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Environment, Conflict and Threats to Canadians Sovereignty: The Need for a Canadian Maritime Strategy

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> Over the next fifty years, we will almost certainly see a global population approaching nine billion; a decrease in rich, adequately irrigated agricultural land; the loss of much of the remaining virgin forests and the abundance of species they sustain; the widespread depletion and degradation of aquifers, rivers, and other water resources; and the decline of many fisheries. We may also see significant climate change and further ozone depletion. These trends may come to dominate all other factors affecting domestic and international security.[1]

INTRODUCTION

The Earth has been evolving and changing slowly since its birth. Temperature changes, extinction of species, migration and natural disasters have been part of that evolution. These changes have come slowly, over thousands of years, allowing the earth and her multitude of species the time to adapt. Indeed, for most of the few thousands of years that humans have been resident, the earth and her environment have been stable. But the last fifty years have seen an unprecedented acceleration in the pace of change. Temperatures and sea levels are rising. Renewable natural resources, such as forests and fish, are disappearing. Topsoil is blowing away, for numerous reasons, reducing the utility of arable land. Fresh, potable water is becoming scarcer. As Mr. Homer-Dixon stated in the opening quote, these factors, if left unchecked, may become critical to global security in the not too distant future.

[1] Thomas F. Homer-Dixon, *Environmental Change and Human Security* (Toronto: Canadian Institute of International Affairs, 1991) 1-2.

The current state of global environmental degradation is worrisome, however it is the trends associated with the degradation that should cause governments to react. In many areas the destruction of the environment is not being stopped, despite the universal acceptance that something must be done to ensure the continued health of our planet. Often, short-term economic gain outweighs long-term economic stability and environmental health. It seems easier to cut down a forest for the immediate economic benefit rather than to participate in the costlier sustainable development of that resource.

Generally, these trends are associated with the developing world where there is a pressing need for economic improvement. The problems are exacerbated by other international trends such as globalization and information technology. The developing world can see, from almost anywhere and at almost any time, the benefits that prosperity has brought to the developed world. It is human nature to wish such benefits for themselves.

So what does all this mean for Canada? Canada is a resource rich, sparsely populated nation. Canadian security has relied upon alliances and coalitions of like-minded nations. A three-ocean moat and a friendly neighbour to the south have assisted in keeping security concerns on the backburner for most Canadians. For the last two hundred years Canada has had little concern about direct threats to her sovereignty. The danger in such complacency is that, in this rapidly changing world, Canada may not be prepared to react to such challenges in the future.

The need for a growing global population to be fed, to have room to live, and to obtain the benefits of the developed world brings with it the potential for Canadian sovereignty to be challenged. These challenges could be made evident in our fishing grounds, for our fresh water,

and even on our land. Canada should be planning now for ways in which to ensure all such challenges can be met.

Canada is a maritime nation with the world's largest littoral area of responsibility. As such, a vital component to any security planning must be a comprehensive Maritime Strategy. Most problems resulting from environmental damage will reach Canadian shores from on, under or over the oceans. It is proposed that the ability to consistently detect transgressions in or near Canadian territory, and the capability to react to them in an appropriate manner, will be essential to preserving Canadian vital interests. This paper intends to examine the effects of worldwide environmental degradation on global stability, with specific reference to how such degradation could affect Canadian vital interests and Canadian sovereignty. Further, it will propose a Canadian Maritime Strategy and Canadian Maritime force structure aimed at mitigating the potential threats to vital interests and sovereignty.

THE ENVIRONMENT TODAY

Fisheries

The fisheries of the world are under assault. Despite the advances in recent years, such as the banning of drift-net fishing, serious depletion of world fish stocks continues. The UN Food and Agricultural Organization (FAO) have estimated that "at least 60 per cent of the world fisheries are either fully exploited or overfished."[2] The UN Convention on the Law of the Sea (UNCLOS) has assisted in stabilizing some coastal fisheries. Its tenets include:

[2] United Nations Economic and Social Council, Commission on Sustainable Development, *Oceans and Seas – Report of the Secretary-General*, Organizational Session 30 April – 02 May 2001, 01-29252(E) 3.

- Extending the territorial sea out to 12 nautical miles (nm). Here a coastal state can apply its laws and regulations as it does on land;
- Creating a contiguous zone from 12 to 24 nm where the nation may exercise its domestic law as it relates to customs, fiscal, immigration and sanitary matters, where those infractions occurred in territorial sea;
- Creating an exclusive economic zone (EEZ) out to 200nm where the state owns all renewable and non-renewable resources and exercises authority for the preservation of the sea and its resources; and
- Establishing the high-seas beyond the EEZ, where all States have the right to engage in resource exploitation.[3]

The critical point is the establishment of an EEZ out to 200 miles, where the state can claim the resources in the water column and the seabed as its own. Further, it can enforce regulations within the zone. This provision of UNCLOS has allowed some states to reduce the exploitation of already depleted fishstocks within their EEZs. This has been more easily achieved in the developed world where scientific analysis has been able to determine and project scarcity, and where the ability of the State to monitor and police its waters is adequate. The economies of the developed world also allow for compensation and retraining in those communities hardest hit by fishing moratoriums.

The problems experienced by coastal nations in the developing world are more complicated. While they have claimed EEZs, the need for hard currency has led many of them to sell fishing licenses to foreign fishing fleets, permitting the continued exploitation of the resource. While developing nations may derive short-term benefit from these arrangements,

[3] World Wildlife Fund for Nature, *The status of natural resources on the high-seas* (Gland, Switzerland: WWF International, 2001) 77.

many do not have the infrastructure to support an adequate monitoring regime, often resulting in over-exploitation. Mauritania is a good example of such continued depletion of its marine resources. Its need for cash to assist in fighting poverty and to allow it to diversify economically has led it to license foreign fleets from the European Union, Japan and China. "Over-fishing due to a failure by some fishing boats to comply with the rules, lack of enforcement and a shortage of fisheries protection boats alongside other factors, have led to a dramatic fall in catches as fish stocks are over-exploited."[4] This has had a number of consequences. Some types of fish have disappeared altogether (sawfish), others have seen their catch fall dramatically (octopus by more than 50 per cent), accidental mortality of less desirable species (by-catch) is estimated at up to 58 per cent of the total catch, and the indigenous fishery has decreased (from 5000 boats in 1996 to the current 1800).[5]

These developing nations should take a lesson from the Canadian cod experience. Newfoundland's offshore and the Grand Banks were once home to some of the most lucrative fisheries in the world.[6] Overfishing in this region has been going on for hundreds of years, culminating in record catches during the 1960s. The catches of the late 60s were never repeated, and it has been argued that the species were on the verge of commercial extinction as early as 1977. By then, the modern and efficient fleets from Spain, Portugal, France, the USSR, East and West Germany, Italy, Norway and Iceland had been fishing the region for decades. It should have been realized that it was taking a greater number of more modern vessels with more efficient fishing methods just to maintain the same historic catch.[7]

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[4] *Well Managed Fisheries Vital for Environmentally Friendly Development in Poor Parts of the Globe*, UN Environment Program Press Release, 15 March 2002, URL www.unep.org/Documents/ 1.
[5] *Well Managed Fisheries* 1-2.

[6] Endangered Seas Campaign of World Wildlife Fund International, *The Footprint of Distant Water Fleets on World Fisheries* (UK: Branksome House, 1998) 68.
[7] *The Footprint of* 69-72.

In 1977 Canada drove the distant water fleets (DWF) from these seas by declaring a 200nm fishing limit, however filled the void left by the departed Europeans through the expansion of her own fishing fleet.[8] The stocks collapsed to such an extent that a moratorium on the cod fishery was declared in 1992. The stocks have not recovered to this day, and although many theories have been put forward to try to explain the phenomenon, human interaction with the resource remains an important factor. "In all likelihood, the intensified fishing effort that took place in the 1980s put increased pressure on a population that was already weakened by the fiercely competitive international fishing activity that took place between 1962 and 1977. The resource, which had fed so many for centuries, was finally unable to sustain itself."[9]

Canada has not licensed any DWFs to fish in its waters, however many developing coastal nations use these arrangements as a source of hard currency. A major problem is that these nations do not have the capability to ensure that regulations and agreements on catch size, by-catch limits, or species caught are complied with. "The coastal state is likely to find it costly to ensure that the DWFs comply fully and precisely with the terms and conditions laid down by the coastal state."[10] Additionally, the inability to monitor and police the EEZ invites criminal activity. "Of course, DWFs may attempt to enter an EEZ, and catch the stocks contained therein, without obtaining access agreements from the coastal state, as is exemplified by the case of the Galapagos Islands. Such action constitutes poaching, pure and simple."[11]

Over-exploitation of the marine environment is not restricted to coastal fisheries. As fishstocks in coastal areas dwindle, or licensing agreements cannot be reached, DWFs are forced further and further afield to search for fish. Their catch now includes large quantities of trans-

[8] *The Footprint of* 74.
[9] *The Footprint of* 76.
[10] *The Footprint of* 97.
[11] *The Footprint of* 95.

boundary fish. These can be either straddling stocks – fish that migrate from the EEZ to the high seas and back as part of their life cycle – or highly migratory stocks – fish that migrate through EEZs and the high seas, sometimes over large distances, on a continual basis.[12] Because of the effect of such practices on coastal nation stocks, this has caused problems between coastal states and the states of DFWs. The problem has been acute enough that the UN held conferences on Straddling Fish Stocks and Highly Migratory Fish Stocks from 1993 to 1995. An agreement was finally reached that called "for straddling stock type of resources to be managed on a region by region basis through regional fisheries management organizations (RFMOs), in which membership will be open to relevant DWFs. The coastal state will have no choice but to deal with the relevant DWFs…"[13]

If the coastal nation and the DWF do not agree on conservation methods, the result can be conflict.

> Major conflicts have arisen over high-seas fish stock depletion over the past few years. These conflicts over depletion have already caused 'fish wars.' In the past five years alone, there have been over a dozen major conflicts, both armed and unarmed between nations who have felt threatened by the fishing practices of another state. To illustrate the interaction between nations who are separated by great distances, Panama and Australia clashed in 1997 over fishing in the Arctic waters.[14]

Canada is not immune to such conflict. This has been proven through the "annual tomfoolery and posturing between Canada and the United States over Pacific salmon and the 1996 Turbot

[12] *The Status of Natural Resources* 65.
[13] *The Footprint of* 99.
[14] *The Status of Natural Resources* 66.

