Chapter–3

The Empirical Studies Across the World

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A. CLIMATE CHANGE PERCEPTION			
SOURCE	**YEAR**	**AUTHOR**	**IMPACT POINT**
The adoption of interrelated innovations: A human capital approach. Review of Economics and Statistics 66 (LXVI): 70–79.	1984	Wozniak, G. D.	Agricultural extension enhances the efficiency of making adoption decisions. In the world of less than- perfect information, the introduction of new technologies creates a demand for information useful in deciding on adopting new technologies.
Consequences of climate change for human environment, Clim Res. 1:63□79.	1990	Scott, M. S., Rosenberg, N.J., Edmonds, J. A., Cushman, R. M.	Studies focusing on the socioeconomic aspects of climatic change are sparse and have almost exclusively restricted their analysis to the impact of environmental modifications on agricultural production.
Factors affecting peanut producer adoption of integrated pest management. Review of agricultural economics 13: 129–139.	1991	McNamara et al.	The occupation of the farmer is an indication of the total amount of time available for farming activities. Off-farm employment may present a constraint to adoption of technology because it competes for on-farm managerial time.
The Costs and Benefits of Soil Conservation: The Farmer's Viewpoint. The World Bank Research Observer 9: 273–295.	1994	Lutz et al.	land tenure can contribute to adaptation, because landowners tend to adopt new technologies more frequently than tenants, an argument that has justified numerous efforts to reduce 21 tenure insecurity.
Agroforestry and Soil Conservation: Adoption and Profitability in El Salvador. Agroforestry Today 9: 16–17.	1997	Shultz et al.	

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International tourism and U.S. beaches. Shore and Beach 64:27-35.	1996	Houston, J. R.	Readers interested in the science behind climate change, climate change assessments, general circulation models and other impacts are directed towards the National Assessment Synthesis Team Overview .
Farmers' perceptions and adoption of new agricultural technology: Evidence from analysis in Burkina Faso and Guinea, West Africa. Agricultural Economics 13:1–9.	1995	Adesina,-A-A; Forson,-J-B	Of the many sources of information available to farmers, agricultural extension is the most important for analyzing the adoption decision. Based on the innovation-diffusion literature .
User-Friendly Handbook for Mixed Method valuations. National Science Foundation. Division of research, development and communication.	1997	Frechtling, J. and Sharp, L.	The interviewers seek to encourage free and open responses, and there may be a trade-off between comprehensive coverage of topics and in-depth exploration of a more limited set of questions. In-depth interviews also encourage capturing of respondents‘perceptions in their own words, a very desirable strategy in qualitative data collection.
Public expectations as an element of human perceptions of climate change, climatic change, Springer, Netherlands, Vol. 32, p. 495□509.	2000	Rebetcz,-M	Human expectations regarding weather and climate sometimes lead to perceptions of climate change which are not supported by observational evidences.
Introduction to Geography (7th edition.) New York: McGraw-Hill. Assessment of socio-economic characteristics and quality of life expectations in rural communities of Enugu State, Nigeria. Applied Research in Quality of Life. 5 (4) 353-371. DOI: 10.1007/s11482-010-9096-4.	2000 2010	Getis et al. Nzeadibe,-T-C Ajaero,-C-K	Perception is arguably related to awareness level and availability of information on a phenomenon. The spatial behavior and behavioural responses of individuals and communities are often framed around their perceptions of problems.

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Climate change in the western Himalayas of India : A study of local perceptions and response, Clim. Res. 19:109□117.	2001	Vedwan,-N; Rhoades,-R-E	In order to understand how human beings would respond to climate change, it is essential to study people's perceptions of climate and the environment in general. Overall, of course the climate is described as being much warmer, but people's perception of temperature changes should not simply described as an increase or a decrease in annual temperatures. They are mainly related to change distributions.
Adaptation toclimate change in the developing world .Progress in Development Studies 3(3) 179–195.	2003	Adger et al.	It has been argued that the world's climate is changing and will continue to change at rates unprecedented in human history, and that all societies need to enhance their adaptive capacity to face both present and future challenges of climate change.
Determinants of adoption of poultry technology: A double hurdle approach. Livestock Research for Rural Development 18 (3). http://www.lrrd.org/lrrd18/3/tekl18040.htm	2006	Teklewold et al.	The influence of household size on the decision to adapt is ambiguous. Household size as a proxy to labor availability may influence the adoption of a new technology positively as its availability reduces the labor constraints.
The perception of and adaptation to climate change in Africa. CEEPA Discussion Paper No. 10. Centre for Environmental Economics and Policy in Africa, University of Pretoria, South Africa.	2006	Maddison,-D	Adaptation to climate change requires that farmers first notice that the climate has changed, and then identify useful adaptations and implement them.
Farm-level adaptation to multiple risks: Climate change and other concerns. Occasional paper No. 27. Canada: University Of Guelph.	2006	Belliveau et al.	Nevertheless, empirical assessment of actual adaptive behaviour is advocated, even though such behaviour is place- and time-specific and more likely represents a response to interperiodic climatic variability, as well as to multiple nonclimatic risks and opportunities.

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National Action Plan on Climate change, Prime Ministers council on climate change, Government of India, 30th June	2008	NAPCC	This study is a small step towards gaining a better understanding of climate change impacts and challenges corresponding to the core objective of National Mission on Strategic Knowledge for Climate Change which is the 8th mission of the National Action Plan on Climate Change.
Climate Change Governance after Bali. Global Environmental Politics. 8 (3), 1-7. Rethinking Global Climate Change Governance. Economics: The Open-access, Open Assessment E-journal. Vol. 3, 1-12. Available at http://www.economics-ejournal.org/economics/journalarticles/2009-5 (accessed 09:11:10). Conceptualizing climate change governance beyond the international regime. Global Environmental Politics, 9(1), 58-78. Climate Change Governance: Boundaries and Leakage. Discussion Paper RFF DP 09-51. Washington, DC: Resources for the Future.	2008 2009 2009 2009	Haas,-P-M Barrett,-S Okereke et al. Vandenbergh,-M-P; Cohen,-M-A	Climate change, being a key governance issue in recent years, appears to have predominantly focused on the development of global climate change regime agreements, the UNFCCC and the Kyoto Protocol, and their implementation.
Climate Change Governance. World Bank Policy Research Working Paper 4941. Washington, DC: World Bank. Available from http://www wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/2009/05/19/000158349_20090519144015/Rendered/PDF/WPS4941.pdf (accessed 09:11:10).	2009	Meadowcroft,-J	Few studies have examined the role national governments can play in putting in place institutions, policies, plans and measures to promote mitigation of, and adaptation to climate change and these have mostly addressed environmental governance of climate change in developed countries.

