocol in Article 3(1) requires each Party to reduce its total annual emissions into the atmosphere of the three heavy metals, but Annex I leaves countries the discretion to choose the reference year (1990 or an alternative year from 1985 to 1995 inclusive specified by a Party upon ratification/acceptance) and the Protocol does not provide a specific reduction target. *Id.*

211. *See* Heavy Metals Protocol, *supra* note 16, at Annex V. For example, Annex V sets limit values for mercury emissions from hazardous waste incinerators at .05 mg/m^3 and from municipal waste incinerators at .08 mg/m^3. Limit values for mercury emissions from medical waste incinerators are to be evaluated by the Parties no later than two years after the Protocol's entry into force. *Id.*

212. *Id.* at Art. 3(2)(d).

213. Heavy Metals Protocol, *supra* note 16, at Annex IV.

214. *Id.* at art. 17(1), POPs Protocol, *supra* note 16, at art. 18.

ratified by only seven countries: Canada; Denmark; Luxembourg; the Netherlands; Norway; Sweden and; Switzerland.[215] The Heavy Metals Protocol had been ratified by nine countries: Canada; Denmark; Finland; Luxembourg; the Netherlands; Norway; Sweden; Switzerland and; the United States.[216]

The North American Sound Management of Chemicals Initiative

Rather, minimal steps to address hazardous chemicals have been taken to date under the umbrella of the North American Agreement for Environmental Cooperation[217] adopted as a side agreement to the North American Free Trade Agreement.[218] Through Resolution #95-05 on the Sound Management of Chemicals, adopted by the Council of Ministers of the Commission for Environmental Cooperation on October 13, 1995, the United States, Canada and Mexico agreed to develop North American Regional Action Plans (NARAPs) for addressing persistent, bioaccumulative and toxic chemicals of concern to the three countries.[219] To date, the Sound Management of Chemicals Initiative has focused on developing NARAPs on a chemical-by-chemical basis. Only four NARAPs have been developed, thus far, covering DDT, chlordane, PCBs and mercury.[220] A complicated process for nominating and selecting additional chemicals for control actions promises to favor industrial interests over environmental protection. For example, before a substance can be designated for tripartite action, a comprehensive, scientifically-based risk assessment document must be prepared characterizing risks to the environment and human health of a particular substance.[221] Two other NARAPs are under development,

215. *See* Protocol on Persistent Organic Pollutants (POPs), Status of ratification of the 1998 Aarhus Protocol on Persistent Organic Pollutants (POPs) as of 5 October 2001, *at* http://www.unece.org/env/lrtap/protocol/98pop_st.htm (last visited Nov. 21, 2001).

216. Protocol on Heavy Metals, Status of the ratification of the 1998 Aarhus Protocol on Heavy Metals as of 5 October 2001, *at* http://www.unece.org/env/lrtap/protocol/98hm_st.htm (last visited Nov. 21, 2001). The European Community was listed as a further acceptance. *Id.*

217. North American Agreement for Environmental Cooperation, Sept. 14, 1993, 32 I.L.M 1480.

218. North American Free Trade Agreement, Dec. 17, 1992, 32 I.L.M. 289.

219. *See* COMMISSION FOR ENVIRONMENT COOPERATION [hereinafter CEC], Council Resolution #95-05 (1995), http://www.cec.org/who_we_are/council/res. . ./disp_res.cfm?varlan=english&documentID=6 (last visited Dec. 15, 2001).

220. *See* CEC, Pollutants and Health, http://www.cec.org/programs_projects/pollutants_health/smoc/index.cfm? varlan=english (last visited Nov. 9, 2001) (detailing the Action Plans promulgated for these substances).