War between Canada and Spain, where the question of whether Canada was within its right to seize a vessel on the high seas is still being debated in court."[15]

The problems are not expected to decrease. Different studies have estimated that there are two times[16] to two and a half times[17] the number of fishing fleets needed to maintain sustainable fishery development. It has also been estimated that worldwide demand for fish products will increase 40 per cent over the next decade.[18] It is expected that continued depletion of stocks will see increased conflict as more and more fishing fleets compete for less and less fish. Consequent with reduced fish stocks will be the ability of indigenous and traditional fisheries to maintain a way of life and harvest a source of protein that has been in existence for centuries.

While troublesome in the North American and African waters, fish shortages could have their greatest impact in the Asia-Pacific region. It has been estimated that one billion Asians use fish as the main source of protein. Over half the fish caught worldwide continue to be taken from this region. "For most states in the region, therefore, the relationship between food security, ecological damage and conflict is most evident at sea."[19] Incidents of illegal fishing in the region have been numerous in the past decade. Thai fishermen routinely cross into the EEZs of neighbouring states. "Vietnam has fired on fishing boats from China, Malaysia and Taiwan, and the Philippines has seized Chinese and Taiwanese trawlers."[20] The dispute over the Spratley Islands comes, in part, from the rich maritime renewable resources concentrated in those seas.

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[15] *The Footprint of* 101.
[16] *The Footprint of* 3.
[17] World Wildlife Fund Endangered Seas Campaign, *Creating a Sea Change for Fisheries* www.panda.org/resources/publications/water/fisheries_99, 6.
[18] *Creating a Sea Change* 2.
[19] Alan Dupont, *The Environment and Security in Pacific Asia* (New York: Oxford University Press, 1998) 50.
[20] Alan Dupont 53.

The diminishing of fishstocks worldwide, combined with the increased demand for this resource, has and will continue to result in conflict between nations. Coastal nations should be concerned about the potential long-term impacts of increased competition on the high seas and within EEZs. "Inter-state confrontation over fish and other living resources is emerging as a significant long-term security problem."[21]

Fresh Water

> Water is another environmental issue which has assumed a new prominence in the international security agenda of the 1990s. The link between fresh water and security is the result of water's central importance to human life and economic development. Water is arguably the most critical of all renewable resources because humankind depends upon continuous access to it, not only for drinking and food production but also for industry, transport and energy.[22]

Looked at holistically, water does not seem to have acute security problems associated with it. Human activity removes about 3,500 cubic kilometres of water per annum from various sources, with consumption growing between 2 to 3 per cent yearly. The annual availability of water from rivers alone totals close to 40,000 cubic kilometres.[23] But these numbers do not tell the whole story. Inequitable distribution of this resource is a constant source of aggravation in some parts of the world. Polluting of the resource is not accounted for in the above quoted numbers. Trans-border rivers have their associated problems, such as river use, damming, and pollution.

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[21] Alan Dupont 56.
[22] Alan Dupont, 59.
[23] Thomas F. Homer-Dixon, *Environmental Change and Human Security* (Toronto: Canadian Institute of International Affairs, 1991) 7.

Some regions of the word are using all of their river water runoff. Population and industrial growth, agricultural needs and climate change could adversely affect these regions in the near future. Large parts of the United States, India and China are currently affected. There are other areas where it is estimated that water availability will reach a crisis by the year 2025. The Middle East and parts of Africa are included here.[24]

Historically there have been numerous instances of friction over the use of river water. They have been evident over the Rio Grande in North America, the Amazon and Parana in South America, the Nile in Africa, the Ganges, Indus and Brahmaputra in Asia, the Rhine in Europe and the Jordan, Litani, Orontes and Euphrates in the Middle East.[25]

As water sources in already dry regions become scarcer, the potential for conflict increases. It has been estimated that water use by humans will increase by 40 per cent over the next two decades, with an additional 17 per cent required for agricultural purposes.[26] Canada cannot isolate herself from the problems of the world at large. As a nation wealthy in this natural resource she will come under pressure to use it as a commodity. Indeed, these pressures have already arisen. This, however, cannot be viewed as simply a domestic issue. Increasing regional scarcity means that water will continue to be a factor in inter-state conflict, a factor that is growing in significance. It has been posited that, given the inter-dependency of economics and politics, the water problems of one state or region will become a concern for all nations.[27]

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[24] Thomas F. Homer-Dixon, *Environmental Scarcity and Global Security* (New York: Foreign Policy Association, 1993) 26- 27.
[25] *Security and the Environment: Exploring Some Key Issues of Our Times*, Report on a workshop organized by the Royal Norwegian Ministry of Defence (Oslo: Otto Falch, 1987) 25.
[26] United Nations Economic and Social Council Commission on Sustainable Development, *Water: A Key Resource for Sustainable Development – Report of the Secretary-General*, Organizational Session 30 April – 02 May 2001, 01-27392(E) 2.

Forests

Forests are the habitat for a wide variety of natural species. They are also a natural carbon sink, absorbing much of the CO_2 released through the production and use of energy. As such they perform an integral part in regulating the temperature of the earth. Despite this, the world's forests continue to disappear.

The earth has approximately half of its original forests remaining.[28] These cover about a quarter of the land area of the planet (3,454 million hectares in 1995), with about 55 per cent situated in the developing world, and the other 45 per cent in the developed world. They are divided equally between tropical and subtropical forests, and temperate and boreal forests.[29]

There are stark differences in forest management evident between the developed and developing worlds. In the fifteen years between 1980 and 1995 the world lost 180 million hectares of forest. 200 million hectares were destroyed in the developing world while there was a net increase of 20 million hectares in the developed world. Although the rate seems to have eased in the last five years of the study (1990 – 1995), there was still a net loss of 56.3 million hectares (65.1 million lost/8.8 million gained as above).[30]

The reasons for the extent of forest loss are varied. In many poor countries wood is still the only fuel available for heating and cooking. The ability of some nations to feed a growing population is forcing the destruction of forests to make way for marginalized agricultural land. This is most evident in areas of Africa and Asia. Urbanization is pushing city limits into forests and rich farmlands. The expansion of cities and industrial economic development are major

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[27] Alan Dupont 73.
[28] Nigel Dudley and Adam Markham *Global Warming: Impacts on Forests*, WWF Climate Change Campaign at www.panda.org/resources/publications/climate/forest_doc/preface.htm 1.
[29] Food and Agricultural Organization of the United Nations, *State of the World's Forests 1999* www.fao.org/docrep/W9950E/W9950E00.htm 1.
[30] *State of the World's Forests* 1.

sources of forest loss in Latin America and Asia.[31] Lumber is also an easily exploitable source of wealth.

The Philippines is a good example of poor forest management. At the turn of the century it had 10 million hectares of virgin forest. Less than one million hectares remain, and they are expected to disappear in the near future. Combined with second growth forest, the Philippines has about 6 million hectares of forest remaining, down from the 16 million hectares in existence at the end of the Second World War. Logging and the clearing of land for agriculture have been the main contributors to forest reduction. During the 70s, the martial regime of Ferdinand Marcos used the value of forests to pay down foreign debt. The companies set up to exploit the resource on behalf of the state saw little utility in reforestation.[32] Although the Marcos regime has gone, this natural resource continues to be over-exploited.

Another major contributor to deforestation is fire. Fire can occur through natural causes, or through human intervention in land clearing, accident or arson. The burning of forests has a multiple effect. The reduction of the forests means that there are fewer resources absorbing CO_2. Conversely, when burned, forests release their stored CO_2 thereby contributing to the greenhouse gases causing global warming. 1997 and 1998 were banner years for forest fires. Much of the blame has been directed toward the change in weather patterns brought about by El Nino. "In 1997, wildfires raged in Indonesia, Papua New Guinea, Australia, Mongolia, the Russian Federation, Colombia, Peru, Kenya, Rwanda and other parts of Africa. By mid-1998, fires were reported in Indonesia, the Amazon, Mexico and Central America, the United States, western Canada, far-eastern Russia and parts of Europe."[33]

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[31] *State of the World's Forests* 1.
[32] Thomas F. Homer-Dixon, *Environmental Change and Human Security* 6.
[33] *State of the World's Forests* 2.

The destruction of forests has long-term implications beyond their effects on climate change. Tree root systems anchor soil and prevent erosion. Further, forests act as sponges during rainy seasons, retaining moisture that can be used during dryer times. Here the Philippines example is again germane:

> Across the archipelago, logging and land clearing have accelerated erosion, changed regional hydrological cycles (the cycles of water between the atmosphere, land and plants that help determine local weather patterns) and decreased the land's ability to hold water during rainy periods. The resulting flash floods have damaged irrigation works while plugging reservoirs and irrigation channels with silt. This may seriously affect crop production.[34]

The result of deforestation, beyond the climactic repercussions, can be devastating to regions. Without this anchor to maintain moist and fertile land, crop production can fall below levels required to sustain local populations. The resulting 'environmental refugees' are forced to seek livelihoods elsewhere, often across borders, placing them in direct competition with indigenous peoples. Inter and intra state conflict can result. This is especially so in the developing world.