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Climate Change Governance. World Bank Policy Research Working Paper 4941. Washington, DC: World Bank. Available from http://www wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/2009/05/19/000158349_20090519144015/Rendered/PDF/WPS4941.pdf (accessed 09:11:10).	2009	Meadowcroft,-J	This author further argues that climate change governance requires governments to take an active role in bringing about shifts in interest and perceptions so that stable societal majorities in favor of deploying an active mitigation and adaptation policy regime can be maintained.
A economic characteristics and quality of life expectations in rural communities of Enugu State, Nigeria. Applied Research in Quality of Life. 5 (4) 353-371. DOI: 10.1007/s11482-010-9096-4.	2010	Nzeadibe,-T-C; Ajaero,-C-K	Awareness and perceptions of a problem such as climate change shapes action or inaction on the problem.
Managing Climate Change - A Critical Governance Issue for Africa. Available at http://allafrica.com/stories/201010080828.html (accessed 09:11:10).	2010	African Development Bank	Climate change has thus become the most important topical development policy and global governance issue in the 21st century.

B. CLIMATE CHANGE PERCEPTION AND AGRICULTURE			
SOURCE	**YEAR**	**AUTHOR**	**IMPACT POINT**
The adoption of interrelated innovations: A human capital approach. Review of Economics and Statistics 66 (LXVI): 70–79.	1984	Wozniak, G. D.	Agricultural extension enhances the efficiency of making adoption decisions. In the world of lessthan-perfect information, the introduction of new technologies creates a demand for information useful in deciding on adopting new technologies.
Climatic Change, 24 (1–2): 23–62.	1993	Easterling et al.	Studies show that without adaptation, climate change is generally detrimental to the agriculture sector; but with adaptation, vulnerability can largely be reduced.
Potential impact of climate-change on world food supply. Nature 367:133–138.	1994	Rosenzweig,-C; Parry,-M-L	
Using a decision matrix to assess climate change adaptation. In Adapting to climate change.	1996	Smith,-J-B	
Climate-change damages. In Economics and policy issues in climate change, ed. W.D. Nordhaus. Resources for the Future: Washington, D.C.	1998	Mendelsohn,-R	

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Agricultural impact assessment, vulnerability and the scope for adaptation. Climatic change 43: 745–788. Adaptations options in agriculture to climate change: A typology. Mitigation and Adaptation Strategies for Global Change 7: 85–114.	1999 2002	Reilly,-J; Schimmelpfennig,-D Smit,-B; Skinner,-M-W	
Factors affecting peanut producer adoption of integrated pest management. Review of agricultural economics 13: 129–139.	1991	McNamara et al.	The occupation of the farmer is an indication of the total amount of time available for farming activities. Off-farm employment may present a constraint to adoption of technology because it competes for on-farm managerial time.
Agricultural adaptation to climatic variation. Climatic Change 33: 7–29. Adaptability of agriculture systems to global climate change: A Renfrew County, Ontario, Canada pilot study. Farm-level adaptation to multiple risks: Climate change and other concerns. Occasional paper No. 27. Canada: University of Guelph. The perception of and adaptation to climate change in Africa. CEEPA Discussion Paper No.10. Centre for Environmental Economics and Policy in Africa, University of Pretoria, South Africa.	1996 1997 2006 2006	Smit *et al.* Brklacich *et al.* Belliveau *et al.* Maddison, D.	The present research, as part of a more recent strand of adaptation research, seeks to investigate actual adaptations at the farm level, as well as the factors that appear to be driving them.

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Agricultural adaptation to climatic variation. Climatic Change 33: 7–29. Adaptability of agriculture systems to global climate change: A Renfrew County, Ontario, Canada pilot study. Farm-level adaptation to multiple risks: Climate change and other concerns. Occasional paper No. 27. Canada: University of Guelph. The perception of and adaptation to climate change in Africa. CEEPA Discussion Paper No. 10. Centre for Environmental Economics and Policy in Africa, University of Pretoria, South Africa.	1996 1997 2006 2006	Smit et al ; Brklacich et al. Belliveau et al. Maddison,-D	The present research, as part of a more recent strand of adaptation research, seeks to investigate actual adaptations at the farm level, as well as the factors that appear to be driving them.
Adaptation in Canadian agriculture to climatic variability and change. Climatic Change 45:181–201.	2000	Bryant et al.	Such varied responses, even within the same geographic area, are partly related to the variety of agricultural systems involved and the different market systems in which farmers operate.
Socio-Economic and Climate Change Impacts on Agriculture: An Integrated Assessment, 1990–2080. Phil. Trans. R. Soc. B 360, 2067–2083 doi:10.1098/rstb.2005.1744.	2005	Fischer et al.	A consensus has thus emerged that developing countries are more vulnerable to climate change than developed countries, because of the predominance of rain-fed agriculture in their economies, the scarcity of capital for adaptation measures, their warmer baseline climates and their heightened exposure to extreme events.

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Climate Change and the Uncertainties Facing Farming Communities in the Middle Belt Region of West Africa. Paper presented at the 7th International Science Conference on the Human Dimensions of Global Environmental Change (IHDP Open Meeting 2009) held at the United Nations University, Bonn, Germany between 26 April and 1 May, 2009. Available at http://www.openmeeting2009.org/pdf_files/Pdf%20papers/Nnamchi_Ozor.pdf	2009	Nnamchi,-H-C; Ozor,-N-O	
Micro-level analysis of farmers' adaptation to climate change in Southern Africa. IFPRI Discussion Paper No. 00714. International Food Policy Research Institute, Washington, D.C.	2007	Nhemachena,-C; Hassan.-R	Farming experience increases the probability of uptake of all adaptation options because experienced farmers have better knowledge and information on changes in climatic conditions and crop and livestock management practices.
Climate Change, Forestry and Livelihoods in Nepal: Issues and Options for LFP and its Potential Successor.	2008	Ojha *et al.*	There is limited understanding on such basic issues as the nature and scale of impacts of climate change on forests governance and livelihood aspect including the carbon sequestration levels of various forest ecosystem types
Climate Change Impacts on Livelihoods of Poor and Vulnerable Communities and Biodiversity Conservation: A Case Study in Banke, Bardia, Dhading and Rasuwa District of Nepal. Strengthened Actions for Governance in Utilization of Natural Resources Program, CARE Nepal, Kathmandu, Nepal, 56 pp.	2009	Sagun	Scientific communities believe that changes in temperature and rainfall are creating favourable environments for pests, diseases and invasive species to emerge, spread and encroach on agriculture and forestlands.

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Resilient adaptation to climate change in African agriculture. Bonn: German Development Institute (DIE).	2010	Speranza,-C-I	Recent research on Climate change has noted the impacts of climate change on agriculture and natural resources management in countries of Africa, Asia and Latin America.

