An Introduction to the Forest Ecosystem Dynamics Program

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British Columbia's forests contain 40% of Canada's wood volume and, in 1989, accounted for $12.6 billion of Canada's shipments of forest products, the majority of which were exported. Some 70 000 people were employed in the process.

Long renowned for its forest industry, the Pacific and Yukon Region is gaining a new reputation. Travel and news media have brought its magnificent forests to world attention. Biodiversity is of particular interest. A remarkable array of mountain, coastal, arctic, and continental landscapes, spread over 21° of latitude, harbour some of the world's most valued genetic resources in woody species. South central British Columbia, for example, is Canada's "hotspot" for diversity of conifer species. The Region is rich in bird and mammal species, but there are numerous less conspicuous organisms, many not even named, that also support the assertion that the Pacific and Yukon Region is a treasure-house of biological diversity with global significance. Its value as a genetic resource has long been known to European foresters, of course. Also, it is argued, the forests of the Region are important elements of Canada's carbon pool, and hence may be important in how we address climate change.

The principles underlying such productive and prolific diversity remain relatively unexplored. Biodiversity and its potential as a genetic resource are vulnerable to the vagaries of exploitation and other disturbances. This vulnerability is now recognized both within and outside the Region, and has led to pressures on the forest sector to reduce or even curtail its activities. The rapid evolution of new values for forestry, expressed by an increasingly interested and vocal public, threatens the socio-economic dependency that characterizes many of the Region's communities.

In addition to concerns about sustainability under current conditions, there are serious uncertainties associated with the emerging issue of climate change. A change in climate would disrupt the harmony that has evolved between forest ecosystems and the ecoclimatic regions they occupy. At risk are the forest resources upon which much of the socio-economic fabric of the Region is based. Major ecological disruptions would likewise have severe impacts on the biodiversity of the Region, and call into question the value of current conservation strategies that assume climatic stability. The stability of live and detrital carbon pools would be strongly affected by a change in climate, especially warming, adding to existing concerns about forest carbon pools and their management.

In short, the forest sector of the Pacific and Yukon Region finds itself at a critical point. While retaining much of its traditional role as a generator of wealth and employment, it is seen to be in conflict with less tangible roles concerned with the well-being of planet Earth. As lofty as such concepts may seem, they are already taking root in critical markets of Canadian forest products. Europeans are grasping the nettle of sustainability, and are calling for more responsible forestry practices. Media and non-government agencies have turned the spotlight on the Region, and it is only a matter of time before our claim to sustainable development is put to the test. If we fail, it will be to the detriment of our forest industry, and a serious reflection on the sector as a whole.

Organizational Posture

As part of Forestry Canada, the Pacific Forestry Centre has a voice in national and international affairs. We are located in the vicinity of some of the most contentious resource and conservation issues in Canada. But we are also located close to three universities and other sources of expertise, and have established networks with provincial and non-government agencies. The Centre has a cadre of scientific and technical staff experienced in problems associated with ecosystem function, biodiversity, conservation, and climate change. In 1991, these people were assembled into a team under the program title of "Forest Ecosystem Dynamics."

Like most government agencies, Forestry Canada has had to adapt to a leaner economic environment, and to new ways of doing business. It is currently operating on a diminishing A-base, but several B-base sources offer new potential for funding. Some of these are suitably oriented to support work in forest ecosystem dynamics, reaffirming the topic as a source of priority issues. As will be seen, the program has been singularly successful in tapping these supplementary funds; this has reassured us in our program direction. However, B-base funds have their own problems, not the least of which is a lack of dependability.

Opportunity

Through the Forest Ecosystem Dynamics Program, Forestry Canada Pacific and Yukon Region can improve scientific and public understanding of the dynamic nature of forest ecosystems in the Region. In particular, the Program gives us the opportunity to investigate the role of biodiversity and essential ecological processes in self-perpetuating ecosystems, and to address two related conservation issues, maintenance of genetic resources and climate change.