Agriculture, Land and Desertification

Global cropland totals about 1.5 billion hectares, with estimates for potential arable land ranging up to 3.4 billion hectares. Most of the good land is already in use, with the majority of that remaining being marginal at best. "Experts generally describe a country as land-scarce when 70 percent or more of the potential cropland is under production. In Asia, which includes

[34] Thomas F. Homer-Dixon, *Environmental Scarcity and Global Security* 35.

four of the world's five most populous countries, some 82 percent of all potential cropland is cultivated."[35]

Exacerbating this problem is the expected growth in world population over the next fifty years. The annual increase in world population steadily increased from 47 million in 1950, peaking at 81 million in 1995. This rate is expected to continue until 2050, when the world population will be about 10 billion, and it is anticipated that population growth will stabilize. Since populations are relatively stable in the industrialized world, 95 percent of this growth is expected to occur in the developing world.[36]

Fifty years ago such population growth trends resulted in doomsday scenarios predicting that the earth would not be able to feed her people. The development of hardier crops, better fertilizers and pesticides, and modern farming techniques have increased the production level per hectare of land to such a degree that the world is in no imminent danger of mass starvation. However, as in many other areas, increased production is much more apparent in the developed world. In the developing world poor agricultural techniques, combined with growing population rates, rapid urbanization, industrialization and erosion, is contributing to large reductions in available cropland. In Asia alone it is estimated that 1 percent of cropland each year is lost to industrialization.[37] "The geographer Vaclav Smil, who is generally very conservative in his judgments about environmental damage, estimates that 2 million to 3 million hectares of cropland are lost annually to erosion, with perhaps twice as much land going to expansion of cities and at least 1 million hectares abandoned because of salinity."[38]

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[35] Thomas F. Homer-Dixon, *Environmental Scarcity and Global Security* 25.
[36] United Nations Economic and Social Council Commission on Sustainable Development, *Global Change and Sustainable Development: Critical Trends – Report of the Secretary General*, Fifth session 7 – 25 April 1997, 6- 7.
[37] *Global Change and Sustainable Development* 21.
[38] Thomas F. Homer-Dixon *Environmental Scarcity and Global Security* 25.

The cumulative effects of urbanization, industrialization and erosion are significant. About 300 million hectares of previously productive land have been abandoned altogether due to degradation.[39] Over 2 billion hectares are experiencing some degree of degradation, affecting the lives of more than 1 billion people.[40] These factors have, recently, revived the discussion about the sustainability of our food sources in the long term.

Desertification is adding to the problem. A number of complex factors contribute to this phenomenon, which occurs mainly in arid and semi-arid areas. Wind erosion and soil moisture content are the main factors. Soil moisture is affected by changing local weather patterns, deforestation and global warming. Nearly one fifth of the world's total cropland has been affected by desertification.[41] Up to 6 million hectares a year are added to lands described as desert-like.[42] "The United Nations Environment Programme (UNEP) estimates that desertification…costs the world approximately US $42 billion a year."[43]

Canada is, once again, not immune to this phenomenon. Soil erosion continues in Canada for numerous reasons. Wind and water remove approximately 300 million tons of topsoil from the prairies annually. Nutrient loss in the order of 40 to 50 percent is apparent in most areas. The widespread use of heavy machinery is leading to compaction of the soil. Contamination from vehicles, pesticides and industry continues. Salinization from water evaporation and industrial intrusion has further reduced the available cropland.[44]

The continued reduction of good cropland worldwide needs to be addressed. "Soil erosion and desertification comprise one of the most serious threats to peace. They lead to large-

[39] *Global Change and Sustainable Development* 21.
[40] United Nations Economic and Social Council Commission on Sustainable Development, *Agriculture, Land and Desertification – Report of the Secretary-General*, 30 April – 02 May 2001, 2.
[41] Thomas F. Homer-Dixon, *Environmental Scarcity and Global Security* 25.
[42] Boyce Richardson, *Time to Change: Canada's Place in a World in Crisis* (Toronto: Summerhill Press, 1990) 81.
[43] *Agriculture, Land and Desertification* 2.
[44] Boyce Richardson 81- 82.

scale movements of people, which may well be beyond the control of local, regional, or national authorities. Hungry people looking for arable land seldom respect national boundaries and unwittingly become a threat to the national security of the host state."[45]

Global Warming and Climate Change

The earth has been able to sustain life because of the warmth generated by naturally occurring greenhouse gases such as ozone, nitrous oxide, methane, carbon dioxide and various chlorofluorocarbons (CFCs). These gases reradiate the sun's energy that is reflected by the earth, warming the temperature. There has been a rapid increase in concentrations of these gases in the atmosphere over the last half-century. Concomitant with this there has been a trend for temperatures to rise globally.

CO_2 is the gas most responsible for global warming, making up 60 percent of the total of greenhouse gases. Analysis of air trapped for thousands of years in glacier ice has revealed that the pre-industrial concentration of CO_2 in the atmosphere was 275 parts per million (ppm).[46] These concentrations have grown in the past fifty years to 370 ppm.[47] Increased emissions of CO_2 through human interaction are most evident through the use of fossil fuels, such as oil, gas and coal.

Methane makes up about 15 percent of greenhouse gases. It is generated from garbage landfills, in growing rice, and via food production by the world's billion cattle. Nitrous oxide is another byproduct of coal and gas burning, and adds 10 percent to greenhouse gases. Chlorofluorocarbons (CFCs) are the final major contributor, generated from refrigeration and air

[45] *Security and the Environment: Exploring Some Key Issues* 26.
[46] Boyce Richardson 51- 52.
[47] WWF Climate Change Campaign, *Scenarios of Global Climate Change Impacts* 19 October 1999 www.panda.org/climate/pubs/scenarios.cfm 1.

conditioning machinery and aerosol sprays.[48] CFCs are also a major contributor to the reduction of the earth's ozone layer. Concentrations of these gases have increased since 1960: methane from 700 to 1720 ppm and nitrous oxide from 275 to 310 ppm.[49]

Globally temperatures have risen about 0.6 degrees Celsius (C) since measurement began in the late 1850s. The disturbing fact is that most of that rise has occurred since 1980, when temperatures began to increase at a rate of 0.2 degrees C per decade.[50] The six warmest recorded years all occurred in the 1990s, with 1998 probably being the warmest year of the millennium. This trend is expected to continue. Temperatures could increase worldwide by 2.6 degrees C by 2050, a rate that would exceed the capability of many living creatures and ecosystems to adapt.[51] In comparison, since the coldest period of the last ice age, about 18,000 years ago, the world temperature has increased by only 9 degrees C.[52] While modeling of climate changes and their effects are still an inexact science, some broad conclusions can be made about the impact of global warming on the earth.

It is known that temperatures will increase more dramatically the higher the latitude, that sea levels will continue to rise, and that the coastal regions will be wetter and interior lands drier. "For instance, by 2030 it is predicted that central North America will warm from 2 to 4 degrees in winter and 2 to 3 degrees in summer and experience a 15 to 20 percent decrease in soil moisture. This, of course, could have a major affect on grain production in the United States and Canada.[53]

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[48] Boyce Richardson 54- 55.
[49] P. Vellinga and W.J. van Verseveld, *Climate Change and Extreme Weather Events*, Institute for Environmental Studies, WWF September 2000, www.panda.org/resources/publicatons/climate/xweather/xweather.html 2.
[50] P. Vellinga and W.J. van Verseveld 2.
[51] *Scenarios of Global Climate Change Impacts* 2.
[52] Thomas F. Homer-Dixon, *Environmental Scarcity and Global Security* 20.
[53] Thomas F. Homer-Dixon, *Environmental Scarcity and Global Security* 21.

More recent studies have concluded that temperature increases in the Northern Hemisphere will be much greater than the Southern, perhaps by as much as a factor of two. This would be caused because of the greater landmass in the north, and could see temperatures rise by as much as 8 degrees C by the year 2100.[54]

Global warming is contributing to the rise is sea levels. This is mostly due to the expansion of seawater as it warms, but is contributed to by the melting of fresh water ice in the polar regions. Sea levels have risen by somewhere between 10 and 25 centimeters in the last century, with most of the rise occurring in the last fifty years. It is estimated that the seas could rise by another 45cm or more in the next fifty years. Given that half the world's population lives within 200 meters of sea level, the effects could be devastating. "Rising oceans could flood many millions of hectares of valuable coastal ecosystems world wide, from the shorebird havens of northern Europe's Waddensea and South America's Suriname, to the highly populated river deltas of China, Vietnam and Bangladesh, where millions of people live and depend on coastal fisheries."[55]

Ocean circulation could be affected. The ocean conveyer belt, which moves colder polar waters toward the equator and warmer tropical waters toward the poles, is believed to be a key contributor to maintaining life in the sea. It supplies life-sustaining oxygen to the deepest regions of the ocean. It also affects the ocean currents that regulate temperature. Europe is much warmer than areas of similar latitude due to the effect of warm tropical waters on its climate. Warmer surface water could disrupt the ocean conveyer belt, affecting both climate and marine life in ways not yet fully understood.[56]

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[54] P. Vellinga and W.J. van Verseveld 22 – 24.
[55] WWF Climate Change Campaign, *Global Warming: The Oceans in Peril* 08 June 1999 www.panda.org/climate/pubs.cfm 1.
[56] *Global Warming: The Oceans in Peril* 1.

The polar regions may experience the most dramatic effects. As previously stated, temperature increases will be greatest in the high latitudes. In the Antarctic a massive section of the Larsen ice shelf broke off in 1995, followed by two more large areas in 1999. In the Arctic "ice masses appear to be thinning noticeably and seasonal ice is forming later and melting earlier…Other signs of warming in 1997 and 1998 in the Arctic were never-before seen blooms of marine algae so massive that they were easily visible from space."[57] Studies have concluded that mean sea ice thickness in the Arctic has been reduced by about 1.3m, with a further 2.9 percent loss expected per decade.[58]

An additional oceanic consequence of global warming will be its impact on marine life. Thirty countries reported bleaching of coral reefs, caused by abnormally high seawater temperatures, during the very warm years of 1997 and 1998. This was the worst ever report of life-sustaining coral reef destruction. The effects of warmer water on fish are only now being researched. "Canadian scientists have shown that sockeye salmon are extremely sensitive to changes in water temperature, particularly in the winter. Other species, including steelhead, chum, coho are similarly sensitive to water temperature."[59] The warmer the water, the more salmon need to feed to survive. Ocean warming could force them further and further away from the shores in search of cooler water. Studies have shown that the decline of cod in the North Sea is due as much to significantly warmer seawater temperatures as to overfishing.[60] It would not be difficult to directly apply some of these conclusions to the decline of the cod fishery in Canadian Atlantic waters.

[57] *Global Warming: The Oceans in Peril* 2.
[58] P Vellinga and W.J. van Verseveld 11.
[59] *Global Warming: The Oceans in Peril* 2.
[60] P Vellinga and W.J. van Verseveld 18.