221. A Task Force on Criteria, reporting to the North American Working Group on the Sound Management of Chemicals, has developed a substance selection process involving a nomination stage, an evaluation stage and a decision stage. Scientific assessments of toxicity, persistence, bioavailability and bioaccumlation and expert judgments are given key roles. *See* Draft Process of Identifying Candidate Substances for Regional Action

namely, one for dioxins and furans and hexachlorobenzene and the other on environmental monitoring and assessment.[222] Following a Symposium on North American Children's Health and the Environment in May 2000, the Commission for Environmental Cooperation is still at the initial stages of considering law and policy responses in light of the special vulnerability of children to environmental hazards.[223]

The Convention for the Protection of the Marine Environment of the Northeast Atlantic

At first glance, the Convention for the Protection of the Marine Environment of the Northeast Atlantic, often referred to as the OSPAR Convention, adopts quite a strong approach to controlling toxic pollution. The Convention adopts the precautionary principle[224] and the OSPAR Strategy with Regard to Hazardous Substances, adopted in 1998, pledges Parties to endeavor to cease all discharges/losses of hazardous substances by the target date of 2020.[225] Parties agree to develop further programs and measures for addressing chemicals on the OSPAR list of chemicals for priority action (listed in Annex 2 of the Strategy).[226] Parties commit to develop a proactive selection and priority setting mechanism to select further hazardous substances including endocrine disruptors for control actions.[227] The OSPAR

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under the Sound Management of Chemical Initiative Report to the North American Working Group on the Sound Management of Chemicals by the Task Force on Criteria, http://www.ece.org/programs_projects/pol. . .ts_health/smoc/criter.cfm?verlan=english (last visited Nov. 9, 2001).

222. *Final Communiqué: CEC Council Session in Dallas*, 12-13 June 2000, http:www.cec.org/news/details/index.cfm?varlan=english&ID=2257 (last visited Dec. 31, 2001).

223. *See* CEC SECRETARIAT, *Background Paper for the Symposium on North American Children's Health and the Environment* (2000), *available at* http://www.cec.org/programs_projects/pollutants_health/children/child-e.pdf (last visited Oct. 3, 2001).

224. The Convention in Art. 2(2) requires Contracting Parties to apply, "the precautionary principle, by virtue of which preventative measures are to be taken when there are reasonable grounds for concern that substances or energy introduced, directly or indirectly, into the marine environment may bring about hazards to human health, harm living resources and marine ecosystems, damage amenities or interfere with other legitimate uses of the sea, even when there is no conclusive evidence of a causal relationship between the inputs and effects . . . ." *See* Convention for the Protection of the Marine Environment for the North-East Atlantic, *supra* note 17, at art. 2(2).

225. OSPAR COMMISSION, FOR THE PROTECTION OF THE MARINE ENVIRONMENT OF THE NORTH-EAST ATLANTIC, *OSPAR Strategy with Regard to Hazardous Substances, sec. 4* (1998), *available at* http://www.ospar.org/eng/html/sap/strategy_hazardous_substances.htm (last visited Nov. 9, 2001).

226. *See id.* at Annex 2. The Annex lists 15 chemical categories including mercury and organic mercury compounds, lead, pentachlorophenol, polyaromatic hydrocarbons (PAHs), PCBs and dioxins and furans.

227. OSPAR COMMISSION, FOR THE PROTECTION OF THE MARINE ENVIRONMENT OF THE NORTH-EAST ATLANTIC, *supra* note 225, at sec. 3.1(e).

Commission has "legal teeth" whereby besides recommendations, the OSPAR Commission can adopt binding decisions by unanimous vote or three quarters majority vote in case of a lack of consensus.[228]

However, the OSPAR Commission in practice has preferred to move through recommendations rather than binding decisions with almost twice as many recommendations adopted as decisions. Even for binding decisions, few actually ban or prohibit pollution. For example, the use of chlorine for bleaching pulp in the pulp and paper industry was required to be phased out by January 1, 1998, pursuant to PARCOM Decision 96/2.[229] Many OSPAR decisions adopt rather arbitrary/compromise standards. For example, mercury levels from industrial sectors, other than the chlor-alkli industry, and cadmium levels from various industries, such as electroplating, are set in terms of mg/l. Pollutants from pulp industries, such as total suspended solids, sulphur dioxide and nitrogen oxides, are set in terms of kg/tonne of pulp produced.[230] The OSPAR Convention while calling for precautionary and pollution prevention approaches to land-based pollution allows considerable flexibility by requiring Parties to apply best available techniques (BATs) for point sources and best environmental practices (BEPs) for point and diffuse sources.[231] BATs require Parties to look to the state of the art processes, facilities or operation methods and to emphasize non-waste technology if available, but "watering down" occurs through allowing consideration of factors such as economic feasibility. BEPs require the most appropriate accommodation of environmental control measures and strategies (such as public education; mandatory labeling; recycling, recovery and reuse; economic instruments; establishing a license system with restrictions or bans).