C. CLIMATE CHANGE AND ECOSYSTEM			
SOURCE	**YEAR**	**AUTHOR**	**IMPACT POINT**
The Initiation and Development of Peatlands in Newfoundland and their response to Global Warming. In Hall, J., and Wadleigh, M., eds., The Scientific Challenge of our changing environment, Royal Society of Canada, IR93-2, p. 24-25. The effect of climate change on carbon in Canadian peatlands. Global and Planetary Change, 53, 222-232. The impact of climate change on Canadian peatlands. Canadian Water Resources Journal 34, 453-466. Sensitivity of Canadian peatlands to climate change. Mitteilungen der Bodenkundlichen Gesellschafft, 101, 139-140.	1993 2006 2009 2003	Davis,-A-M Tarnocai,-C Tarnocai,-C; Kienast,-F	A combination of slow rates of organic accumulation, and vulnerability to fluctuations in temperature and water supply, makes peat areas particularly susceptible to changing climate.
The Value of the World's Ecosystem Services and Natural Capital. Nature, 387, 253-260. Ecological resilience—in theory and application. Annual Review of Ecological Systematics, 31, 425–439.	1997 2000	Costanza et al. Gunderson,-L-H	Although terrestrial ecosystems are frequently difficult to 'value' quantitatively they are among the first sectors where climatechange impacts can be recognized.
The importance of frost boils for recruitment of arctic-alpine plants in the Mealy Mountains, Labrador. B. Sc. Honours thesis, Department of Biology, Memorial University. Are Frost Boils Important for the Recruitment of Arctic-Alpine Plants? Arctic, Antarctic, and Alpine Research 38, 273-275.	2002 2006	Sutton,-J Sutton et al	In addition to the temperature effects on ground stability, permafrost ablation has negative impacts on plant species that utilize the micro-terrain features created by seasonal freeze-thaw.

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Spatial extent of winter thaw events in eastern North America: historical weather records in relation to yellow birch decline. Global Change Biology 11, 1477. Winter in northeastern North America: a critical period for ecological processes. Frontiers in Ecology and the Environment, 3, 314-322.	2005 2005	Bourque et al. Campbell et al.	Frequent episodes of winter thaw and late spring frost have lead to widespread tree crown dieback in yellow birch throughout eastern Canada.
Spatial and temporal variability of Holocene temperature in the North Atlantic region. Quaternary Research 65, 223-231. Comparison of marine and terrestrial Holocene climatic reconstructions from northeastern North America. The Holocene 9, 267-277.	2006 1999	Kaplan,-M; Wolfe,-A Sawada et al.	Differences in responses of species to past climate changes, both within terrestrial ecosystems and between terrestrial and marine areas,have long been recognized by palaeoclimatological researchers.
Democracy, Oil and Politics in the Niger Delta: Linking Citizens' Perceptions and Policy Reform (pp.94-139). Port Harcourt: Centre for Advanced Social Science. Democracy, Oil and Politics in the Niger Delta: Linking Citizens' Perceptions and Policy Reform (pp.49-93). Port Harcourt.: Centre for Advanced Social Science.	2007 2007	Abutudu et al. Ibeanu et al.	Regrettably, activities of multinational oil companies have recently been linked to degradation of the natural environment, pollution and low agricultural productivity.

D. CLIMATE CHANGE AND WATER			
SOURCE	**YEAR**	**AUTHOR**	**IMPACT POINT**
Dictionary of the Environment. Third edition. New York University Press.	1989	Allaby, M.	Drought is defined as a long period of abnormally low rainfall, especially one that adversely affects growing or living conditions.
The effect of Weather Variability on the Energy Balance of a lake in the Hudson Bay Lowlands, Canada. Arctic and Alpine Research 22, 98-107.	1990	Bello, R., Smith, J. D.	Lakes and wetlands are subject to changes in chemistry and organic content under the influences of changes in temperature and hydrologic regime.

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Climatic change and the risk of eutrophication. Verhandlungen der Internationale ereinigung von Limnologie 29, 1837-1840.	2006	Blenckner *et al.*	
Climate change sensitivities of Atlantic Canada's Hydrological and Ecological Systems. In Shaw, RW, ed., Climate change and climate variability in Atlantic Canada. Environment Canada, Atlantic region, Occasional paper 9, 59- 77.	1996	Clair *et al.*	
Synoptic investigations of the summer climate and lake evaporation in Quebec-Labrador. PhD thesis, Department of Geography, McGill University.	1980	Petzold, D. E.	
Implications of Climate Change for Northern Canada: Freshwater, Marine, and Terrestrial Ecosystems. Ambio, 38, 282-289.	2009	Prowse *et al.*	
Effects of climatic warming on lakes of the central boreal forest. Science 250, 967-970.	1990	Schindler *et al.*	
An assessment of Chironomidae as quantitative indicators of past climatic change. Canadian Journal of Fisheries and Aquatic Sciences 48, 975-987.	1991	Walker *et al.*	
Lack of icebergs another sign of global warming? Science 285, 37.	1999	Wuethrich,-B	Early speculation that iceberg numbers were directly linked to climate change has been replaced by more detailed research.
The formation and maintenance of the North Water Polynya. Atmosphere-Ocean 41, 187-201.	2003	Yao,-T; Tang,-C-L	
Century-scale effects of increased atmospheric CO2 on the Ocean-atmosphere system. Nature 364:215-218.	1993	Manabe,-S; Stouffer,-R-J	It should also be noted that the levels of CO2 increase in this scenario are higher than anticipated under most projections for greenhouse gases. Earlier projections had indicated that change of this magnitude could halt the deep water circulation entirely .

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Coastal land management, town of Conception Bay South. Honours BA thesis, Memorial University of Newfoundland. Evaluating shoreline change and associated risk from coastal hazards: an inexpensive qualitative approach.	1994 1996	Taylor,-T Young et al.	A long-term erosion rate is a useful guide to the establishment of set-back limits and indicates where specific structures are in danger.
Climate change and northern fish populations. Canadian Special Publication of Fisheries and Aquatic Sciences 121. Discussion Document on the Implications of Catch-and-Release Angling for Atlantic Salmon, With Particular Reference to Water Temperature-Related River Closures Department of Fisheries and Oceans, Atlantic Fisheries Research Document 96-117. Effects of temperature, global extremes, and climate change on year-class production of warmwater, coolwater, and coldwater fishes in the Great Lakes Basin. American Fisheries Society Symposium 2002 (32), 39-60. Climate change related to egg-laying trends. Nature 399, 423- 424. Implications of climate change for parasitism of animals in the aquatic environment. Canadian Journal of Zoology, 79, 1331-1352. The cumulative effects of climate warming and other human stresses on Canadian freshwaters in the new millennium. Canadian Journal of Fisheries and Aquatic Sciences, 58, 18-29.	1995 1996 2002 1999 2001 2001	Beamish *et al.* Bielak, A. T. Casselman, J. M. Crick, H. Q.P., Sparks,T. H. Marcogliese,D.J. Schindler, D. W.	Changes in streamflow volume, velocity, and water temperature have impacts on fish populations, particularly salmonids .