The growth and sustainment of forests, and the biodiversity they harbour, will also be affected. Temperature and precipitation levels are key factors in forest health. The vast boreal evergreen forests of the northern climes will probably be at the highest risk. "Reduced moisture in the soil during summer will increase drought-stress and the extent of wild fires. Climate zones will migrate northwards at rates of up to 5 km per year. Most tree species are not able to migrate this fast."[61] The result may be a rapid reduction of boreal forests toward their southern fringes with a slower expansion to the north. Temperate forests will be affected by temperature in the northern latitudes, and rainfall in the southern. "Drought-stress at certain low-latitude margins will lead to significant die-back, whilst increased temperature will enhance growth and establishment of temperate forest species at higher latitudes."[62] While these forests may expand over time, significant species losses are predicted during the transition phase. The greatest threat to mangrove forests will be rising sea levels and loss of their anchoring sediment.[63]

Global warming may force significant societal change. There are benefits and costs associated with this change. Warmer temperatures in the northern climes could support increased agricultural production, expanded tourism and less demand for energy for heating. There is potential to exploit the economically attractive shorter northern shipping routes.[64] Some have suggested that climate change could force a mass migration northward, with Canada's population burgeoning to ten times its current size.[65]

Finally, global warming is causing a change in the ferocity and frequency of extreme weather. "While a 2 to 5 degree average global warming might not seem too significant for food

[61] United Nations Environment Programme, *Forests in Flux* www.unep-wcmc.org/forest/flux/executive_summary.htm 1.
[62] *Forests in Flux* 2.
[63] *Forests in Flux* 2.
[64] P. Vellinga and W.J. van Verseveld 31.
[65] Boyce Richardson 61.

production, it could cause a sudden increase in the chance of crop devastating droughts, floods, heat waves and storms, even if it does not force the climate system to a completely new equilibrium."[66]

Global warming could affect every aspect of life. The changes have economic, environmental and societal impacts for which we are not ready. As seen above, global warming affects the oceans, the forests, cropland and climate. Its effects are all encompassing. They are transnational, and it will take worldwide cooperation to mitigate the causes, and prepare for the consequences of what has already been done.

> Climate change means a global redistribution of costs and benefits of the weather. The costs will be greater than the benefits, as society is not prepared for weather surprises and it takes time to adjust and reap the benefits. In fact climate change is an additional uncertainty in economic development and thus an additional cost factor. And last but not least, (global) society does not have the instruments and institutions that can redistribute or settle the damage. Therefore, climate change is likely to lead to great political tensions.[67]

THE ENVIRONMENT AND CONFLICT

Now that some of the major causes and effects of environmental degradation have been reviewed, it is time to explore the place of the environment in international relations, in notions of national security, and in its potential to lead to conflict. While it has been said that all war has been a competition for territory or resources, historically conflict has been waged over access to non-renewable resources, such as oil. But the potential to wage war over non-renewables seems

[66] Thomas F. Homer-Dixon, *Environmental Scarcity and Global Security* 21.
[67] P. Vellinga and W.J. van Verseveld 31.

to be reducing. These items are open to market forces that increase prices in times of scarcity, reducing demand. Further, additional reserves of most non-renewable resources are being discovered frequently, and they are widely distributed globally. "The substitutability and wide geographical distribution of most nonrenewables mitigate their scarcity and ensure they are rarely catalysts for international conflict."[68]

Recent analysis has concentrated more on the potential for conflict brought about by competition for renewable resources. In the developing world, population growth combined with the destruction of cropland, forests and fisheries is resulting in mass migrations, driving disparate peoples together. "There is now evidence that such scarcities threaten the internal stability of many developing countries. By creating complex humanitarian disasters and stimulating large migrations, this civil strife can in turn have major repercussions for international security."[69]

In 1991, as the Cold War was coming to an end, the United States for the first time acknowledged the environment as a security concern. Published in August 1991, the National Security Strategy stated that prudent management of the earth's resources was necessary to ensure their availability for future generations, and affirmed that environmental stresses were already leading to political conflict.[70] This view was reinforced in the 1994 National Security Strategy.

The Project on Environment, Population and Security, sponsored by the University of Toronto, was started in 1994 with an aim, inter alia, to understand the links between population growth, renewable resource scarcity, migration and violent conflict. The study resulted in a number of key findings on the relationship between environmental scarcity and conflict:

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[68] Thomas Homer-Dixon and Valerie Percival, *Environmental Scarcity and Violent Conflict: Briefing Book* (Toronto: University of Toronto, 1996) 3.
[69] Thomas Homer-Dixon and Valerie Percival 3.

a. That the causal relationship between environmental scarcity and conflict can often be obscure. Whereas conflict can often be directly related to such things as poverty, migration and ethnic tension, the underlying cause of these factors is often a scarcity of cropland, forests or fresh water.

b. That environmental scarcity is invariably caused by one of three things – the degradation and depletion of the resource, increased consumption of the resource, or its inequitable distribution.

c. That scarcity encourages powerful groups to keep resources, and the wealth represented by them, to themselves, forcing the migration of marginalized groups to ecologically sensitive areas.

d. That societies can adapt to resource scarcity by reducing their need for such resources or by using them more efficiently. "In the next decades, population growth, rising average resource consumption, and persistent inequalities in access to resources ensure that scarcities will affect many environmentally sensitive regions with a severity, speed and scale unprecedented in history. Some poor countries will be ill equipped to adapt."[71]

e. That if nations cannot adapt, it will lead to impoverishment and migration.

f. That if nations cannot adapt, they will be weakened. "Vigorous state-society relations are crucial for social stability and prosperity. The state must respond to the demands of society, yet not be hostage to powerful social groups. Scarcities

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[70] Kent Hughes Butts, "Why the military is good for the environment" *Green Security or Militarized Environment*, ed. Jyrki Kakonen (Vermont: Dartmouth Publishing Company, 1994) 86.
[71] Thomas Homer-Dixon and Valerie Percival 7.

of renewable resources, and the economic problems that often ensue, threaten the delicate give-and-take relationship between state and society."[72]

g. That if nations cannot adapt, scarcity can be divisive among different groups in society. Group identities can be strengthened during hardship, leading to enhanced competition between groups.

h. That environmental scarcity can weaken a state to such an extent that it could be the target of conflict, insurgency or coup d'etat. "The likelihood of violence increases as the social balance of power shifts against the state and in favor of challenger groups."[73]

i. That other than for transboundary water resources, environmental scarcity will not directly cause interstate conflict. There are two reasons for this, "First, in general, states cannot easily or quickly convert renewable resources into assets that significantly augment their power. Second, the very countries that are most dependent on renewable resources…also tend to be poor, which lessens their capability for aggression."[74]

j. That conflict which has an environmental factor can have significant impacts internationally.[75]

Many of these points are well illustrated by the recent Zapatista rebellion in southern Mexico:

Environmental scarcity can contribute to diffuse, persistent subnational violence, such as ethnic and civil strife. The incidence of such conflict will probably increase as

[72] Thomas Homer-Dixon and Valerie Percival 8.
[73] Thomas Homer-Dixon and Valerie Percival 9.
[74] Thomas Homer-Dixon and Valerie Percival 9.
[75] Thomas Homer-Dixon and Valerie Percival 6 – 10.

environmental scarcities worsen in some parts of the developing world. This subnational violence will not be as conspicuous or dramatic as interstate resource wars, but it may have serious repercussions for the security interests of both the developed and the developing worlds. The Zapatista rebellion in the Mexican state of Chiapas helped trigger a peso crisis which had been building for some time. The crisis had consequences for international money markets, and cost Mexico and its NAFTA partners – the United States and Canada – billions of dollars in their efforts to stop the dramatic decline of the peso's value."[76]

It has been argued that environment induced conflict can be viewed from three perspectives. There is scarcity-induced conflict where there is not enough of a natural resource available to satisfy the needs of everybody. "Such conflicts will probably arise over three types of resources in particular: river water, fish and good cropland. These renewable resources are likely to spark conflict because their scarcity is increasing swiftly in some regions, they are often critical to human survival, and they can be physically seized or controlled."[77]

A good example of resource scarcity contributing to conflict is evident in the Middle East. "Virtually all of Israel's fresh water comes from two sources: surface water supplied by the Jordan River, and groundwater fed by recharge from the West Bank to one of three major aquifers."[78] At the time of the 1967 war Israel was using all of its available fresh water. The occupation of three territories (West Bank, Golan Heights and Gaza Strip) changed this situation dramatically by increasing Israeli total water supply by almost 50 percent, and giving them control of the headwaters of the Jordan River. The control of these headwaters are vital to water

[76] Thomas Homer-Dixon and Valerie Percival 10.
[77] Thomas F. Homer-Dixon, *Environmental Scarcity and Global Security* 46.

management and exploitation in the region. The 1967 war gave Israel control of the Yarmuk River, a major tributary of the Jordan, and their later establishment of a security zone in Lebanon allowed it access to the Litani River. The Israeli position, in defiance of Arab views, is that the Litani is part of the Jordan River watershed, and its waters could be diverted to the Jordan. "Some officials have pointed out that the Litani River is the only source that will allow Israel to maintain present water consumption rates and avoid making the difficult choices accompanying conservation measures."[79] "Control of water resources in the West Bank and the Golan Heights are now essential to Israel's future and, accordingly, to its economy."[80] The control and exploitation of these waters are a continuing source of conflict with Israel's neighbours.

Water and its distribution can also affect stability within the borders. Agricultural and industrial development is heavily dependent upon the waters from the West Bank. There are huge inequities in the distribution of the water resources in this area. Although the population is over 90 percent Palestinian, they account for only about 4.5 percent of the water use.[81] Such huge inequities in population and consumption can only add to the frustration levels in the region, increasing the incidence of violent confrontation. Individual or group confrontation and violence has led to a breakdown in dialogue. Although not the only cause, water is a factor in the ongoing conflict between Palestinian and Israeli authorities.