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228. Convention for the Protection of the Marine Environment for the North-East Atlantic, *supra* note 17, at art. 13. Parties are still allowed to opt out of decisions, however.

229. Oslo and Paris Conventions for the Prevention of Marine Pollution, PARCOM Decision 96/2 on the Phasing-out of Processes Using Molecular Chlorine ($C/_2$) in the Bleaching of Kraft and Sulphate Paper, June 17-21, 1996, art. 2.1, *available at* http://www.ospar.org/asp/ospar/dra.asp (last visited Oct. 3, 2001).

230. Oslo and Paris Conventions for the Prevention of Marine Pollution, PARCOM Decision 85/1, Programs and Measures of 31 December 1985 on Limit Values and Quality Objectives for Mercury Discharges by Sectors other than the Chlor-alkali Industry, *available at* http://www.ospar.org/asp/ospar/dra.asp (last visited Oct. 3, 2001). *See also* Oslo and Paris Conventions for the Prevention of Marine Pollution, PARCOM Decision 85/2, Programs and Measures of 31 December 1985 on Limit Values and Quality Objectives for Cadmium Discharges; *available at* http://www.ospar.org/asp/ospar/dra.asp (last visited Oct. 3, 2001); Oslo and Paris Conventions for the Prevention of Marine Pollution, PARCOM Decision 95/2 on Discharge and Emission Limit Values for the Integrated and Non-integrated Sulfate Paper Pulp Industry; *available at* http://www.ospar.org/asp/ospar/dra.asp (last visited Oct. 3, 2001).

231. Convention for the Protection of the Marine Environment for the North-East Atlantic, *supra* note 17, at Annex I.

Glacial Responses to Global Climate Change

In light of the long list of environmental threats to the Arctic marine environment raised by climate change, including sea ice melting and disruption of ocean currents, one can certainly be cynical over the limited control commitments to date. The overall commitment in the Kyoto Protocol by industrialized countries to reduce their greenhouse gas emissions by at least 5% between the year 2008-2012 provides no reason to celebrate. Some States, such as Australia and Iceland, are even allowed to increase their emissions.[232] Developing countries have yet to "come aboard." It remains highly questionable whether industrialized states such as United States will be able to meet their greenhouse reduction targets. For example, the US committed to a 7% reduction in greenhouse gas emissions from 1990 levels by 2008-2012, but emissions have been projected to increase by some 23% by 2010.[233] In March 2001, the US administration declared the Protocol to be "fatally flawed," and industry and Congressional opposition to the Kyoto Protocol in the United States has been zealous.[234] As of September 28, 2001, only 40 countries, almost all developing states, had ratified the Kyoto Protocol.[235] The Protocol requires ratification by at least fifty-five Parties to the Framework Convention on Climate Change, including developed countries and countries with economies in transition representing at least fifty-five percent of the total 1990 carbon dioxide emissions from this group.[236]

While some positive developments occurred at the resumed Sixth Session of the Conference of the Parties to the Framework Convention on Climate Change in July 2001, through the Bonn Agreement,[237] numerous limitations and weak points stand out. For example, even though countries agreed on the need for new and additional funding to

232. Kyoto Protocol, *supra* note 19.

233. SEBASTIAN OBERTHÜR & HERMAN E. OTT, THE KYOTO PROTOCOL: INTERNATIONAL CLIMATE POLICY FOR THE 21ST CENTURY 18 (1999).