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Small icebergs and iceberg fragments off Newfoundland: Relationships to deterioration mechanisms and the regional iceberg population. Atmosphere-Ocean 34, 549-579.	1996	Marko,-J-R	The icebergs observed by tourists off eastern Newfoundland are small fragments of the original calved masses and a single calving event in Greenland can eventually result in the arrival of numerous small icebergs in southern latitudes.
Surprisingly rapid spreading of newly formed intermediate waters across the North Atlantic Ocean. Nature 386:675-679.	1997	Sy et al.	The important role of intermediate water formation in the Labrador Sea for convective flow in the Atlantic has recently been highlighted.
Global Warming: The Complete Briefing. Cambridge University Press, Cambridge, MA. 251 pp. Houghton, J.T., L.G. Meira Filho, B.A. Callander, N. Harris, A. Kattenberg, and K. Maskell. 1996. Climate Change 1995: The Science of Climate Change. Cambridge University Press, Cambridge, UK. 572 pp.	1997	Houghton et al.	Generally, the consensus is that under most climate change scenarios, the hydrologic cycle will become more intense .
Secular trends of precipitation amount, frequency and intensity in the United States. Bulletin of the American Meteorological Society 79:231-241.;	1998	Karl,-T-R; Knight,-R-W	Extreme rainfall events, already demonstrated to have increased over the last century, are likely to become more common, as may droughts and floods .
Changing spatial structure of the thermohaline circulation in response to atmospheric CO2 forcing in a climate m odel. Science399:572-575.	1999	Wood et al.	Projections by the Hadley Centre model suggest that a decline in the strength of the deep water thermohaline circulation by approximately 25% under a scenario of a 2% increase in CO2 per year up to a quadrupling of current CO2 levels .
Increased hurricane intensities with CO2-induced warming as simulated using the GFDL hurricane prediction system. Climate Dynamics 15:503-519.	1999	Knutson,-T-R; Tuleya,-R-E	Recently, the relationship between typhoon intensity and climate change was investigated for the northwest Pacific with a regional, high resolution hurricane prediction model.

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Global water resources: Vulnerability from climate change and population growth. Science 289:284-288.	2000	Vörösmarty et al.	However, under warmer climatic conditions increased precipitation may not result in a direct increase of freshwater inflow into coastal regions, depending on timing of the precipitation and changes in evapotransporation. Changes in freshwater runoff will also result both from climaterelated factors and changes in human population, land-use, and consumption and diversion.
The Health of Our Water. Agriculture and Agrifoods Canada, Publication 2020/E.	2000	Coote,-D-R; Gregorich,-L-J	A decrease in the supply of water to treatment plants, due to lower water levels, could increase turbidity, resulting in the need for a greater level of water treatment.

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Water sector: Vulnerability and adaptation to climate change (Final Report).	2000	Bruce et al.	Changes in temperature and precipitation influence the hydrological cycle and will affect evaporation and runoff, and the amount of water stored in lakes, wetlands and groundwater.
Climate Change Impacts and Adaptations Directorate, Report #348.	2002	Charman,-D	
Peatlands and Environmental Change. Wiley, New York. Canadian Freshwater wetlands and Climate Change. Climate Change, 40, 163-165.	1998	Clair,-T-A	
Probable changes in lake chemistry in Canada's Atlantic Provinces under proposed North American emission reductions. Hydrology and Earth System Sciences 7, 574-582.	2003	Clair et al.	
Étude de l'impact potentiel des changements climatiques sur les ressources en eau souterraine dans l'Est du Canada. Geological Survey of Canada, Open File 1577, Ottawa.	2003	Rivard et al.	
The cumulative effects of climate warming and other human stresses on Canadian freshwaters in the new millennium. Canadian Journal of Fisheries and Aquatic Sciences, 58, 18-29.	2001	Schindler,-D-W	
Snow avalanche hazard in Canada: a Review. Natural Hazards 28, 487-515.	2003	Stetham et al.	Avalanche activity is also related to climate.
Long Range Forecasting of the Iceberg Population on the Grand Banks. Fisheries and Oceans Canada, www.mar.dfompo.gc.ca/science/ocean/seaice/Posters/Iceberg_Nov2003.pdf.	2003	Petersen,-I	The numbers of icebergs seen off the Newfoundland coast vary substantially from year-to-year but the variations are not primarily due to changing water temperatures.
Long-Range Forecasting of Iceberg Numbers on the Grand Banks. Fisheries and Oceans Canada, www.mar.dfompo.gc.ca/science/ocean/seaice/Pictures/Icebergs/IcebergForecast05Peterson.pdf	2005	Petersen,-I	

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Climate change impacts on boundary and transboundary water management. Climate Change Impacts and Adaptations Directorate, Report A-458.	2003	Bruce et al.	Where water resources are shared across sectors, municipalities, or provincial boundaries, climate changes can impact transboundary management.
Vulnerability of Waterborne diseases to climate change in Canada: A review. Journal of Toxicology and Environmental Health Part A, 67, 1667-1677.	2004	Charron et al.	Increases in temperatures, prolonged summer dry seasons, and flooding resulting from intense storm events could also increase the risk of contamination of drinking water by waterborne parasites, such as Giardia, Cryptosporidium, and E. Coli.
The Health of Our Water. Agriculture and Agrifoods Canada, Publication 2020/E.	2000	Coote, D.R; Gregorich, L.J	
Respiratory health effects of home dampness and molds among Canadian children. American Journal of Epidemiology, 134, 196-203.	1991	Dales et al.	
Safer water, better health: Costs, benefits and sustainability of intervention to protect and promote health. World Health Organization, Geneva.	2008	Prüss-Üstün et al.	
A role of high impact weather events in waterborne disease outbreaks in Canada, 1975-2001. International Journal of Environmental Health Research, 16, 167-180.	2006	Thomas et al.	

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Treating the hidden wounds of a springtime disaster. Environment Canada, http://www.ec.gc.ca/water/en/manage/floodgen/e_andov.htm.	2004	Alchorn, H. S., Blanchard, H. J.	Changes in the amount, timing, and nature of precipitation can result in increased flooding frequency.
The impacts of climate change on rivers and river processes in Canada. Geological Survey of Canada Bulletin, 555.	2001	Ashmore, P., Church, M	
Flooding. In Brooks, GR, ed., A synthesis of natural geological hazards in Canada. Geological Survey of Canada Bulletin 548, 101-143.	2001	Brooks *et al.*	
Changes to the runoff of Canadian ecozones under a doubled CO2 atmosphere. Canadian Journal of Fisheries and Aquatic Sciences, 55, 2464-2477.	1998	Clair *et al.*	
Conference Board of Canada. 2007. Navigating the Shoals, Assessing Water Governance and Management in Canada. Toronto: Conference Board of Canada. www.conferenceboard.ca/documents.asp?rnext=1993.	1989	Watt, W. E.	
Hydrology of Floods in Canada: A guide to Planning and Design. Associate Committee on Hydrology, National Research Council of Canada. Winter, G., 1996. Fluvial geomorphology, North River, Newfoundland. Honours B.Sc. thesis, Department of Geography, Memorial University of Newfoundland.			

