Canadian Forest Ecosystem Classification System (CFEC)

INTRODUCTION

One of Canada's commitments arising from The Convention on Biological Diversity (a key agreement adopted at the 1992 Earth Summit) was the development of a national standardized classification of forest and woodland ecosystems. This system was designed as a tool to be used when monitoring criteria and indicators of biodiversity conservation, forest health, and sustainable development. Work began on the development of the Canadian Forest Ecosystem Classification System (CFEC) in 2000. Having a national classification system in place will lead to a greater understanding of ecosystem processes and thus support Canada's sustainable forest management endeavors.

The CFEC defines and describes Canadian forest and woodland vegetation communities using standardized classification criteria and nomenclature. Its development is being coordinated by Natural Resources Canada - Canadian Forest Service (CFS), together with a broad partnership of governmental and non-governmental agencies. The immediate objective of the CFEC project is to correlate the over 4,000 existing provincial and territorial forest types into a common national classification that will allow direct comparisons across jurisdictional boundaries. CFEC is part of the broader Canadian National Vegetation Classification (CNVC), which classifies all vegetation and applies CNVC protocols to the classification of Canadian forests and woodlands.

Ecologists are collaborating closely with their U.S. counterparts to ensure compatibility between the CNVC and the U.S. National Vegetation Classification (USNVC), so that they will have a common reference in their discussions about ecosystems in Canada and the U.S. Currently, for example, the classification is being used in the development of a standard vegetation mapping methodology for the North American component of the Circumboreal Mapping Project, an international cooperative effort to map the global boreal biome.

GREAT LAKES FORESTRY CENTRE (GLFC) ROLE

GLFC forest ecologist Ken Baldwin is the co-chair of the CNVC Technical Committee and leads the team that is coordinating the development of the national CFEC. The CFEC vegetation types (called associations) are defined and described in terms of vegetation characteristics that represent fine-scale variations in regional climate, site-specific moisture and nutrient regimes, and underlying ecological processes.

The team is using provincial and territorial field plot data of soil, site and vegetation characteristics to review and compare the ecological classifications that currently exist for each jurisdiction. Each local classification is then assigned a national CFEC vegetation type, which links them into a common system

Individual components of the work are being conducted regionally in Western Canada, Ontario, Quebec, the Maritimes, and Newfoundland and Labrador. Baldwin and his GLFC team are working with ecologists in each of these regions to correlate the existing classification systems, which often require updating to be more compatible with the CFEC.

Each association is described in a factsheet using a common CNVC format (Figure 1).

Ultimately, the CFEC will produce a catalogue of approximately 1000 standardized forest and woodland associations. The factsheets provide a summary of the ecological attributes of each association, including information on community structure, plant species characteristics,

Figure 1. Example of part of a CNVC association factsheet

habitat, biogeographic distribution, and ecological process relationships. This information will reside in a national database that will link to nationally and regionally mapped ecological products, such as the ecozones and ecoregions outlined in the National Ecological Framework for Canada and provincial ecological classifications, and national collections of information such as the National Forest Inventory.

Associations constitute the first level within a larger, international vegetation classification hierarchy (Figure 2). The hierarchy uses lifeform and structural criteria at the upper levels (e.g., boreal forest and woodland), floristic criteria at the lower levels (e.g., white spruce/ step moss forest), and a gradation from one to the other through the mid levels (e.g., North American lowland and submontane boreal forest). In addition to developing associations, GLFC staff are working on identifying alliances, groups and macro-groups to populate the full classification hierarchy for Canadian forests and woodlands (see Figure 2).

For a more detailed look at the CNVC system, which serves as the basis for the CFEC, visit the website: www.cnvc-cnvc.ca (user name: cnvc, password: cnvc05!)

Upper Levels (classification based on physiognomy)

    1 – Class
    2 – Subclass
    3 – Formation

Mid Levels (classification based on physical descriptions and species composition)

    4 – Division
    5 – Macro-group
    6 – Group

Lower Levels (classification based on species composition)

    7 – Alliance
   8 – Association

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Figure 2. CNVC Hierarchy

Importance of CFEC

The CFEC will be an important platform and framework for providing benchmark descriptions of ecological characteristics of forest and woodland ecosystems, including current plant species composition and community structure under specific conditions of climate, soil moisture and nutrient gradients. The common language and format will allow sharing of ecological information about forest and woodland ecosystems, both within Canada and between Canada and the United States. It will also facilitate the linking of field-collected information about ecosystems to information gathered by remote sensing technologies at multiple scales.

The CFEC will be useful in the identification and delimitation of habitat for the development of conservation and protection strategies. It will also be used to describe successional changes in forest composition and structure following natural and human disturbances, including the influences of climate change, and will permit the extrapolation of ecological research results and forest management protocols from one region of Canada to another. Furthermore, a completed CFEC will facilitate monitoring of criteria and indicators of biodiversity conservation, forest health, and sustainable development and identification of vegetation communities at risk.

CONCLUSION

The CFEC is an ongoing initiative that will provide a consistent framework for applying ecological knowledge of Canadian forests and woodlands to monitoring, research, and reporting activities. Such a classification is essential for extrapolating information from local to national and global scales and will help to establish Canada as a world leader in the application of ecosystem classification for sustainable forest management, including both timber and non-timber values.
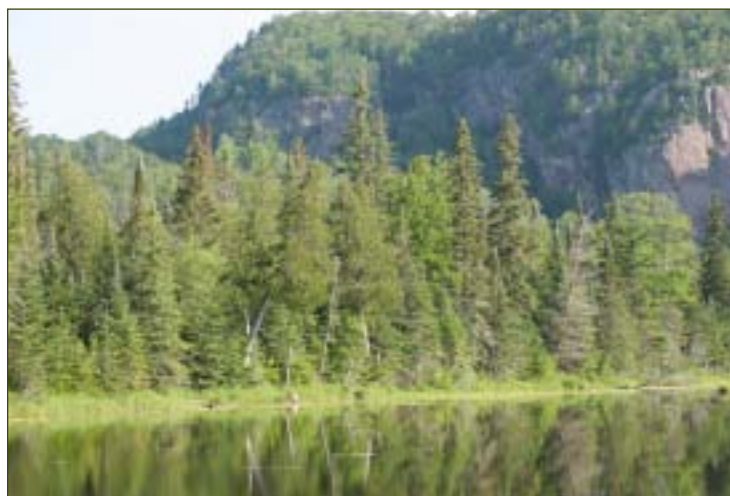
Principal Collaborators

Ecological expertise from all regions of the country and bordering regions of the U.S. is required, so collaboration with numerous partners from both governmental and non-governmental sectors is essential.

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