234. For a detailed review of the politics surrounding U.S. climate change policy, *see* CLIMATE CHANGE AND AMERICAN FOREIGN POLICY (Paul G. Harris ed., 2000). *See also, letter from President George W. Bush to Senators Hagel, Helms, Craig and Roberts, reprinted in* 31 ENVTL. POL'Y & L. 122 (2001).

235. *Kyoto Protocol Status of Ratification*, http://www.unfcc.de/resource/kpstats.pdf (last visited Oct. 26, 2001).

236. The United States is a key country since its share of 1990 carbon dioxide emissions has been calculated at 36.1 percent of global emissions. *See* U.N. DEP'T OF INFO., *Setting the Record Straight: Facts About the United Nations*, U.N. Doc. DPI/1815/Rev. 14 (1998).

237. *See Review of the Implementation of Commitments and of other Provisions of the Convention: Preparations for the First Session of the Conference of the Parties Serving as the Meeting of the Parties to the Kyoto Protocol (Decision 8/Cp.4)*, United Nations Framework Convention on Climate Change, U.N. Doc. FCCC/CP/2001/L.7 (2001), *available at* http://www.unfccc.int/resource/docs/cop6secpart/107.pdf.

assist developing countries and to establish three new funds, no specific funding level was specified. A joint political declaration was made by the European Community and its member States, together with Canada, Iceland, Norway and Switzerland, pledged preparedness to contribute collectively US $410 million annually by 2005, with that level to be reviewed in 2008.[238] Many technical details of the flexibility mechanisms remain to be worked out. Even though a cap has been placed on the use by countries of forest management credits, a complex accounting system seems likely to foster ongoing controversies over allowable credits for land-use, land-use change and forestry activities (LULUCF).[239] Only a general framework for addressing compliance under the Kyoto Protocol was agreed to at Bonn, such as the composition of a compliance committee, with resumed negotiations scheduled for the Seventh Conference of the Parties and national viewpoints still differing over the legally binding nature of the regime.[240]

CONCLUSION: FUTURE DIRECTIONS

Effective governance for Arctic marine environmental protection is more of a distant goal than a present reality. Key agreements for addressing transboundary pollutants into the Arctic, including the global POPs Convention and UN ECE Protocols on POPs and Heavy Metals, are not yet in force.[241] No comprehensive global chemicals management convention exists. No global agreement on controlling heavy metal emissions has been forged. Effective addressing of climate

238. *See Review of the Implementation of Commitments and of other Provisions of the Convention: Preparations for the First Session of the Conference of the Parties Serving as the Meeting of the Parties to the Kyoto Protocol (Decision 8/Cp.4)*, United Nations Framework Convention on Climate Change, U.N. Doc. FCCC/CP/2001/L.7 (2001), *available at* http://www.unfccc.int/resource/docs/cop6secpart/107.pdf.

239. *See id.* at 10.

240. For reviews of the Bonn Agreement and related political "deal-making", *see* R.J. Kopp, *An Analysis of the Bonn Agreement*, WEATHERVANE, *at* http://www.weathervane.rff.org/features/feature134.htm (last visited Nov. 16, 2001); *Summary of the Resumed Sixth Session of the Conference of the Parties to the UN Framework Convention on Climate Change*, 12 EARTH NEGOTIATIONS BULL. (July 30, 2001), *at* http://www.iisd.ca/linkages/vol12/enb12176e.html (last visited Nov. 16, 2001). The Conference of the Parties at its seventh session in Marrakesh, Morocco in November, 2001, while developing some rules for emissions trading joint implementation and the clean development mechanism, still left for future decision the legal form of compliance procedures and mechanisms. The Marrakesh Accords are *available at* http://www.unfccc.de/cop7/documents/accords_draft.pdf (last visited Nov. 19, 2001).