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Initial National Communication to the COP of UNFCC. Kathmandu: Ministry of population & Environment, Government of Nepal.	2004	GON	Observations of regional and seasonal variation at different part of the country resulted high rainfall regions and seasons are recording increases in precipitation and becoming wetter, whereas low rainfall regions and seasons are recording decreases in precipitation and becoming drier.
Flood hazard and vulnerability in Newfoundland communities. Office of Critical Infrastructure and Emergency Preparedness Canada.	2004	Catto,-N-R; Hickman,-H	Winter thaw and rain events could lead to increases in rainon- snow flooding.
Navigating the Shoals, Assessing Water Governance and Management in Canada. Toronto: Conference Board of Canada. www.conferenceboard.ca/documents.asp?rnext=1993. Toward a Canadian National Water Strategy: Final Report for the Canadian Water Resources Association, Guelph. http://www.cwra.org/Resource/Discussion.aspx#CNWS. Challenging the status quo: the evolution of water governance in Canada. In: Eau Canada: The Future of Canada's Water, K. Bakker (ed.). Vancouver, UBC Press. Effects of forest management on water resources in Canada: A Research Review. NCASI Technical Bulletin 969.	2007 2008 2007 2009	Conference Board of Canada. de Loë,-R De Loë,-R; Kreutzwiser,-R Mallik,-A-U; Teichert,-S	Questions of governance arise when formerly abundant resources become limited, even on temporary bases.
Enhancing Water Supply Infrastructure Investment Planning Practices for a Changing Climate. Unpublished research funded by Climate Change Impacts and Adaptations Directorate.	2007	Bouchart,-F	Renewed investment in water-related infrastructure may be desirable.

Implementing integrated water resources management: The importance of cross-scale considerations and local conditions in Ontario and Nova Scotia.	2008	Cervoni *et al.*	Questions of governance arise when formerly abundant resources become limited, even on temporary bases.
Navigating the Shoals, Assessing Water Governance and Management in Canada. Toronto: Conference Board of Canada. www.conferenceboard.ca/documents.asp?rnext=1993.	2007	Conference Board of Canada.	
Toward a Canadian National Water Strategy: Final Report for the Canadian Water Resources Association, Guelph. http://www.cwra.org/Resource/Discussion.aspx#CNWS.	2008	de Loe, R.	
Challenging the status quo: the evolution of water governance in Canada. In: Eau Canada: The Future of Canada's Water, K. Bakker (ed.). Vancouver, UBC Press.	2007	De Loe, R., Kreutzwiser, R.	
Effects of forest management on water resources in Canada: A Research Review. NCASI Technical Bulletin 969.	2009	Mallik, A. U., Teichert, S.	

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An all-hazard assessment of the Marystown area, Burin Peninsula, Newfoundland and Labrador. M. Environmental Science thesis, Memorial University.	2008	Brake,-K-K	Erosion of coastal cliffs by frost action can also be correlated with aspect, wind direction, and temperature regime.
Hurricanes and climate change. CMOS Bulletin, 33 (5), 131.	2005	Bruce, J. P;	
Erosion at Cape St. Mary's Ecological Reserve. Report to Tourism, Recreation, and Parks, Government of Newfoundland and Labrador.	2003	Catto,-N-R	
The coastline of Eastern Newfoundland. Canadian Technical Report of Fisheries and Aquatic Science, 2495.	2003	Catto et al.	
Coastal Management Issues, Cape St. Mary's, NL. M. Environmental Science, report, Memorial University of Newfoundland.	2001	Speller,-R	
A preliminary assessment of slope stability and rockfall hazard, St. Brendan's, Bonavista Bay, Newfoundland. M. Environmental Science project report, Memorial University of Newfoundland.	2002	White,-M	

E. CLIMATE CHANGE AND BIO DIVERSITY			
SOURCE	**YEAR**	**AUTHOR**	**IMPACT POINT**
Monthly mean sea-level variability along the West coast of North America. Journal of Physical Oceanography 12:757-784.;	1982	Chelton, D. B.,	Land movements are not, however, the only reason for regional variations in the rate of sea-level rise. Regional climate can also alter sea-levels through changes in local atmospheric pressure and alongshore wind stress, integrated water column density and thermocline depth .
ENSO events in the Northern Gulf of Alaska and effects on selected marine fisheries. California Cooperative Oceanic Fisheries Investigations Reports 36:78-96	1995	Davis, R. E., Bailey *et al.*	

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Coastal zone tourism: A potent force affecting environment and society. Marine Policy 15:75-99.	1991	Miller, M. L., Auyong, J.	Clean water, healthy ecosystems and access to coastal areas are critical to maintaining tourism industries, ironically, however, these industries themselves often pose additional impacts to coastal environments and local communities .
Atmospheric carbon dioxide and the ocean. Nature 365:119-125	1993	Siegenthaler, U., Sarmiento, J. L.	The oceans are thought to be taking up about one third of the carbon dioxide released by Anthropogenic emissions.
Climate and exceptional fish production off the west coast of North America. Canadian Journal of Fisheries and Aquatic Sciences 50:2270-2291.; A Pacific interdecadal climate oscillation with impacts on salmon production. Bulletin of the American Meteorological Society 78:1069-1079.	1993 1997	Beamish, R. J. Mantua *et al.*	Changes in the strength of the Aleutian low pressure system have been linked to regime shifts in the North Pacific .
The paradox of berry production in temperate species of Vacciniurn. Canadian Journal of Botany 72, 52-58. Stability of pitcher-plant microfaunal populations depends on food web structure. Oikos 110, 146-154. Local interactions in pitcher plant communities scale-up to regional patterns in distribution and abundance. Environmental Entomology 34, 1464-1470.	1994 2005a 2005b	Vander Kloet,-S-P; Hill,-N-M Trzcinski et al.	All wetland plants, including blueberries and pitcher plants will be influenced by changing climate.
Coastal land management, town of Conception Bay South. Honours BA thesis, Memorial University of Newfoundland. Evaluating shoreline change and associated risk from coastal hazards: an inexpensive qualitative approach.	1994 1996	Taylor, T. Young *et al.*	A long-term erosion rate is a useful guide to the establishment of set-back limits and indicates where specific structures are in danger.

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Small icebergs and iceberg fragments off Newfoundland: Relationships to Deterioration mechanisms and the regional iceberg population. Atmosphere-Ocean 34, 549-579.	1996	Marko, J. R.	The icebergs observed by tourists off eastern Newfoundland are small fragments of the original calved masses and a single calving event in Greenland can eventually result in the arrival of numerous small icebergs in southern latitudes.
Dynamics of Marine Ecosystems. 2nd Ed. Blackwell Science, London.	1996	Mann, K. H., Lazier, J. R. N.	Increased temperatures and river runoff could lead to an earlier onset of stratification and the timing of phytoplankton blooms. This earlier development could lead to a shift in phytoplankton species composition, favoring smaller forms such as dinoflagellates and increasing the number of links in the food web .
Can a naturally impoverished boreal Ephemeroptera, Plecoptera, andTrichoptera (EPT) fauna serve as an indicator of water quality? Unpublished M.Sc. thesis ,Department of Biology, Memorial University of Newfoundland.	1997	Lomond,-T-M	Driftwood transported by ice and spring freshet provides habitats for invertebrates, whichare vital as food sources for fish as well as pollinating blueberries and other plants.
Biological and geomorphological classification of Placentia Bay: A preliminary assessment. Canadian Technical Report of Fisheries and Aquatic Sciences 2289.	1999	Catto et al;	Most recent studies of marine species have indicated that climate change and/or variations and oscillations (particularly the North Atlantic Oscillation, NAO) influences the health of the populations.

