Climate Change in British Columbia - Implications for the Forest Sector: Developing a Framework for Response
FRDA Report 075

Considered the first step towards assessing the effect of climate change on British Columbia’s forest sector, the Climate Change Information meeting was convened on October 13, 1988 in Vancouver by the University of British Columbia and co-sponsored by Forestry Canada and the B.C. Ministry of Forests.

The current work and interest as presented for the 32 participants indicates that a wide spectrum of expertise already exists in British Columbia:

- R.J. Hebda (Royal B.C. Museum) in his work with paleoecology suggested that future planning for forests could be aided by paleoecological analyses of cores adjacent to areas scheduled for replanting to discover which species grew in warmer drier climate, with the assumption that these species would also provide better yields 70-80 years from now should the climate change.

- K. Johnstone summarized Environment Canada’s AES Atmospheric Environment Service climate change impact studies conducted since 1984. The AES has examined the direct impact of climate change on agriculture, forestry, navigation, power generation, fisheries, recreation, tourism, and the impact of sea level rises on some coastal communities. Current priorities included water resources, Canada’s Arctic, infrastructure, forestry and policy issues. Results from these studies have been published in the new Climate Change Digest and have attracted considerable media attention.

- In dendroclimatic research at Forentek Canada Corp., L.A. Jozsa reported a breakthrough in research where traditionally the relationship between climatic variation and tree growth could be proven only on open-grown old trees in marginal environments. Based on the soil moisture deficit work of David Spittlehouse, 70-year-old coastal Douglas-fir trees on xeric, submesic, and subhygric sites were analyzed and approximately 50% of the variance in annual ring width was found to be predictable from annual transpiration stress.

- Climate change was reported as the framework for the new WESTFORR group (Western Forest Regeneration Research Group) organized by the Department of Forest Sciences at U.B.C. J.P. Kiemens reported that research will be on seedling stress physiology, winter chilling physiology, alteration of geographical location of biogeoclimatic zone and subzone boundaries, implications of climate change for nutrient cycling, tree nutrition, tree biomass and productivity. In addition, studies will investigate alteration of ecological succession patterns and competition or other forms of interference from non-crop vegetation, design of silviculture systems to minimize risks with climate change, and ecosystem modelling to provide a forecast of the long-term implication of climate change.

- Denis Lavender from the Forest Sciences Department of U.B.C. examined the predicted global warming and the chilling requirement of conifers from western Washington and Oregon. He concluded that if global warming results in an increase of winter temperature of 5-7°C in northern California, Oregon and Washington, as predicted, Douglas-fir will be eliminated from the productive forest stands below 300 m and possibly higher. Short-term effects of global warming indicate nursery stock will not receive sufficient chilling and will, therefore, have a very low survival rate. Species like lodgepole pine and white spruce, whose chilling requirements would still be satisfied by warmer climates, would be subject to a much greater risk of frost damage from late spring cold events.

- Ken Lertzman from Resource Ecology, at U.B.C. reported on development of a model of long-term climate-driven change based on regional climate history and pollen records. His work suggests that over the next 100 years climate change will exceed the ability of many forest communities to respond, and as a consequence we may see: local species extinctions, increased difficulty in post-harvesting regeneration, and a decline in the value of tools which depend on vegetation and soils being in equilibrium with climate (i.e., the biogeoclimatic classification system and stand yield tables).

- In the Atmospheric Science Programme developed by the Department of Geography and Oceanography at U.B.C., Gordon A. McBean indicated their research focus will be on the water cycle. He suggested that while predictions of large changes in the water cycle are uncertain, their impacts could be significant. Research will examine the atmosphere component, i.e., evaporation, precipitation, hydrological and geomorphological components, satellite remote sensing of land-surface processes, urbanization, land use, and hydrology.