The second perspective is group identity conflicts, caused when scarcity induces the migration of culturally and ethnically different groups into direct contact with each other. Burgeoning populations in the developing world coupled with poor environmental practices

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[78] Research Panel on Environment and Security, *Environment and Security: An Overview of Issues and Research Priorities for Canada*, Canadian Global Change Program Technical Report No. 96-1 (Ottawa: The Royal Society of Canada, 1996) 8.
[79] *Environment and Security: An Overview of Issues* 8.
[80] *Environment and Security: An Overview of Issues* 8.
[81] *Environment and Security: An Overview of Issues* 8.

could result in large migrations to the wealthier and more attractive industrialized world. "People will seek to move from Latin America to the United States and Canada, from North Africa and the Middle East to Europe, and from South and Southeast Asia to Australia. This migration has already shifted the ethnic balance in many cities and regions of rich countries, and the governments are struggling to contain a backlash against 'foreigners.'"[82]

Human migration due to environmental degradation has become such a problem that a phrase has been coined to capture its essence – environmental refugees. "As deforestation, desertification, global warming and other environmental threats mount, a new category of displaced people is being recognized – environmental refugees."[83] There are up to 10 million people displaced by environmental conditions today, and it has been estimated that up to 300 million could be displaced by the flooding that could accompany global warming.[84]

Some of these conditions are exacerbated by rapid population growth. In Bangladesh the quality of cultivatable land is kept high through the silt deposits laid down by the annual flooding of the Ganges and Brahmaputra rivers. However the population of Bangladesh is exploding, and is expected to almost double from 115 million to 235 million by 2025. With all of the good arable land already developed, the region has seen a considerable displacement of population. It has been estimated that neighbouring regions of India have absorbed up to 15 million Bengalis since the India-Pakistan war that created Bangladesh in 1971. Such massive change will tend to destabilize a region. "This enormous movement of people has produced sweeping changes in the politics and economies of the receiving regions. It has altered land distribution, economic relations, and the balance of political power between religious and ethnic groups, and it has

[82] Thomas F. Homer-Dixon, *Environmental Scarcity and Global Security* 47.
[83] *Environment and Security: An Overview of Issues* 9.
[84] *Environment and Security: An Overview of Issues* 9.

triggered serious intergroup conflict…"[85] The continuing population growth in both of these countries will only serve to deepen the crisis and complicate the relationship between these two historically friendly nations.

As previously mentioned, rising waters due to global warming could cause a worldwide population displacement estimated at 300 million for flooding alone. A refugee problem of this magnitude could lead to instability in many regions of the world. It will affect both developing and developed nations. Flooding would be most critical in low-lying areas, such as the Nile delta, where a large portion of the Egyptian population makes its living. Even in the United States, coastal cities such as New York, Miami and Boston would be threatened.

The final perspective is depravity induced conflict, or that caused by resource inequities. These inequities can be between groups within one state, or between states themselves. In poorer nations, as the amount of wealth available through exploitation of resources reduces due to degradation, it is often the disenfranchised that will suffer the most. The wealthy will use all means necessary to keep a larger portion of a shrinking pie. "At some point, the frustration and anger of certain groups may cross a critical threshold, and they will act violently against those groups perceived to be the agents of their economic misery or those thought to be benefiting from an unfair distribution of economic rewards in the society."[86] The water allocation between the Israelis and Palestinians is one example, but there are many more.

In the Philippines the history of powerful landlords controlling much of the nation's wealth has continued. As modern agricultural techniques were introduced, fewer and fewer peasant labourers were needed to grow the nation's cash crops. An expanding poor population migrated to the cities and the hills, creating shantytowns and stripping marginal land of its utility.

[85] Thomas F. Homer-Dixon, *Environmental Scarcity and Global Security* 52.
[86] Thomas F. Homer-Dixon, *Environmental Scarcity and Global Security* 49.

Their slash and burn techniques turned fragile ecosystems into wasteland, increasing erosion and landslides, and affecting local weather. These people, marginalized by environmental scarcity and victimized by the inequitable distribution of wealth, were easy recruits to the communist insurgency waged by the New People's Army (NPA).[87]

The problem with many of the studies on environmental degradation and the consequences for violent conflict or global stability is that they base their findings and conclusions on recent events and stop. They rarely project their findings into the future in order to estimate the potential for conflict due to environmental scarcity. If the trends in environmental degradation continue – increased erosion of arable land, deforestation, desertification, and global warming – and the trends in demographics continue – mass migrations and continued population growth – then the potential for violence will increase, both in frequency and magnitude.

In the near future, the interaction between scarcity, poverty, migration, and population growth will affect the industrialized world, including Canada, in three main ways: where large, populous and resource rich states, such as China, India, Indonesia, Brazil or Mexico are affected; where states in key regions, such as the Middle East, are affected; and where the result of these factors is such misery that international action is demanded, as in Somalia and Rwanda. [88]

In the longer term, the potential for mass migration, reduction of fish stocks, and opening of passage in the North could have significant impacts on Canada's foreign and domestic policy. Indeed the definitions of national security and sovereignty suffer when applied to environmental issues. Because of the inherent transboundary nature of environmental threats, individual states can do little to affect real change. International cooperation is needed to address what has

[87] Thomas Homer-Dixon and Valerie Percival 49.
[88] Thomas Homer-Dixon and Valerie Percival 3.

become known as environmental security. "Environmental security must ultimately transcend national borders, because ecological systems do not respect these borders. Ecologically sound management of resources and preservation of a healthy environment necessitates international cooperation."[89]

Another conundrum is that the industrialized world, to support its economic viability, relies on a cheap and plentiful supply of fossil fuels. It is the massive consumption of these fuels that both supports the Western lifestyle while it imperils the earth through the production of greenhouse gases. The industrialized world is looking at global warming and environmental scarcity as a threat to national security while it is also a major contributor to the problem.[90] How this problem will be resolved is unknown. Nations such as the United States may acknowledge the threats environmental issues will pose to their security, yet they refuse to act on them through ratification of international treaties such as the Kyoto Accord.

The issue is one of economics. National security would be compromised by weakened economic power without the fossil fuels that drive industry. The long-term environmental effects of using such fuels could, in turn, compromise national security. Within the developing world, national security could be compromised economically through reduced exploitation of their natural resources, such as fish and lumber. The demands of sustainable development would require a limit on fossil fuel consumption in the developed world, and a limit on environmental exploitation in the developing world.

Focusing on limits requires ethical judgements that are politically contentious. First, to decide which losses are unacceptable to future generations is inherently divisive. Second,

[89] Odelia Funke, "Environmental dimensions of national security: The end of the Cold War" *Green Security or Militarized Environment,* ed. Jyrki Kakonen (Vermont: Dartmouth Publishing Company, 1994) 57.
[90] Simon Dalby, "The politics of environmental security," *Green Security or Militarized Environment*, ed. Jyrki Kakonen (Vermont: Dartmouth Publishing Company, 1994) 32.

admonishments to limit growth raise suspicions among both rich and poor. Rich nations recognize an implicit call for reduced consumption and poor societies suspect they are being asked to forego development to support what they deem to be a profligate standard of living in the West. An ongoing North-South debate is whether the primary threat to ecological balance is overpopulation in the less developed countries or overconsumption in the developed nations.[91]

How nations respond to this challenge will depend in large part on how threatened they feel at home. As long as the effects of degradation are far away there is little incentive to compromise current lifestyles. Governments should be establishing policy to ensure the long-term health of the nation. In a democratic society, where long-term is measured in years instead of decades, pro-environment decisions that affect short-term economics can be unpopular. The prudent government will support international agreements like the Kyoto Accord despite the economic repercussions.

POTENTIAL IMPLICATIONS TO CANADA

Canada must be an active participant in the international debate on environmental issues. At the same time, she must prepare for the consequences of the current and continuing degradation that has occurred. The Turbot War with Spain and recent surge in illegal immigration on the West Coast may be the tip of the iceberg. Straddling fish stocks will persist as a problem as distant water fleets continue in their search for dwindling supplies on the high seas. Poaching of fish within the EEZ cannot be discounted as a threat. Canada is a large nation, comprising 7 percent of the earth's total landmass and 9 percent of the earth's total fresh water.[92]

[91] Odelia Funke 67.
[92] Boyce Richardson 85.

These facts make Canada a tempting target. There are vast open spaces, rich in resources, seemingly available for the taking. Fresh water has the potential to be a very profitable commodity. The warming of the north could result in increased tourism. Perhaps the most critical consequence for Canada is the possible opening of the Northwest Passage.

Donat Pharand's excellent book, *The Law of the Sea of the Arctic with Special Reference to Canada*, outlines the challenges Canada may face in asserting sovereignty over the huge, largely unpopulated areas in the north. Although Canada has claimed sovereignty over the lands comprising the Canadian Arctic archipelago, the status of the waters surrounding them, with specific reference to the Northwest Passage, has not yet been resolved. It has remained unresolved because the passage is not an economical route for world trade, therefore not a global concern. That could change.

The Canadian Arctic archipelago is comprised of two groups of islands separated by the Northwest Passage. The group of southern islands and the waterways between them are recognized as Canadian. The northern group, the Queen Elizabeth Islands, and its environs are similarly undisputed. The passage between them, connecting Baffin Bay in the east and the Beaufort Sea in the west, is known as Parry Channel. Although it may not be disputed as Canadian territorial waters, this channel will see resistance to any claim as internal waters. Similarly, any claim to waters beyond the archipelago stretching to the North Pole will be challenged. Should the Northwest Passage become a viable route for shipping, Canada has interests in ensuring the safety and preservation of the north's fragile and unique ecosystem.

While the waters of Parry Channel are undoubtedly Canadian territorial seas, such a designation would not restrict the 'right of innocent passage' of vessels engaged in international trade or transit. Canada may wish to make a claim to them as internal waters thus being able to

restrict passage of vessels that have the potential to cause significant environmental damage, such as oil tankers. This would be a hard case to make.