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The Effects of climate change on migratory birds: An annotated bibliography. Fredericton, University of New Brunswick, Atlantic Cooperative Wildlife Ecology Research Network. Effects of climate change on Migratory Birds. Unpublished research funded by Climate Change Impacts and Adaptations Directorate. Impact of Climate Change on Birds in Eastern Canada. Unpublished research funded by Climate Change Impacts and Adaptations Directorate.	2001 2009 2007	Boucher,-J-J; Diamond,-A-W Diamond,-T; Francis,-C-M;	The spectrum of bird life in a region represents many different habits and habitats. As they are widelyobserved and studied by both birders and researchers, they have the potential to be useful indicators of environmental change.
Migration behaviour of white-tailed deer under varying winter climate regimes in New Brunswick. Journal of Wildlife Management, 66, 718-728.	2002	Sabine,-D-L; Morrison,-S-E	The seasonal migration of white-tailed deer in New Brunswick is restricted by deep snow Cover.
Climate change impacts on run-timing of Atlantic salmon in eastern Canada and adaptation of in-season models and management to improve resource access opportunities. Canadian Climate Impacts and Adaptations Directorate, report.	2002	El-Jabi,-N; Swansburg,-E	With warmer water temperatures, salmonid species will most likely suffer range contraction as a result of changing habitat, introduced competitors and predators, and increased parasitism.
National recovery plan for Long's Braya (Braya longii Fernald) and Fernald's Braya (Braya fernaldii Abbe). National Recovery Plan No. 23. Recovery of Nationally Endangered Wildlife (RENEW), Ottawa, Ontario, 33pp. Geology and geobotany: examples of the influence of local conditions governing alpine plant habitats in the Nain region of Labrador. Atlantic Geology 42, 197.	2002 2006	Hermanutz et al. Ryan,-B	Small populations of isolated plants are the species at potential risk of extinction unless overriding geological conditions prevent new species from becoming established.

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Trends and variability in spring and autumn 0 °C-isotherm dates over Canada. Climatic Change, 57, 341 - 358.	2003	Bonsal,-B-R; Prowse,-T-D	Phenological spring, marked by budding-out, flower blooms, and bird migrations, has generally advanced by ca. 1 week in eastern North America since 1959.
Changes in North American spring. International Journal of Climatology, 20, 929-932.	2000	Schwartz,-M-D; Reiter,-B-E	
Intercomparison, interpretation, and assessment of spring phenology in North America estimated from remote sensing for 1982-2006. Global Change Biology 15, 2335-2359.	2009	White et al.	
Climate change, communities and civilizations: driving force,supporting player, or background noise? Quaternary International, 123, 7–10.	2004	Catto,-N-R; Catto,-G	The role of climate change has varied throughout the Atlantic, both in place and over time, from that of "supporting player" to mere "background noise".
Climate, fishery and society interactions: Observations from the North Atlantic. Deep-sea Research 11, 2958-2969.	2007	Hamilton,-L-C; Rennie,-H-G	
North Labrador and the Torngat Co-op: A Soft Systems Analysis of the Response of Coastal Communities to Fisheries Development. MA thesis, Department of Geography, Memorial University	1990	Stokoe,-P	
Socio-economic assessment of the physical and ecological impacts of climate change on the marine environment of the Atlantic region of Canada, phase 1. Ottawa, Environment Canada.	1988		

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Risk assessment of insect pests and pathogens on endangered plants of the Limestone Barrens of Newfoundland – Final report to the Endangered Species Recovery Fund. St. John's, Canada: Memorial University of Newfoundland, Department of Biology. Are boreal ecosystems susceptible to alien plant invasion? Evidence from protected areas. Oecologia 139, 467-77. Statistical downscaling of temperature and precipitation for climate change impact assessment of rare plants on the limestone barrens of northwestern Newfoundland. B.Sc. Honours Thesis, Department of Geography, Memorial University.	2004 2004 2005	Hermanutz et al. Rose,-M; Hermanutz,-L Slater,-J	In general, ecotonal boundary areas (such as treelines) and landscapes with unique vegetation assemblages are considered to be most susceptible to change.
A plan of action to support climate change adaptation through scientific capacity, knowledge and research. http://www.fishclimate.ca/pdf/windsor/Plan_of_Action.pdf. Innovation and Outlook in Fisheries. UBC Fisheries Centre Research Report 13(2). Adaptation to climate change in marine capture fisheries. Marine Policy 34, 606-615. Placentia Bay-Grand Banks Large Ocean Management Area Ecologically and Biologically Significant Areas. Canadian Science Advisory Secretariat Research Document 2007/052. Fisheries and Oceans Canada, 21 pp.	2005 2005 2010 2010	Baethgen et al. Chuenpagdee,-R; Bundy,-A Grafton,-R-Q Templeman,-N-D	The challenges facing communities dependent on marine capture fisheries are numerous, and require broadly-based adaptation efforts.

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Potential impacts of climate change on the distributions of several common and rare freshwater fishes in Canada. Diversity and Distributions 11, 299-310. Predicting the impact of climate change on the spatial pattern of freshwater fish yield capability in eastern Canadian lakes. Climatic Change 22, 327-346.	2005 1992	Chu et al. Minns,-C-K; Moore,-J-E	Most freshwater species are adapted to a relatively narrow range of temperature conditions.
Habitat and Predatory Relationships of Red Squirrels in Different Newfoundland Forests. Ph.D. thesis, Cognitive and Behavioural Ecology, Department of Biology, Memorial University.	2005	Lewis,-K-P	Newfoundland's isolation as an island is an additional complicating factor: many animal and plant species which could survive under present climates have been unable to reach the island.
Disaster Review 2005. Series XIII, Kathmandu, Nepal: Department of Water Induced Disaster Prevention, Government of Nepal.	2006	Ministry of Home, quoted in DWIDP	The changed intensity and amount of monsoon rains positively correlate with the increase in water□induced disasters like floods and landslides.
The Influence of climate on the timing and rate of spring bird migration. Oecologia 142, 307-315.	2006	Marra et al.	The timing of bird migration is also affected by increases in spring temperature, although long-distance migratory birds appear to alter the timing of migration in response to changes in weather and phenology.
Impacts of Climate Change and Variation on the Natural Areas of Newfoundland and Labrador. Report, Ministry of the Environment, Newfoundland and Labrador, 160 pp. Seal / Salmon Fisheries Interactions: The Relationship between climate Change and Seal Predation Pressure on Salmon in Newfoundland and Labrador Rivers. Climate Change Impacts and Adaptations Directorate Report A 1035	2006b 2007	Catto et al. Sjare,-B	The potential for impacts due to climate change extends beyond fish species, to include numerous aspects of fishery operations, transportation, marketing, occupational health-andsafety, and community health.