241. Given the substantial pollutant loading from the Russian Federation, especially heavy metals and smog from northern industries including smelters, a special concern is when the Russian Federation will accept binding legal obligations. *See* Inuit Circumpolar Conference, Northern Contaminants and Global POPs Program, *at* http://inuitcircumpolar.com/Activities/Northern_Contaminants_and_Glob/Northern_contaminants_and_glob.htm (last visited Nov. 16, 2001).

change threats remains elusive.[242] The Regional Programme of Action for the Protection of the Arctic Marine Environment From Land-Based Activities remains quite a general document with few concrete actions and lacking a guaranteed budget.[243] The Arctic Council has continued the "talk and study" mentality of the Arctic Environmental Protection Strategy.

Various political and practical realities will likely continue to hinder strong governance responses. Arctic States, like Canada and the United States, are not driven solely by a "northern vision" while southern economic and trade interest have compromised negotiation positions in climate change and chemicals management.[244] Forging comprehensive and effective environmental agreements has not come easy with continuing problems of weak standards, limited acceptance and implementation, insufficient financing and questionable compliance and enforcement.[245] A globalization agenda and free market values have overshadowed alternative societal visions embracing cultural diversity and environmental integrity.[246]

While fundamental reforms in forging international environmental law have been called for, such as an empowered UN Environment Organization with regulatory powers and strengthened public and industry representation,[247] various incremental steps seem more likely

242. *See* The Royal Institute of International Affairs' various workshop reports and papers on climate change, *at* http://www.riia.org/Reasearch/eep/eep1.html#cc (12 October 2001).

243. For a detailed critique *see* David VanderZwaag, *Land-Based Marine Pollution in the Arctic: Polarities Between Principles and Practice, in* PROTECTING THE POLAR AND MARINE ENVIRONMENT: LAW AND POLICY FOR POLLUTION PREVENTION 192-94 (Davor Vidas ed., 2000).

244. For a good discussion of how Canada's negotiating positions for the UN ECE POPs Protocol were subject to differing views of civil servants and how a coalition of indigenous groups sought to influence Canada's positions, *see* Terry Fenge, *POPs in the Arctic: Turning Science into Policy*, 25:2 N. PERSP., 21 (1998). The Government of Canada has provided federal funding to allow the Canadian Arctic Indigenous Peoples Against POPs (CAIPAP) to be involved in international negotiation processes. *See* ENVIRONMENT CANADA, INDIGENOUS PEOPLES AND SUSTAINABLE DEVELOPMENT IN THE CANADIAN ARCTIC (2000), *available at* http://www.ec.gc.ca/agenda21/2000/indigenous.htm (last visited Nov. 9, 2001).

245. For a review of the theoretical and practical problems of evolving international environmental law relating to oceans, see Douglas M. Johnston & David L. VanderZwaag, *The Ocean and International Environmental Law: Swimming, Sinking and Treading Water at the Millennium*, 43 OCEAN & COASTAL MGMT. 141 (2000).

246. For a discussion of how globalization efforts have supported inequalities and hierarchical decision-making, *see* Anthony G. McGrew, *Human Rights in a Global Age: Coming to Terms with Globalization, in* HUMAN RIGHTS FIFTY YEARS ON: A REAPPRAISAL 188 (Tony Evans ed., 1998).

247. For example, *see* Geoffrey Palmer, *New Ways to Make International Environmental Law*, 86 AM. J. INT'L L. 259 (1992). *See also* Frank Biermann, *The Case for a World Environment Organization*, 42 ENV'T 22 (2000). An Open-Ended Intergovernmental Group of Ministers or their Representatives on International

in responding to Arctic transboundary environmental challenges. Additional substances might be controlled under the global POPs Agreement, UN ECE Protocols and other regional arrangements, such as the OSPAR Convention and the North American Sound Management Chemicals Initiative.[248] As sources of heavy metals, such as mercury, become clearer, pressures may increase for additional regional protocols on heavy metals, for example for the Asia Pacific region, and even a global agreement.