There are three arguments that could be put forward to claim these seas as internal waters. One argument proposed to sector the Arctic among the northern nations of Russia, Finland, Norway, Denmark, Canada and the United States. It would probably be futile to make this argument because of challenges to such a theory. Challenges were made by Norway in 1930, and consistently by the Unites States in 1929, 1959, and in subsequent years. The main problem is that the sectoring theory claims waters up to the North Pole, whereas many nations view the waters under the Arctic ice cap as high seas.[93]

A second argument would entail claiming the seas on historic rights or as historic waters. Precedent has been set that two factors need to be satisfied: the coastal state must have shown a constant exercise of state authority over the waters, and there must have been acquiescence to this view from other nations. A third factor that assists in this argument is claiming that the waters are part of the vital interests of the state, either from a geographic, economic, or security viewpoint. This argument was successfully made by Norway against the United Kingdom in the 'Fisheries Case' of 1951, where the Vestfjord and the waters of all other Norwegian fjords were deemed to be internal waters. Canada would have difficulty making this case because fulfilling the precepts of constant exercise of state authority and obtaining the toleration of other nations have not been met.[94]

The final argument would be the establishment of straight baselines around the whole of the archipelago, with the claim that everything inside the baselines was internal waters. The problem is that the average width of Parry Channel is 50nm, with portions expanding to over

[93] Donat Pharand, *The Law of the Sea of the Arctic with Special Reference to Canada* (Ottawa: University of Ottawa Press, 1973) 142.

100nm. Legitimate challenges would be raised that the channel, while Canadian territorial waters, would be subject to the right of innocent passage by vessels, just as any other international highway such as the Malacca Straits. The baseline argument would need to be reinforced by a historic waters argument to have any chance of being successful.[95]

It is unlikely that Canada could make a successful argument in claiming internal water status for the Northwest Passage. Nevertheless, there is a very real possibility that this waterway could be open for routine oceanic traffic within the next 30 years. While claiming sovereignty to this region has been a relatively simple matter due to accessibility, the exercising of Canadian authority here could become much more complex and much more expensive in the near future.

Given the wide ranging and in some cases irreversible degradation of the environment today, and the potential for significant global warming and all of its implications for the future, Canada must look forward and develop strategies to mitigate the effects both to herself and the world. A vital part of this forward looking approach must be a comprehensive maritime strategy.

MARITIME STRATEGY

Before exploring the intricacies of Canadian Maritime Strategy it is first necessary to place it in its proper framework. Maritime strategy is a subset of national or grand strategy. "In its broadest sense, grand strategy is the comprehensive direction of power to achieve particular national goals."[96] Grand strategy is the responsibility of politicians and policy makers and is expressed in many ways: through law, both domestic and international; through alliances; through diplomacy and speech; through military might, and; perhaps most importantly, among

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[94] Donat Pharand 101 – 113.
[95] Donat Pharand 88 – 92.
[96] John B. Hattendorf, "What is Maritime Strategy?

all of the other ways that government can bring pressure to bear to achieve national goals, through the allocation of resources.

Maritime strategy, like military strategy, must be responsive to the national priorities and goals established through grand strategy. Maritime strategy should be the expression of a nations interests over all activity related to the sea. While military naval forces are one means of expressing this interest, true maritime strategy has a much broader scope.

> Maritime strategy involves the other functions of state power that include diplomacy, the safety and defense of merchant trade at sea, fishing, the exploitation, conservation, regulation and defense of the exclusive economic zone at sea, coastal defense, security of national borders, the protection of offshore islands as well as participation in regional and worldwide concerns relating to the use of oceans, the skies over the oceans and the land under the seas. Such issues include expanding the scientific and technological understanding of the entire maritime environment, working with the full range of national organizations…in order to bring forth a truly national concept and plan for the maritime aspects of national life.[97]

In Canada the domain of maritime strategy is the responsibility of numerous government departments. The Department of Fisheries and Oceans (DFO) is responsible for the regulation of renewable and non-renewable resources, for safety and for oceans management. The Department of Transport (DOT) looks after the regulation of ports and other transportation related infrastructure. The Department of Foreign Affairs and International Trade (DFAIT) is concerned with diplomacy and trade. The Solicitor General (SolGen) governs policing. The Department of National Defence (DND) is responsible for national security through the military, diplomatic and constabulary roles it plays. Other relevant government departments include the

Department of the Environment (DOE), Citizenship and Immigration Canada (CIC), and the Office of Critical Infrastructure Protection and Emergency Preparedness (OCIPEP).

This is a complex and convoluted way of expressing Canada's interests in the maritime environment. It comprises a hodgepodge of stovepipe acts, regulations and policy loosely interwoven, in some areas, through numerous Memoranda of Understanding (MOU). In order to make some sense of Canada's interests in the maritime environment it would be useful to review some of the more relevant documents.

DFAIT's last policy statement was the 1995 paper *Canada in the World*. It stated that Canadians wished to remain involved in the world, and that the government would respond to those wishes through the achievement of three key objectives:

a. The promotion of prosperity and employment;

b. The protection of our security, within a stable global framework; and

c. The projection of Canadian values and culture.[98]

The first key objective is the promotion of prosperity and employment, and it is stressed throughout the document. The policy recognizes the effects of globalization on national sovereignty worldwide. "All societies are having to respond to the pressures of economic globalization…the power of financial markets to influence the value of currencies without regard to political geography…Globalization means that economies respond less to political control than before."[99] The policy states that economic development at home requires stability abroad. What if fails to mention is that the vast majority of the goods that fuel the engines of multinational corporations are carried by ships upon the seas. The disruption of that flow of

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[97] John B. Hattendorf 236.
[98] *Canada in the World*, (DFAIT, 1995) www.dfait-maeci.gc.ca/english/foreignp/cnd-world/summary.htm 1.
[99] *Canada in the World*, at URL above except replace summary.htm with c

goods, or the coastal infrastructure to embark/disembark or transport those goods, will have an effect on economies worldwide.

The policy acknowledges that the information technology explosion is a key factor in the momentum for globalization. Information technology has facilitated the flow of ideas, money, and culture between countries. "This has diminished the ability of states to act independently since they can no longer isolate themselves from the world without unacceptable domestic consequences."[100]

As a result of globalization and the information technology explosion, the policy paper states that global stability and security are essential to domestic economic well-being. The difficulty, it foresees, is that many of the threats to security today and in the future are very complex and transcend national borders. These proposed threats include mass migration, disease, environment, overpopulation and crime, and it is stressed that they can have security implications at the global level. "Our own security, including our economic security, is increasingly dependent on the security of others. More than ever, the forces of globalization, technological development and the scale of human activity reinforce our fundamental interdependence with the rest of the world. Our well-being and our national interest are inextricably linked to global developments."[101] This protection of our security through a stable global framework is the second key objective.

The third key objective is the projection of Canadian values and culture. It identifies those values as respect for democracy, the rule of law, human rights and the environment, and states that their application "will be critical to the struggle for international security in the face of

[100] *Canada in the World*, chap1.htm 3.
[101] *Canada in the World*, chap2.htm 1.

new threats to stability."[102] Again and again throughout the paper the term sustainable development and the link between the environment and human, economic and global security are repeated.

As a recap, Canada's foreign and international trade policy affirms that Canada will remain involved in global affairs, indeed must remain involved because the prosperity of Canadians is inextricably linked to global stability. It also recognizes that the threats to security today are complex and varied, and that environmental degradation is not only a threat in itself, but is a key factor contributing to other threats such as mass migration and disease.

Canada's Fisheries and Oceans policy is established through various documents and acts. The 2000-2001 DFO Estimates makes the creation of a fishery for the 21st century a top priority. It also stresses the importance of using the Oceans Agenda and Oceans Management Strategy to ensure sustainable development of maritime resources. It acknowledges the difficulty in balancing the economic livelihood of those who make a living from the sea and the need to ensure sustainable development through restrictions on fishable species and amount harvested. The long-term priorities and goals for DFO include: management and protection of fisheries resources; protection of the marine and freshwater environment; the understanding of oceans and aquatic resources; and facilitation of maritime commerce and ocean development.[103]

The *Oceans Act* recognizes that three oceans – the Pacific, Atlantic and Arctic – are part of the common heritage of all Canadians, and affirms Canada's sovereign rights to the EEZ. It confirms Canada's commitment to sustainable development to such an extent that a precautionary approach will be taken to the conservation, management and exploitation of

[102] *Canada in the World*, chap2.htm 1.
[103] *Fisheries and Oceans Canada 2000-01 Estimates: A Report on Plans and Priorities* (Ottawa: PWGSC, 2000) 1–3.

marine resources.[104] One of the key conservation tools allowed for in the act is the establishment of Marine Protected Areas. These are areas within the EEZ, territorial or internal waters, where the government can grant special protection to marine species, habitats or areas of high biodiversity or biological productivity.[105]

The key points here are the affirmation of Canada's sovereignty over three oceans to the limits of the EEZ, and the importance of the economic benefits Canadians reap from the maritime environment, both through the resources therein and by the commerce that it supports.

Canada's national security policy is outlined in the *1994 Defence White Paper*. It was written at the end of the Cold War and during a time of fiscal restraint. Although a new defense review is under way, which may or may not result in a new white paper, the 1994 version still remains the latest valid policy on defence. The paper, in reviewing international security concerns, identified many of the same challenges that face us today. The burgeoning world population and the resultant environmental damage and depletion of natural resources, refugees and failed states are among these challenges.[106]

Although it did not foresee any direct military threat to Canadian sovereignty, the policy maintained that a basic national requirement was the ability to contribute to the defence of the country. More importantly, it stated that Canada would remain committed to collective security, and in order to be relevant in that role it had to have combat capable forces. "Canada needs armed forces that are able to operate with the modern forces maintained by our allies and like-minded nations against a capable opponent – that is, able to fight 'alongside the best, against the best'."[107]

Domestically, defence policy is concerned primarily with the sovereignty of the nation. "Sovereignty is a vital attribute of a nation-state. For Canada, sovereignty means ensuring that, within our area of jurisdiction, Canadian law is respected and enforced."[108] Other domestic responsibilities include aid of the civil power, peacetime surveillance and control, securing the borders against illegal activity, fisheries protection and environmental surveillance.[109]

Internationally, Canada is to remain involved through bilateral arrangements, particularly with the United States, and multilateral arrangements via alliances and organizations such as NATO and the UN. It is recognized that few nations have the resources to confront challenges to global stability by themselves, and that coalitions of nations, all of whom have a stake in ensuring stability, are the best way to face these challenges. "…by choosing to maintain a multi-purpose, combat-capable force, Canada will retain the capability to make a significant and responsible contribution to international peace and stability, within a UN framework, through NATO, or in coalitions of like-minded countries."[110]

In 1999, DND published *Shaping the Future of the Canadian Forces: A Strategy for 2020*. Its purpose was to bridge the gap between existing defence policy, represented by the White Paper, and the future national security requirements demanded by the emerging strategic environment. This environment was projected out beyond twenty years and, among its determinations, concluded that the United States would remain the dominant power. The potential sources of conflict were estimated. "Ethnic unrest, religious extremism and resource disputes will likely remain the main source of conflict, but environmental degradation and the threat to the nation-state by globalization may arise as new sources."[111] The strategy stated that

[108] *1994 Defence White Paper* 15.
[109] *1994 Defence White Paper* 15-17.
[110] *1994 Defence White Paper* 38.
[111] *Shaping the Future of the Canadian Forces: A Strategy for 2020* (Ottawa: DND, 1999) 4.

the high priority Canadians place on the environment and economic and social development was dependent upon international trade and global stability.[112] As a follow-on to the military strategy set out in 1999, the Canadian Navy published *Leadmark: The Navy's Strategy for 2020*.