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Climate change aids Pacific diatom's return to North Atlantic. Frontiers in Ecology & the Environment 5, 402. A biological consequence of reducing Arctic ice cover: arrival of the Pacific diatom Neodenticula seminae in the North Atlantic for the first time in 800 000 years. Global Change Biology 13, 1910-1921.	2007 2007	Gewin,-V Reid et al.	The ongoing effects of changing climate are apparent with changes in plankton species Distribution.
Analyse dendrochronologique des variations passées du régime hydro Research 99(D12), 835-844. Summer temperatures across northern North America: Regional reconstructions from 1760 using tree-ring densities. Journal of Geophysical Research 99(D12), 835-844. Interannual to multidecadal modes of Labrador climate variability inferred from tree rings. Climate Dynamics 20, 219-228. On the "Divergence Problem" in Northern Forests: A review of the tree-ring evidence and possible causes. Global and Planetary Change 60, 289-305. Tree growth and inferred temperature variability at the North American Arctic treeline. Global and Planetary Change 65, 71-82.	2007 1994 2003 2008 2009 1982	Begin *et al.* Briffa *et al.* D'Arrigo *et al.* Elliot-Fisk *et al.* Kaplan, M., Wolfe, A. Lamb, H. Short, K. Short, S., Nichols, H.	The longer-term response to climate changes can also be identified through both dendrochronological and pollen and microfloral studies.

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Isopoll maps and an analysis of the distribution of the modern pollen rain, Eastern and Central Northern Canada. Géographie Physique et Quaternaire 36, 91-108. Spatial and temporal variability of Holocene temperature in the North Atlantic region. Quaternary Research 65, 223-231. Palynological evidence for postglacial change in the position of tree limit in Labrador. Ecological Monographs 55, 241-258.	2006 1985 1978		
Holocene Palynology in Labrador-Ungava: Climatic History and Culture Change on the Central Coast. PhD thesis, Department of Biology, University of Colorado. Holocene Pollen Diagrams from Subarctic Labrador-Ungava: Vegetation History and Climate Change. Arctic and Alpine Research 9, 265-290.	1977		
Consequences of climate change for biogeochemical cycling in forests of northeastern North America. Canadian Journal of Forest Research 39, 264-284. Impacts of climate warming on terrestrial ectotherms across latitude. Proceedings, National Academy of Science 105, 6668–6672. Washington On the "Divergence Problem" in Northern Forests: A review of the tree-ring evidence and possible causes. Global and Planetary Change 60, 289-305.	2009 2008 2008 1986	Campbell et al. Deutsh et al. D'Arrigo et al; Foster,-D; King,-G	Biogeochemical processes, including CO2 production, operate as feedback in boreal forests under changing climate and can complicate palaeoclimate interpretation.

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Vegetation pattern and diversity in S.E. Labrador, Canada: Betula papyrifera (birch) forest development in relation to fire history and physiography. Journal of Ecology 74, 465-483. The interacting effects of temperature, ground disturbance, and herbivory on seedling establishment: implications for treeline advance with climate warming. Plant Ecology.	2010	Munier et al.	
Journal-of-Forest-and- Livelihood. 8(1)5-14	2009	Chaudhary,-P; Aryal,-K-P	There is a worldwide consensus that global warming is a real, rapidly advancing and widespread threat facing humanity this century. Scientists have presented evidence and tested models to substantiate this truly alarming fact.

F. CLIMATE CHANGE AND HEALTH			
SOURCE	**YEAR**	**AUTHOR**	**IMPACT POINT**
Climate Change and its Implications for Human Health in the Himalaya. Sustainable Mountain Development in the Greater Himalayan Region, 50.	2006	Eriksson,-M	As in other regions of the world, climatic and ecological changes caused by global warming have resulted in several negative consequences for people‘s health, the economy and livelihoods in Nepal.
Environmental Statistics of Nepal. Kathmandu.	2006	CBS	Agriculture the mainstay of rural food and economy that accounts for about 96% of the total water use in the country suffers a lot from erratic weather patterns such as heat stress, longer dry seasons and uncertain rainfall, since 64% of the cultivated area fully depends on monsoon rainfall.

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Climate Change related Health Impacts in the Hindu Kush–Himalayas. EcoHealth, 4: 264□270.	2007	Ebi et. al.	Declined yield due to unfavourable weather and climate will lead to vulnerability in the form of food insecurity, hunger and shorter life expectancies.
Integrated Approach to Climate Change Adaptation. Journal of Forest and Livelihood, 8(1)91-99	2009	Gurung,-G-B; Bhandari,-D	In response to climate change, the prospects of bringing new land under cultivation by clearing the vegetation have also threatened biodiversity conservation in high altitude areas through habitat destruction, degradation, fragmentation and loss. Important habitats will be displaced by croplands.
Anthropogenically accelerated mass movement, Kullu valley, Himachal Pradesh. Geomorphology. 26 : 123-138.	1998	Sah,-M-P; Mazari,-R-K	The atmospheric temperature increase brought about by global climate change has resulted in the shift of monsoon pattern accompanied by an increase in intensity of rainfall and cloudbursts and heavy landslides during recent years.
Mountain, weather and climate, London: Routledge.	1992	Barry,-R-G	states that 19 out of the 30 principal observations on climate change are in Europe and there is none from the Himalayan region.
International tourism and U.S. beaches. Shore and Beach 64:27-35.	1996	Houston,-J-R	Readers interested in the science behind climate change, climate change assessments, general circulation models and other impacts are directed towards the National Assessment Synthesis Team Overview .

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Classified Shellfish Growing Waters. NOAA's State of the Coast Report.NOAA, Silver Spring, MD. Available on-line: http://state-of coast.noaa.gov/topics/html/state.html.	1998	Alexander,-C-E	Some 30 to 40% of shellfish growing waters in the nation's estuaries have harvest prohibited or restricted each year, primarily due to bacterial contamination from urban and agricultural runoff and septic systems .
Coastal zone tourism: A potent force affecting environment and society. Marine Policy 15:75-99.	1991	Miller,-M-L; Auyong,-J	Clean water, healthy ecosystems and access to coastal areas are critical to maintaining tourism industries, ironically, however, these industries themselves often pose additional impacts to coastal environments and local communities .