The development of a comprehensive and strong chemicals convention, ensuring endocrine disruptors[249] and other toxic substances stay off the market and promoting non-synthetic industrial agricultural processes, does not appear imminent.[250] UNEP's environmental law reform agenda[251] has backed off encouraging negotiation of a

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Environmental Governance has been considering various options for strengthening governance and at the time of writing had yet to formalize proposals. *See Linkages, Summary of the Third Open-Ended Intergovernmental Group of Ministers or their Representatives on International Environmental Governance*, Sept. 9-10, 2001, *at* http://www.iisd.ca/unepgc/ieg3/ (last visited Dec. 18, 2001).

248. For example, in June 2000, twelve additional hazardous chemicals were identified under the OSPAR Convention for priority action including dicofol, endosulphan, methoxychlor, octylphenol and benzene. *See OSPAR Commission Press Notice, Further Protection for the North-East Atlantic*, *at* http://www.ospar.org/eng/html/final_ospar_2000pressrelease.htm (last visited Dec. 18, 2001). The North American Sound Management of Chemicals Initiative is considering the need for a regional action plan on lindane. *See* Final Communiqué, *supra* note 222. The possibility for the Initiative to be expanded to other Latin American countries should also be recognized and capacity-building and training efforts have been suggested for Central America in assisting countries to fight malaria without DDT. *See* CEC, Program Update and Report on the Outcome of the 8th Regular Meeting of the North American Working Group on the Sound Management of Chemicals, *at* http://www.cec.org/programs_projects/pollutants_health/smoc/index.cfm?varlan=english (last visited Dec. 18, 2001).

249. For a review of special regulatory challenges raised by endocrine disruptors, some of them POPs and whose numbers remain uncertain but estimated at over 50, *see* Noah Sachs, *Blocked Pathways: Potential Legal Responses to Endocrine Disrupting Chemicals*, 24 COLUM. J. ENVTL. L. 289 (1999).

250. For suggestions for a more proactive approach to chemicals management, *see* David VanderZwaag, *International Law and Arctic Marine Conservation and Protection: A Slushy, Shifting Seascape*, 9 GEO. INT'L ENVTL. L. REV. 303, 342-344 (1997).

251. A Draft Programme for the Development and Periodic Review of Environmental Law for the First Decade of the Twenty-First Century (Third Montevideo Programme), following an experts meeting 23-27 October 2000, was tabled for approval at the February 2001 meeting of UNEP's Governing Council. *See Meeting of Senior Government Officials Expert in Environmental Law to Prepare a Programme for the Development and Periodic Review of Environmental Law for the First Decade of the Twenty-First Century, Nairobi, 23-27 October 2000*, UNITED NATIONS ENVIRONMENT PROGRAMME, U.N. Doc. UNEP/Env.Law/4/2 (2000), *available at* http://www.unep.org/new_law/ (last visited Oct. 3, 2001). The Council adopted the Programme through decision 21/23. *See Decisions Adopted by the Governing Council at Its Twenty-First Session*, UNITED NATIONS ENVIRONMENT PROGRAMME, TWENTY-FIRST SESSION OF THE GOVERNING COUNCIL GLOBAL MINISTERIAL ENVIRONMENT FORUM (Feb. 9, 2001), at 40.

comprehensive, global chemicals agreement.[252]

Nor does the forging of Arctic regional agreements, such as a framework regional seas agreement with protocols in key areas like land-based activities, shipping, and biodiversity protection, seem likely in the near future.[253] The PAME Working Group, recommending against new international agreements in its 1996 Report,[254] continues to review the legal situation and is expected to report at the next Arctic Council ministerial meeting in 2002. A U.S. administration, committed to resource development in the North, including possibly opening up the Arctic National Wildlife Refuge to oil and gas development, is unlikely to support new regional regulatory efforts.[255] The Arctic Council is still a relatively new initiative and even the continued financial support for that initiative remains uncertain.[256]