The Pacific Forestry Centre is located close to threatened landscapes of the Coastal Western Hemlock zone (CWH) and the Coastal Douglas-fir zone (CDF). Scoping and planning activities, pursued in an atmosphere of distrust and confrontation, show conclusively that there is inadequate information for developing an effective conservation strategy for these landscapes.

There are many interested stakeholders in the forests of the Pacific and Yukon Region. Some of these, notably provincial agencies and universities, have policies and programs that address the issues described above. Given adequate networking through appropriate institutions, the program will help these stakeholders achieve their goals, while meeting the corporate needs of Forestry Canada.

Statement of Purpose

The purpose of the Forest Ecosystem Dynamics Program is to contribute to an acceptable, scientifically based framework for the sustainable development of forests—a framework that meets both utilization and conservation needs.

We believe that sustainability will be found to be flourishing in the vast majority of forest ecosystems, including those harvested. If this can be effectively communicated to interested stakeholders, their concerns may be sufficiently addressed to reverse current trends of antipathy towards Canada's forest sector. Likewise, a better understanding of the principles of sustainability should encourage modifications to forest practices where necessary, including those needed for adaptive response to climate change.

Objectives

The Program has four objectives, each identified as a distinct yet interrelated project:

- to assess impacts of environmental changes on biological diversity of forest ecosystems;
- to assess the effects of forestry practices on carbon and nutrient dynamics in coastal forests ;
- to conserve genetic resources of forests in the Pacific and Yukon Region; and
- to address the climate change issue for the forest sector in the Pacific and Yukon Region.

Our intention is to develop a clearer understanding of the way in which forests respond to human intervention, and to establish guidelines that ensure that these responses are consistent with ecosystem sustainability.

General Approach

As our objectives indicate, the Program engages a variety of issues, and does not confine itself to the Region's boundaries (see Figure 1). The observer may wonder why, during a difficult period of fiscal restraint and limited human resources, the Program has not limited itself to providing more concentrated input on a single problem.

Part of the answer lies in the mandate and corporate obligations of Forestry Canada, whose expertise is drawn from regional establishments such as the Pacific Forestry Centre, to provide scientific support for government policies and to contribute to specific programs. Several examples may be found in Forest Ecosystem Dynamics: Project PC-71-40 is largely committed to supporting a major interdepartmental study of the Mackenzie Basin, led by the Canadian Climate Centre, Environment Canada; the Program Head was requested to lead the Green Plan Ecological Reserves Project; and Project PC-71-20, on carbon and nutrient cycling, leads a national experiment on decomposition.

The needs of our partners have likewise established compelling contexts for our research. In particular, the Salal–Cedar–Hemlock Integrated Research Project (SCHIRP) has established a model research partnership of industry, university, and government to investigate a serious problem of productivity decline in the north end of Vancouver Island. It is in the very nature of science that researchers increase their knowledge and experience through networking. Some in this program have gained international recognition in the process, and this too entails commitments.

A balance must be found between our external obligations and the need to contribute effectively to the priorities at hand. The Program has resolved this problem by establishing a core network of its own, aimed at elucidating some of the issues concerning conversion of old growth to second-growth forests. A network of researchers, comprising Forestry Canada staff and collaborators, is focusing its attention on a series of successional stages, from regeneration to old growth, in one of the most seriously threatened landscapes in the Pacific and Yukon Region—the Very Dry Coastal Western Hemlock subzone.

The chronosequence network provides a common platform from which all four of our objectives may be addressed; the potential for synergism is particularly strong in the areas of biodiversity and ecological processes. The success of the network may be measured in a variety of ways, but it is most noticeable in the degree of support we have received from supplementary funding sources, and in the number of visiting scientists, graduate and co-op students, and volunteer collaborators attracted to the Program. Indeed, the rapid proliferation of the network inspired the Participants Workshop reported here, for there is an urgent need for all involved to be conversant with work in progress. Before presenting progress reports for the four projects, however, it is necessary first to describe the setting of the chronosequence network.