G. CLIMATE CHANGE AND MARINE LIFE			
SOURCE	**YEAR**	**AUTHOR**	**IMPACT POINT**
Predictability of North Atlantic multidecadal climate Variability. Science 275:181-184.	1997	Griffies, S. M., Bryan, K.	Although atmospheric systems alone become unpredictable beyond several weeks, it has been suggested that with atmosphere-ocean coupling, multi-decadal variations in climate models can be projected .
The maximum potential intensity of tropical cyclones. Journal of Atmospheric Science 54:2519-2541.	1997	Holland, G. J.	Prediction of the future intensity and frequency of tropical cyclones has been limited by the coarse resolution of global climate models. However, some progress has been made in estimating future maximum potential intensities of cyclones based on thermodynamic considerations

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Tropical cyclones and global climate change: A post IPCC assessment. Bulletin of the American Meteorological Society 79:19-38.	1998	Henderson, Sellers et al.	A review of the linkages between tropical cyclones and climate change concluded that the broad geographic areas where cyclones are generated, and therefore the areas impacted, are not expected to change significantly .
The Arctic and Antarctic Oscillations and their projected changes under global warming. Geophysical Research Letters. 26:1601-1604.	1999	Fyfe et al.	Projections for the NAO over the next century based on the Hadley and Canadian climate models, however, show no trend in the index over time; however the Canadian model does suggest substantial changes in the Arctic Oscillation.
Lack of icebergs another sign of global warming? Science 285, 37. The formation and maintenance of the North Water Polynya. Atmosphere-Ocean 41, 187-201.	1999	Wuethrich, B.	Early speculation that iceberg numbers were directly linked to climate change has been replaced by more detailed research.
Satellite evidence for an Arctic sea ice cover in transformation. Science 286:1937-1939.	1999	Johannessen,O.M.,Shalina, E. V., Miles, M. W.	Observations in the Arctic have already shown significant declines in ice extent, and recent work suggests that the declines may be occurring at a much greater rate than previously thought, with ice extent shrinking by as much as 7% per decade over the last 20 years .
On the record reduction in 1998 Western Arctic Sea-ice cover. Geophysical Research Letters 26:1905-1908.	1999	Maslanik, J. A., Serreze, M. C., Agnew,T.	During 1998 the late summer ice extent in this region declined by as much as 25%; less than had been recorded over the previous 45 years

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Global warming and Northern Hemisphere sea ice extent. Science 286:1934-1937.	1999	Vinnikov et. al.	However, comparisons with other GCM outputs (the Geophysical Fluid Dynamics Laboratory model and the Hadley Centre model) strongly suggest that these Observed declines in sea ice are related to anthropogenic ally induced global warming .
The significance of seasonal wind patterns in forcing biological processes in the eastern Bering Sea. American Geophysical Union Ocean Sciences Meeting, January, 2000. San Antonio, TX.	2000	Stabeno, P. J.	preliminary estimates from the 1999-2000 ice season suggest that this season has had the most extensive initial ice coverage observed in the Bering Sea over the last 20 years .
Increased El Niño frequency in a climate model forced by future greenhouse warming. Nature 398:694- 696.;	1999	Timmerman et al.	In general, heating over land causes increased land/sea temperature gradients during summer months, but the reverse is usually true in the winter. Possible changes in the frequency and intensity of El Niño Southern Oscillation (ENSO) events will also have important consequences for upwelling in the California Current System.
Trends in extreme weather and climate events: issues related to modeling extremes in projections of future climate change. Bulletin of the American Meteorological Society 81:427-436.	2000	Meehl et al.	
The El Niño-Southern Oscillation in the second Hadley Centre Coupled Model and its Response to greenhouse warming. Journal of Climate 13:1299-1312.	2000	Collins, M.	A lower index favors El Niño conditions and therefore more frequent ENSO events are projected under this model. By contrast, the Hadley model shows no clear trend in ENSO events until a quadrupling of atmospheric carbon dioxide concentrations.
Predicted response of Northwest Atlantic invertebrate and fish stocks to CO2-induced climate change.	1986	Wright et al.	Increases in precipitation and runoff can be expected to influence flow strongly in systems such as the Labrador Current.
Transactions of the American Fisheries Society 119:353-365.	1990	Frank et al.	

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Does the ocean-atmosphere system have more than one stable mode of operation? Nature 315: 21-26.; On the structure and origin of major laciation cycles. 2. The 100,000 year cycle. Paleoceanography 8:699-735.; On the structure and origin of major glaciation cycles. 1. Linear responses to Milankovitch forcing. Paleoceanography 7:701-738.	1985 1992 1993	Broecker, W. S. Imbrie et al.	It is known that during the last glaciation, the conveyer-belt circulation slowed and may have stopped
Oceanic carbon dioxide uptake in a model of century scale global warming. Science 274:1346-1350.	1996	Sarmiento, J. L., Le Quere, C.	Sedimentary records do suggest that rapid shutdowns of thermohaline circulation have occurred in extremely short time intervals. Ironically, the result could be further acceleration of global warming trends, as aresult of a decrease in the oceanic uptake of carbon dioxide that would likely follow weakening or cessation of thermohaline circulation .
Inverse production regimes: Alaska and west coast Pacific salmon. Fisheries 24:6-14.	1999	Hare et al.	Changes in wind-driven vertical mixing can be expected to have several important effects. Changes in the mixed layer depth with changes in wind stress have been implicated in changes in primary production in the Northeast Pacific with associated changes in salmon production .
Trends in extreme weather and climate events: issues related to modeling extremes in projections of future climate change. Bulletin of the American Meteorological Society 81:427-436.	2000	Meehl et al.	Limited evidence suggests that there will be little change in global frequency of cyclones, although regional and local variability could change significantly depending upon a variety of phenomena .

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Climate change aids Pacific diatom's return to North Atlantic. Frontiers in Ecology & the Environment 5, 402. A biological consequence of reducing Arctic ice cover: arrival of the Pacific diatom Neodenticula seminae in the North Atlantic for the first time in 800 000 years. Global Change Biology 13, 1910-1921.	2007 2007	Gewin.,V. Reid et al.	The ongoing effects of changing climate are apparent with changes in plankton species Distribution.
Influence of thermal fronts on the habitat selection of four rorqual whale species in the Gulf of St. Lawrence. Marine Ecological Progress, Series 335, 207–213. Effects of the North Atlantic Oscillation on sea ice breeding habitats of harp seals (Pagophilus groenlandicus) across the North Atlantic. Progress in Oceanography - Climate Impacts on Oceanic Top Predators (CLIOTOP) Special Issue. Seal / Salmon Fisheries Interactions: The Relationship between climate Change and Seal Predation Pressure on Salmon in Newfoundland and Labrador Rivers. Climate Change Impacts and Adaptations Directorate Report A 1035. Changes in the reproductive parameters of female harp seals (Pagophilus groenlandicus) in the Northwest Atlantic. ICES Journal of Marine Sciences 67, 304-315. Understanding the Impacts of Climate Change on Arctic Sea Ice Conditions: A community-based research initiative – landfast ice and ringed seal productivity. Canadian Climate Impacts and Adaptations Directorate, report.	2007 2010 2007 2010 2006	Doniol Valcroze et al. Friedlaender et al. Sjare, B. Sjare, B. Stenson, G. B. Sjare et al.	Changes in water temperatures, food availability, and the extent and timing of sea ice formation could impact seals and other marine mammals.