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252. The Report of the experts meeting, including the Third Montevideo Programme in Annex I, highlights the need for more effective implementation of existing international environmental regimes rather than forging of new ones. Action items under Section 15 on pollution prevention and control, while promoting the further development of regional agreements to combat transboundary pollution, in particular transboundary air pollution, merely calls for promoting, "the effective implementation of multilateral agreements in the field of chemicals, including adherence to the Rotterdam Convention . . . and to a global legally binding instrument on persistent organic pollutants." Another action item is to elaborate, "a strategy to enhance the coherence between environmental and other conventions concerning chemicals." *Meeting of Senior Government Officials Expert in Environmental Law to Prepare a Programme for the Development and Periodic Review of Environmental Law for the First Decade of the Twenty-First Century, Nairobi: 23-27 October 2000: Report of the Meeting of Senior Government Officials Expert in Environmental Law to Prepare a Programme for the Development and Periodic Review of Environmental Law for the First Decade of the Twenty-First Century*, UNITED NATIONS ENVIRONMENT PROGRAMME, U.N. Doc. UNEP/Env.Law /4/4 (2000). In decision 21/7 on Chemicals Management, the Governing Council of UNEP at its twenty-first session in February 2001 requested "the Executive Director, in consultation with Governments, the Inter-Organization Programme for the Sound Management of Chemicals, the Intergovernmental Forum on Chemical Safety and other relevant organizations and stakeholders to examine the need for a strategic approach to international chemicals management and to prepare a report on the subject for consideration at the seventh special session of the Governing Council/Global Ministerial Environment Forum in 2002." *Decisions Adopted by the Governing Council at Its Twenty-First Session*, UNITED NATIONS ENVIRONMENT PROGRAMME, TWENTY-FIRST SESSION OF THE GOVERNING COUNCIL GLOBAL MINISTERIAL ENVIRONMENT FORUM (Feb. 9, 2001), at 12.

253. Various authors have suggested the need for strengthening the legal basis for regional sea cooperation or at least further assessing the need. *See* Nigel Bankes, *Steps towards the International Regulation of POPs*, 25:2 N. PERSP., 21 (1998); DOUGLAS BRUBAKER, MARINE POLLUTION AND INTERNATIONAL LAW: PRINCIPLES AND PRACTICE (1993).

254. *See* PAME 1996 Report, *supra* note 1, at 13-14.

255. *See Bush Plans to Dismantle Recent Clinton/Gore Conservation Initiatives*, 5:3 GARY GALLON ENVTL. LETTER, Jan. 18, 2001, *available at* http://mai.flora.org/forum/23826.

256. Funding for Arctic Council activities continues to be voluntary and *ad hoc*. For a discussion *see* David Scrivener, *Arctic Environmental Cooperation in Transition*, 35:192 POLAR RECORD 51, 55 (1999).

While cooperative approaches to addressing environmental issues in the Arctic have become the norm,[257] the possibility of more adversarial approaches cannot be ruled out. With pollutant modeling becoming more sophisticated and individual sources identified, as in the recent North American dioxin transport study,[258] prospects for litigation may increase.[259] Indigenous groups might consider civil actions against the more serious polluters including the seeking of injunctive relief. State responsibility/liability claims, even if there was political will, would face numerous obstacles including questions of jurisdiction and acceptance of binding dispute resolution, as well as uncertain doctrinal principles such as the basis of liability (strict vs. fault).[260]

One thing is certain. The Arctic law and policy agenda will not remain "frozen in time" as various jurisprudential currents are amassing and will likely drive further national, regional and multilateral reforms. Calls for greater and clearer recognition of the emerging right of children to a clean environment,[261] the human right to a healthy environment[262] and indigenous rights[263] can be expected,

257. The large amounts of financial assistance pledged by G-7 nations to assist Ukraine close and clean-up the Chernobyl nuclear plant and the recent Norwegian-Russian agreement pledging Norwegian cooperation and financial aid in dealing with pollution from the Northern Fleet has caused one author to lament over the trumping of the polluter gets paid principle over state responsibility. *See* Justin Mellor, *The Negative Effects of Chernobyl on International Environmental Law: The Creation of the Polluter Gets Paid Principle*, 17 WIS. INT'L L.J. 65 (1999); Justin Mellor, *Radioactive Waste and Russia's Northern Fleet: Sinking the Principles of International Environmental Law*, 28 DENV. J. INT'L L. & POL'Y 51 (1999).