- Timothy L. McDaniels, visiting assistant professor Huzley College of Environmental Studies, Western Washington-
ton University and Principal, McDaniel's Research Ltd., Vancouver, emphasized the need for careful policy analysis that reflects the uncertainties of the effects of climate change on forests. He recommended that the most informative way to approach the problem is to consider a number of scenarios regarding climate change, articulate the key uncertainties the scenarios are intended to reflect, and scrutinize available models to see how well they reflect these uncertainties. With limited time and funds available, the economic assessment in forest/climate research must be prioritized.

- Jean-Pierre Savard from the Canadian Wildlife Service explored some of the effects of climate change on forest wildlife, where the forest changes, so does the wildlife community. This imbalance may increase disease and insect damage to the forest. Because climate changes will lead to new forest exploitation policies (i.e., shorter rotation times) he predicts these could negatively affect several wildlife species, especially those associated with mature forests.

- David L. Spittlehouse explained how the current work of the B.C. Ministry of Forests in improving forest management may also develop 'predictors' to help determine the effects of climate change on the forest sector. The development and implementation of the Ecological Classification Program, the computer models and other procedures to assess how weather and climate affect soil moisture and thermal regimes are process-oriented, short time step (1 day) models that he predicts will be the type we will need for detailed assessments of climate change on our forests.

- Gordon F. Weetman from the Department of Forest Science at the University of British Columbia theorized that since climate change is expected to fundamentally change ecosystem functioning and productivity, it is constructive to examine the fundamental ecological laws proposed by Dansereau that control organism growth and development, i.e., the laws of ecotopic fitness, community adjustment, climatic response and geographic laws of distribution.

- The B.C. Ministry of Environment, as reported by R.J. Williams sees global climatic change as a critical management issue. For example, if significant climate change occurs, we will need policies, global and local, that may have to respond to an increased risk to public safety through rising ocean levels, greater frequency of floods, and/or droughts and loss of economic opportunities through effects on water supplies and consequently agriculture, fisheries, wildlife and forestry.

- The recent activities of Forestry Canada and Pacific Forestry Centre in Climate Change, presented by D.A. Winston include: The June, 1986 international conference on the Changing Atmosphere where Dr. J. Maini, ADM Forestry Canada gained important international media attention for the threat of global climate change to forestry in Canada. Strategic planning for all regional centres will now focus on the impacts of climate change, i.e., a socio-economic impact study will be initiated in early 1989.

A scoping session was used to develop a general framework for assessing the effect of climate change on forestry in British Columbia, and then cross referenced with current research in British Columbia and Washington as represented in this meeting. The session also identified gaps in information and understanding and indicated directions and priorities for future research.

In a second discussion, seeded by a hypothetical scenario which asked the group to give recommendations on management practices and to outline a 10-year research program, a number of basic requirements were outlined for the formulation of an advisory and research program:

- the need for more definite climate scenarios. This was viewed as critical because climate change is characterized by uncertainties in its expected development and impact, while the forest sector requires long-term planning. Consequently, appropriate strategies must be implemented as soon as possible.

- the necessity for clarifying the objectives for forestry in Canada under a changing climate.

- the need for a better understanding of biological requirements and future values of the resource. The report suggests that certain precautionary steps may be prudent in the near future particularly where a “safe-fall” strategy can be employed. The conservation of genetic resources and continued emphasis on backlog reforestation and short rotation forestry are also applicable here.

- there must be an appropriate means to enhance public awareness of the issue.

- a strategy is required to ensure best use of funds and a co-ordinated approach to research management and communication.

The workshop concluded that the work on the above concerns could be initiated through a high profile conference. Aimed at the forest sector, the conference would provide scenarios of change for British Columbia and for the first time, would provide a platform for experts in key areas to portray the various implications for forestry and the options open to forest managers.

Copies of this 55-page report, Climate Change in British Columbia—Implications for the Forest Sector: Developing a Framework for Response compiled by ESSA and edited by D.L. Spittlehouse and D.F.W. Poliard, are available while supplies last from:

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