Leadmark is a comprehensive vision of Canada's naval strategy. It delineates the trends that will pose challenges to national security in the future. These include global economics, information technology, demographics and the environment. Whether it be the new economics that blur state boundaries and jurisdictions, the ability to immediately know what is going on anywhere in the world, the growing population or the exhaustion of natural resources, these trends are expected to continue and place stress on global stability.[113] With these threats in mind, *Leadmark* proposes a strategy of forward security. "Although never formally codified, the notion holds that, with its territorial boundaries safe from direct conventional military assault, Canada is made more secure by seeing to the resolution of global problems at their source, before they can expand to threaten the Canadian heartland."[114]

Leadmark also recognizes that forward security will not be enough. Some of the threats to national security simply cannot be stemmed from abroad, and will require homegrown solutions:

> But this does not mean that all threats can be defeated from afar.
>
> The shrinking of the Arctic icecap could, in the near future, see the advent of commercial navigation via the Northwest Passage. Depletion of ocean resources elsewhere is likely to increase demands by others for access to our own. Piracy and the rise of 'states of concern' will threaten to challenge the free passage of goods upon the seas. Canada has extensive global interests, and seaborne access to vast sweeps of the planet's surface will

[112] *Shaping the Future of the Canadian Forces: A Strategy for 2020* 4.
[113] *Leadmark: The Navy's Strategy for 2020* (Ottawa: Directorate of Maritime Strategy, 2001) 76-77.

> figure more than ever in the pursuit of conflict resolution. Safeguarding Canada's maritime resources, maintaining our enjoyment of freedom of movement upon the oceans, and exploiting our natural seaward defences argue strongly for the sustainment of a robust naval force.[115]

The multitude and complexity of threats means that Canada will need forces able to resolve crises thousands of miles from our shores, and forces able to assert our sovereignty at home. While overseas action will normally be part of a coalition, the need to assert sovereignty will be wholly independent.

A number of consistencies are revealed when reviewing the various documents related to maritime strategy. Canada will continue to remain involved internationally. She will do so through participation in coalitions, international lawmaking, and non-governmental and supra-national organizations. She will do so because her own economic security in closely linked to events that occur far from her shores. She will do so because the resolution of problems at their source will prevent them from becoming domestic concerns. Further, Canada is keenly aware of threats to her own sovereignty. While direct military confrontation is not an immediate concern, incursions to poach fish or deliver illegal immigrants are.

If the trends in the environment continue, then the frequency with which such incursions occur will increase. Growing populations in countries with poor records on environmental management will experience increased hardship. Technology will allow them to see the consumer lifestyle and wealth of the developed nations. They will seek, in ever increasing numbers, to share in that lifestyle. Significant migration could become a problem not solely relegated to the developing world.

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[114] *Leadmark* 11.
[115] *Leadmark* 3.

A growing thirst worldwide for resources, in the form of fish or lumber or water, will place an increased strain on those countries with plenty. Canada is fortunate to be rich in natural resources, but the vastness of her land and sea areas of responsibility means that exercising the required vigilance to ensure sovereignty will be difficult.

From a maritime perspective, the protection of Canada's vital interests demands a force mix capable of projecting power far from our shores, while concurrently policing activity within our claimed jurisdiction.

PROPOSED MARITIME STRATEGY

Following the old dictum 'if it ain't broke, don't fix it', there are some things that Canada is doing well that need to be mentioned, but don't need to be addressed. Canada's navy is making a credible contribution to coalition and alliance forces worldwide in pursuit of global stability. Canadian naval vessels not only participate in meaningful ways globally, but they are the only ships that can integrate seamlessly with the US Navy (USN) Battle Groups, actually replacing USN ships when necessary. Whether it be in the Maritime Interdiction Operations in the Arabian Gulf, or in areas of hostility such as the Adriatic or Arabian Sea, the navy's ability to apply force in support Canada's diplomatic and military concerns is considered very good. The challenge will be in keeping the navy technologically and militarily modern so that these contributions will continue to be relevant.

Likewise, Canada's participation in international fora and in support of international law to regulate relations between countries, and to encourage the prudent use of the environment and resources, is viewed as good. Canada has been an integral player on thrusts to reduce ozone-depleting substances, to govern the management of straddling fish stocks, and to address the

sources contributing to climate change. Through the Canadian International Development Agency (CIDA), Canada is supporting sustainable development globally by contributing funds and expertise to such international organizations as the UN Environment Programme (UNEP), the UN Development Programme (UNDP), the Food and Agriculture Organisation (FAO), the International Fund for Agricultural Development (IFAD) and the Global Environment Fund (GEF).[116]

Further, Canada's support of non-governmental and supra-national organizations in support of global stability and the rule of law is good. Canada is a signatory to the UN Convention on the Law of the Sea (UNCLOS). She also participates in and supports the initiatives of such international bodies as the UN, the World Trade Organization, The International Monetary Fund, the G-7 and the World Bank. By participating in these and other organizations, and by being capable of making a credible military contribution when called for, Canada is fulfilling some of the basic tenets of her maritime strategy. She is attacking the problems at their root. Through ensuring that the maritime superhighways remain open for business and supporting sustainable environmental, economic and social development, Canada is also ensuring her own economic well-being and mitigating the potential threats to her sovereignty.

On the domestic front Canada is doing well from regulatory and sustainment viewpoints. Sustainable development is being implemented through a series of policies, legislative tools and programs. Examples include the *Oceans Act* and its establishment of Marine Protected Areas, and the development of an Integrated Fisheries Management Process. The *Canada Oil and Gas Operations Act* and the *Canada Petroleum Resources Act* are other key legislative tools.

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[116] *Canada and the Fight Against Desertification*, DFAIT Sustainable Development Site, www.dfait-maeci.gc.ca/sustain/EnvironIssu/desertification/desertification-e.asp 1.

Canada's thrust for sustainable development is beginning to see results. She replaces more forests that she clears[117], and there are signs of a revitalized fishery on both coasts.[118] The issue of using freshwater as a commodity has been addressed in the short-term, however this could become contentious in the future as global warming adversely affects water availability in many regions, including the United States.

Where Canada fails is in the ability to exercise authority over the vast land and sea territories she claims as her own. The ability to do so does not come easily or cheaply, but sovereignty demands these capabilities:

> Today, threats to national security are primarily non-military, with more public concern over the illegal use and abuse of our waters than about any military challenge…The immediate requirement is to make sure that national and international laws and conventions are respected in our own waters. If those laws and rules are violated, then we want appropriate action taken by Canadians, not by someone else. This is our sovereign duty. To be sovereign at sea a nation must be able to control whatever takes place in the waters under its jurisdiction. This applies to the territorial waters within 12 nautical miles of the shore, to the waters of the 200 mile Exclusive Economic Zone, and to the adjoining areas of the continental shelf. Not maintaining the capability to control all activities in our waters is tacit acceptance that others can use those waters as they please and without regard or respect to our law. This is an abrogation of sovereignty.[119]

The demands of sovereignty require the capability to monitor and police activity within our areas of jurisdiction. Yet Canada's littoral areas are vast and her population is small. The

[117] *State of the World's Forests, 1999* 111.
[118] *Fisheries and Oceans Canada: 2000-01 Estimates* 1.
[119] Peter T. Haydon, "Canadian Naval Policy: Still Stalled, Still Contentious, and Still Political" *Canadian Defence Quarterly* Summer 1997 10.

application of conventional monitoring and policing methods may be untenable. Satellites are very expensive and weather dependant. The maintenance of a fleet large enough to act as a deterrent would also be prohibitively expensive. Canada must turn to science and technology to develop cost effective means of surveillance.

One such technology under development is High Frequency Surface Wave Radar (HFSWR). This technology, a collaborative effort between the government (DND) and Raytheon Canada, could go a long way toward resolving the surveillance problem. There are two experimental sites situated in Newfoundland. Indications are that HFSWR can detect vessels of about 3000 tons out to 220 nm and beyond. It would take about 16 sites, at a total initial capital cost of approximately $53 million, to cover the Atlantic and Pacific EEZs. Significantly, this would be continuous coverage, satisfying the requirements of surveillance and monitoring demanded by sovereignty. A couple of additional sites, situated to cover the eastern and western approaches to the Northwest Passage, could be established when necessary.[120]

Another promising technology is the Global Hawk unmanned aerial vehicle (UAV). This platform, developed for the military, is a high altitude, long endurance vehicle with an impressive suite of onboard sensors. It can travel up to 3000 nautical miles (nm) from its launch site and loiter over an area for 24 hours at 60,000 feet. The sensors include a synthetic aperture radar, along with electro-optical and infra-red detectors. The radar will detect objects moving as slow as four knots, and it has a 0.3 meter resolution in spot mode, with a 1 meter resolution in wide area search. The coverage is approximately 40,000 sq nm per mission. The system can

[120] LCdr Steve Jorgensen, personal interview, 13 March 2002.

communicate in direct line of sight to a ground station, or via satellite, enabling a near real-time picture to be compiled.[121]

The development and implementation of a technology such as HFSWR or Global Hawk would assist the policing role in a number of ways. Continuous coverage of our ocean territory would allow for the detection of anomalies, meaning accurate cuing would be available to policing authorities. This, in turn, would allow more efficient utilization of the fleet, reducing the need for sovereignty or fishery patrols just to establish presence. The final result of accurate cuing would be the need for fewer vessels to effectively enforce domestic and international law.