258. *See* BARRY CONMONER, ET AL., LONG-RANGE AIR TRANSPORT OF DIOXIN FROM NORTH AMERICAN SOURCES TO ECOLOGICALLY VULNERABLE RECEPTORS IN NUNAVUT, ARCTIC CANADA (2000).

259. For a review of legal issues surrounding transboundary pollution cases, see PAUL MULDOON, CROSS-BORDER LITIGATION: ENVIRONMENTAL RIGHTS IN THE GREAT LAKES ECOSYSTEM (1986).

260. The International Law Commission has for decades been involved in drafting articles on state responsibility and international liability for injurious consequences arising out of acts not prohibited by international law, but no global agreements have been forged and customary law principles remain controversial. *See* Devereau F. McClatchey, *Chernobyl and Sandoz One Decade Later: The Evolution of State Responsibility for International Disasters, 1986-1996*, 25 GA. J. INT'L & COMP. L. 659 (1996).

261. *See* Malgoria Fitzmaurice, *The Right of the Child to a Clean Environment*, 23 S. ILL. U. L.J. 611 (1999); THE RIGHT OF THE CHILD TO A CLEAN ENVIRONMENT (Agata Fijalkowski & Malgoria Fitzmaurice eds., 2000).

262. *See* John Lee, *The Underlying Legal Theory to Support a Well-Defined Human Right to a Healthy Environment as a Principle of Customary International Law*, 25 COLUM. J. ENVTL. L. 283 (2000).

263. Various rights continue to evolve including land and resource rights, rights to engage in traditional and economic activities and self-governance but one of the most important for environmental protection purposes may be the right to a people not to be deprived of its own means of subsistence which is recognized in Article 1 of the International Covenant on Economic, Social and Cultural Rights and the International

especially from NGOs and indigenous groups.[264] The precautionary principle/approach will continue to spark debate over how strong precautionary measures should be.[265] Whether ongoing tinkerings will be sufficient to ward off Arctic environmental disasters remains questionable.

Covenant on Civil and Political Rights. HUMAN RIGHTS, SELECTED DOCUMENTS 40-61 (Willem-Jan F.M. van der Wolf ed., 1994). For general review of indigenous rights *see* INDIGENOUS PEOPLES, THE UNITED NATIONS AND HUMAN RIGHTS (Sarah Pritchard ed., 1998); SHARON HELEN VENNE, OUR ELDERS UNDERSTAND OUR RIGHTS: EVOLVING INTERNATIONAL LAW REGARDING INDIGENOUS PEOPLES (1998); and Garth Nettheim, *'Peoples' and 'Populations': Indigenous Peoples and the Rights of Peoples*, *in* THE RIGHTS OF PEOPLES 107 (James Crawford ed., 1988).

264. The Indigenous Environmental Network, in fact, argued for strong global measures on POPs in light of various indigenous rights and prepared a briefing paper for the fourth negotiating session in Bonn. INDIGENOUS ENVIRONMENTAL NETWORK,, *Indigenous Peoples and POPs, Briefing Paper in Preparation for the UNEP POPs Intergovernmental Negotiating Committee (INC4) Meeting, in Bonn Germany*, 20-25 March 2000, *at* http://www.ienearth.org/pops_bonn_iea11.html (last visited Dec. 20, 2001).

265. The precautionary principle/approach, while torn between differing political and philosophical views, has potential to continually drive decision-makers in more preventative and biocentric directions. *See, e.g.*, Andrew Jordan & Timothy O'Riordan, *The Precautionary Principle in Contemporary Environmental Policy and Politics*, *in* PROTECTING PUBLIC HEALTH AND THE ENVIRONMENT: IMPLEMENTING THE PRECAUTIONARY PRINCIPLE 15, 32(Carolyn Raffensperger & Joel A. Tickner eds., 1999).