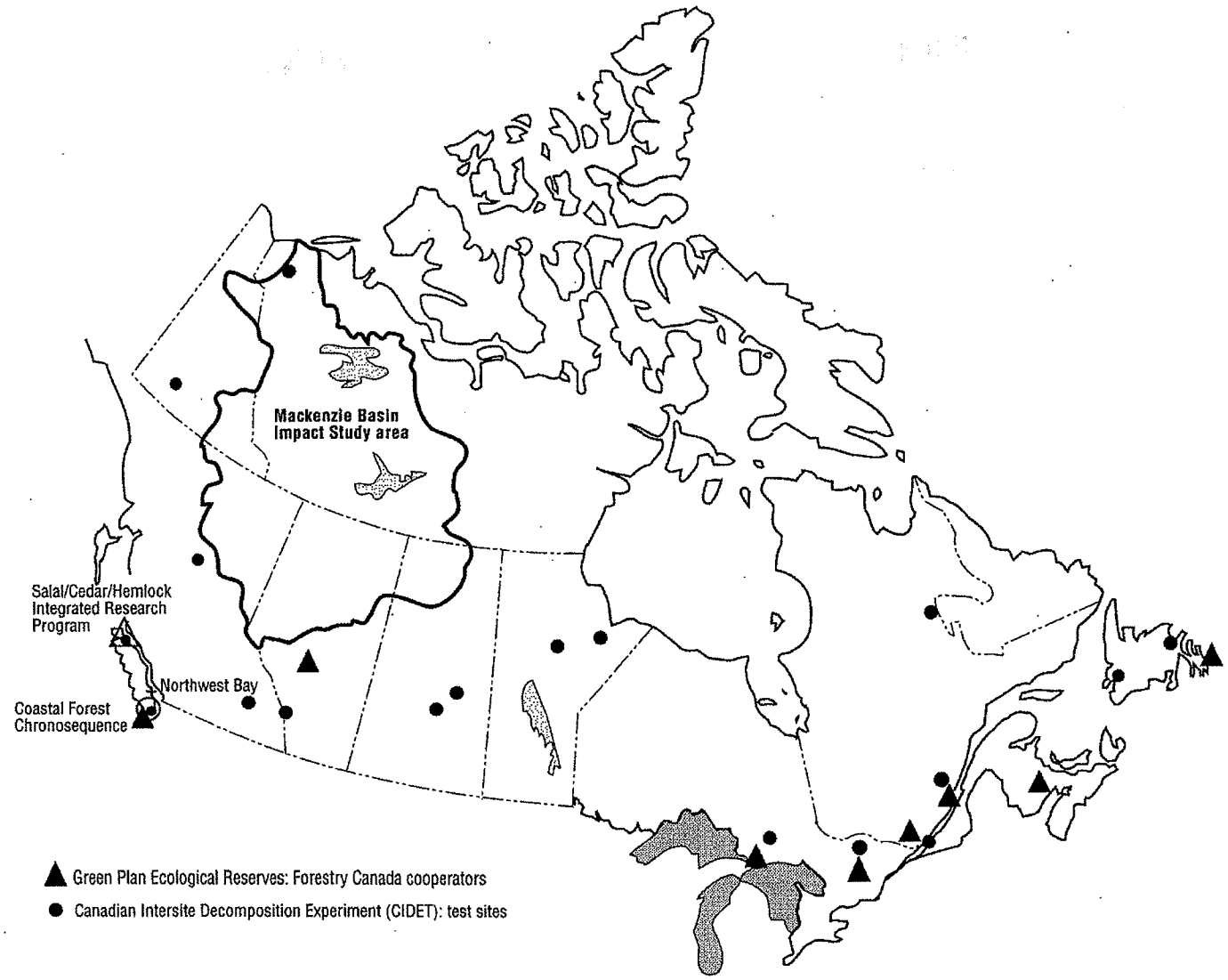

FIGURE 1. Research networks of the Forest Ecosystem Dynamics Program.