The Canadian Navy has often been the instrument through which Canada has exercised muscle in the offshore. Yet the navy does not have the legislative authority to enforce Canadian law. The navy has the platforms and armament needed to show resolve in a harsh environment. The RCMP (SolGen) and fisheries officers (DFO) have the authority to enforce law. The arrangement is a marriage of convenience between government departments, each leveraging their comparative advantages, and remains a convoluted way of enforcing law at sea.

Canada needs to consolidate the policing organization under one department. National Defence is not the right department. Canada's navy and maritime air arm are busier than ever protecting national interests abroad. They do not have the legislative mandate to perform these duties, nor should they in a democratic society. It is not the purpose of a military force to enforce domestic law.

The SolGen and DFO share the enforcement authority. With the transfer of the Canadian Coast Guard (CCG) from DOT to DFO, a first step was taken in the right direction. This essentially means that all civilian government fleets are consolidated under DFO. The next step

[121] *RQ-1A Global Hawk (Tier II + HAE UAV)*, Intelligence Resource Program, www.fas.org/irp/program/collect/global_hawk.htm

would be to empower DFO with the authority to enforce all Canadian law in the offshore. This could easily be done through the enactment of appropriate legislation. The final step would be to give DFO the tools needed to exercise this authority. The CCG and fisheries fleets are rusting out, and it would be timely to rationalize their fleets and start a new build program. The new program should consist of fast, seaworthy, armed vessels that are capable of acting as a deterrent.

A good model on which to build a revitalized DFO is the United States Coast Guard (USCG). The USCG has a unique structure in that it is part of the Department of Transportation during peacetime, but is under the authority of the Secretary of the Navy during war, or when directed by the President. It has five strategic goals. Maritime safety and mobility are two. It is also responsible for maritime security involving drug and alien migrant interdiction, law and treaty enforcement, and general maritime law enforcement. The final two duties are national defence, including homeland and port security, and the protection of natural resources.[122] Some of these duties parallel the DFO responsibilities of fisheries enforcement, maritime safety and environmental protection. A unique aspect of the USCG is that it is the only federal organization responsible for the enforcement of domestic and international law in US waters and the high seas.[123]

This comprehensive homeland defence approach is required in Canada. To concentrate the resources and authority for offshore monitoring and enforcement in one department makes sense. A force structure something akin to the USCG would add teeth to the enforcement role. A balanced mix of shore and space based surveillance equipment, ships and aircraft is needed. This need not mean expensive ownership. Surveillance aircraft can be contracted to the private sector, and existing space-based assets can be used as required. Ships, however, should be

[122] U.S Coast Guard, *Coast Guard Overview*, www.uscg.mil/overview/overviewpage.htm 1.
[123] U.S. Coast Guard, *Maritime Security*, www.uscg.mil/overvi ew/maritime%20security.htm 1.

purpose built for the role and environment. They need to be robust enough to be able to operate effectively in the North Atlantic, and have good range, speed and armament. The navy had plans for a sovereignty and surveillance corvette about 15 years ago. This type of vessel, of approximately 1500 tons, would be ideal for the enforcement role.

By taking such actions the Canadian government would be sending a clear signal that it is serious about protecting its sovereignty. This would be timely as the US stands-up its Northern Command, raising fears, real or imagined, about Canadian sovereignty. The consolidation of these responsibilities under one department would address the concerns about homeland security that resulted in the creation of Northern Command. A force capable of protecting Canada's interests in fisheries, illegal immigration and pollution would also be capable of drug interdiction and be able to assist in combating asymmetric threats. To complete the picture, the responsibility for port security should also be included in the mandate.

Such an approach would relieve an over-extended navy of the majority of its constabulary duties. It would also provide a fresh mandate and clear direction to DFO. As an aside, the literally hundreds of vessels making up the combined government fleets (military and civilian) would create enough demand to keep two shipyards busy, should the vessels be

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(IPCRC), co-chaired by DFO and DND. This committee, however, no longer exists. It would be prudent to revitalize such interdepartmental coordination through some sort of Canadian maritime strategy committee. DND and DFO, charged with protecting Canadian vital interests abroad and at home, would be the major players and should be co-chairs. DFAIT would also be a key member. This committee should be charged with anticipating the future threats to Canadian sovereignty posed in the maritime environment, and with proposing mitigating solutions. Each of the departments' responsibilities with respect to the marine environment should be clearly delineated. Most importantly, the Ministers would be able to present a united front at the Cabinet table with a view to obtaining the requisite resources to achieve these national goals.

Canada's national strategy looks to project and protect Canadian values and vital interests both abroad and at home. It is right to do so. The maritime strategy must echo this methodology. Through words and deeds Canada has been a significant contributor to international law and global stability. On the home front, however, Canada has been remiss in addressing the current and potential future threats to sovereignty. Given that many of these threats will appear at our shores via the maritime environment a consolidated, comprehensive and coordinated approach to the protection of our internal and territorial seas, and EEZ, is the only prudent way ahead.

CONCLUSION

Human interaction with the environment has been devastating. Fisheries worldwide are experiencing declining commercial stocks. Distant water fleets are searching further and further afield in pursuit of their livelihoods, impacting on straddling and highly migratory species.

Coastal nations, especially in the developing world, are mortgaging their futures by licensing these fleets to exploit their resources. The developing world does not have the infrastructure to monitor their resource management regulations. As a result by-catch, total catch, and species caught are not monitored. This leads to over-exploitation and poaching.

Fresh water is abundant worldwide. Regionally, however, it can be one of the few resource related scarcities that can directly lead to conflict. More and more, fresh water will be looked at as a commodity, and water rich countries such as Canada cannot isolate themselves from the consequences.

Developing countries, in their search for hard cash or additional land to feed their growing populations, are burning or clearing their forests. Forests are harbours of biodiversity, sponges for water, anchors against erosion, and sinks for greenhouse gases. The effects of their destruction therefore magnify the consequences of other poor environmental management practices.

Agricultural lands are increasingly stressed. Expanding urbanization is planting buildings and squatter settlements instead of crops. Growing populations are forcing a fixed amount of hectares to feed more and more people. Deforestation and poor agricultural practices increase the likelihood of erosion, leading to fewer yields per hectare. Desertification eats away at the total amount of arable land available.

Global warming and climate change are the key variables. Together they create a vicious circle with other forms of environmental degradation whose effects are not yet measurable. Changes in weather patterns, and the tendency to warmer climates, will increase the chances of desertification with its impact on available arable land. Temperatures may increase at too fast a rate to allow forests to adapt, causing an overall decrease in global forest coverage. The

reduction in forests means a reduction in the amount of CO_2 absorbed, which in turn increases the potential for more dramatic global warming. Warmer waters are affecting marine biodiversity in ways only now being researched. The bleaching of coral reefs and changing migration patterns of fish species in search of more hospitable surroundings are just two of the consequences.

The threats to national security contributed to by environmental change are many. The migration of people seeking a better standard of living is one. The temptation to exploit resources in a rich and empty land like Canada is another. The potential for the Arctic region to be a viable mode of transportation, and its untapped abundance of natural resources, adds to the problems that Canada has not had to address directly in the past.

Canada has decided, as part of her national strategy, to be involved internationally. Such involvement is needed because globalization means that crises overseas can directly impact on the lives of Canadians at home. Our economic well-being is closely linked to the freedom of the seas and the uninterrupted flow of goods between nations. By being involved, whether it be through assistance to developing nations, supporting international law, or contributing to conflict resolution, Canada is looking after herself. The participation of the government in all of these activities means that Canada is making a credible and effective contribution to global stability on the international scene.

All the best planning, however, cannot ensure that distant troubles do not appear at our doorstep. As such, government must take the precautionary steps needed to protect Canadian vital interests within the Canadian areas of jurisdiction. We have been woefully unprepared for such incursions. It will take a dedicated maritime homeland strategy to be ready for the threats

caused by environmental degradation. Here Canada stands alone, because sovereignty is an independent responsibility.

Canada must take steps to ensure she is prepared for these challenges. First she must be able to detect any challenges to sovereignty. The exploitation of affordable technology, such as HFSWR or the Global Hawk UAV, is one method of fulfilling this need. Second, she must be able to enforce her laws once transgressions are detected. The best way to do so would be to consolidate all of the responsibilities under one department. DFO, with the combined fleets of fisheries and the CCG, is best suited to assume this mantle. The combination of these fleets, along with the requisite authority to enforce laws in the offshore, would go a long way to addressing this issue. In the longer term the rationalization and rebuilding of the fleet to take into account the new responsibilities should result in an efficient armed fleet capable of providing an effective deterrent to illegal activity. Finally, close departmental cooperation and coordination is needed to ensure Canadian maritime strategy is focused and relevant.

It is the responsibility of good government to tend to the long-term viability of the state. Sometimes this means making tough decisions. Government must look beyond short-term gains and popular decisions to pursue policies that will ensure prosperity for generations to come. On 26 February 2002 Prime Minister Chretien, speaking on Canada's intent to ratify the Kyoto Accord, confirmed this as a principle of Canadian government:

> Prime Minister Jean Chretien, citing the price of inaction for future generations, pledged yesterday he would ensure the Kyoto pact to reduce greenhouse gas emissions is ratified by his government…'It is very important that all countries of the world be pre-occupied with the question of climate change,' Chretien said. 'It would cause problems, not today, but in the generations to come,' he added. 'A good government thinks about the future. It

is possible, in Canada, to remain competitive and yet make sure that our air is not polluted.'"[124]

Canada should continue her involvement internationally. The multitude of initiatives to clean up the environment, promote sustainable development, and encourage good government and rule of law are all worthy. Canada would also be prudent to invest in safeguarding her national territories and resources. By protecting her interests both at home and abroad, Canada would be fulfilling her responsibilities to her citizens of today, while protecting the birthright of her citizens of tomorrow.

[124] Tim Harper, "PM vows to ratify Kyoto accord after consulting provinces," *The Toronto Star* 27 Feb 2002: A7.

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