Certification Standards
for the
Profession of Forestry in Canada

Canadian Federation of Professional Foresters Associations

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Prepared by

CFPFA Members
Approved by the Councils of:
College of Alberta Professional Foresters
Association of British Columbia Forest Professionals
Association of Registered Professional Foresters of New Brunswick
Newfoundland and Labrador Registered Professional Foresters
Registered Professional Foresters Association of Nova Scotia
Ontario Professional Foresters Association
Association of Saskatchewan Forestry Professionals
Canadian Institute of Forestry
Canadian Forestry Accreditation Board

With the assistance of specific Universities and Colleges (see Attachment 1)

Ordre des Ingénieurs Forestiers du Québec have chosen not to ratify and implement the Certification Standarde; they are working on a parallel project.

Assessment Standards developed in 2009 from these Standards and Approved by the above bodies, are now used to assess and accredit University programs

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Contents

Introduction

The Canadian Federation of Professional Foresters Associations (CFPFA) is a national organization founded in 1982 to act as an advocate for matters identified by its member agencies as having national importance or consequence. The member agencies are the professional forester/ingénieurs forestiers associations established through provincial legislation, or similar means, as well as the Canadian Institute of Forestry (CIF), representing provinces without a recognized professional regulatory presence, and the Canadian Forestry Accreditation Board (CFAB) which itself is a body created by the CFPFA member organizations. The mandate of the CFPFA is defined by a Terms of Reference (vrs. 2006)[1] which includes provision of a member's forum for communication on matters such as certification (registration/licensure), and academic standards for accreditation of university forestry programs in Canada.

The requirements for entry into professional practice are central to the statutory mandates of each of the CFPFA member agencies, which are professional regulatory bodies. This is a subset of the larger CFPFA member agency group and for ease of reference will be defined, in this document, as the "regulatory member or members". Whether in *"right-to-title"* or *"right-to-practice"* jurisdictions, each regulatory member is obliged, by law, to maintain appropriate entrance standards within its jurisdiction. Entrance standards have several components:

- Educational requirements for entry;
- Post-graduate practical experience;
- Sponsorship by Registered Professional Foresters in good standing; and
- In most provinces, registration examinations (also called professional or jurisprudence exam depending on jurisdiction).

While the "normal" circumstance is set out in entrance standards, equivalency can be established by a jurisdiction and would be determined by a ruling of the appropriate committee of the regulatory member in that jurisdiction. Attachment 2 illustrates the relationship between the components of the entrance standards and difference between certification, enrolment and university accreditation.

To date, the regulatory members have only produced national academic standards that describe the educational requirements to be delivered by accredited university forestry programs. This has helped facilitate mobility for professionals and has enabled the regulatory members to enter into a formal, mutual

recognition agreement for labour mobility in which professional foresters registered in any regulatory member's jurisdiction are recognized nationally. This said, CFPFA member agencies have become increasingly aware that the entrance standards in use today are not as current as they should be. Further, they do not adequately describe the full scope of professional forestry practice as defined by the respective legislations.

The various academic standards used by regulatory members are, almost exclusively, a knowledge-based assessment method rather than outcomes-based. The approach is generally prescriptive in nature and limits the range of applicants eligible for certification. Also, the standards do not allow for certification of entrants (as defined below). The result is that:

- each regulatory member must make its own certification rules;
- labour mobility potential is not fully exploited; and
- a range of eligible entrants may be disregarded for lack of agreed upon review principles and methodologies.

Further, because these standards form the basis for forestry program evaluation, they also limit the range of programs eligible for accreditation.

In focusing on the four essential elements for certification described in this document, rather than academic standards alone, and in describing a more outcomes-based approach, the CFPFA member agencies provide a blueprint for professional certification and, subsequently, accreditation practices that they hope will:

- allow for more inclusive entrance standards which enable recognition of a broader range of professional forestry practitioners;
- provide increased fairness to the system of entry into the profession;
- make the most of greater labour mobility potentials; and
- encourage innovation in education and training of forestry professionals as well as in the practice of professional forestry itself.

Because of the differences in regulatory formats throughout Canada, it is expected that regulatory members will adopt the certification standards in a variety of forms. Attachment 6 is one example of how the essential elements for certification might be harmonized into a Certification Standard bylaw. Regulatory members will also proceed at different time scales. The Ordre des Ingénieurs Forestiers du Québec has chosen not to implement the certification standards at this time.

[1] Approved by regulatory members November 2006.

Essential Elements of a Certification Standard.

Definitions:

Throughout this document a number of terms are used, that have specific meaning. Some of them are found in a section titled "the Right Words". Others are defined within the text of the document itself. It is important to know what we mean by the terms "accreditation", "certification", "registration", and "science-based degree" at the outset. They are therefore defined below.

Accreditation is a process of education assurance through which formal recognition of the quality and necessary curriculum content of a program of study is conferred by a responsible authority**.** In the professional forestry context, the Canadian Forestry Accreditation Board is the responsible authority empowered to assess university level programs on behalf of the provincial professional forester/ ingénieurs forestiers regulators and to determine whether they deliver the academic requirements for entrance into the profession. The CFAB conducts its accreditation assessments on a national basis for, and on behalf of, each of these regulatory bodies who have agreed, collectively, to abide by its decisions.

Each provincial regulatory body may conduct its own assessments of programs not offered up for national accreditation. Once such a program is assessed, the regulatory body conducting the assessment may recognize it, although the program would not be "accredited" in the sense that the word is used in this document. A program so recognized may or may not satisfy all of the content requirements of the core competency standards. Graduates from a recognized program may have to undertake additional coursework before certification can be granted.

Certification is the authoritative endorsement by a governing body that a person has attained occupational proficiency. In the professional forestry context, certification means that an individual's qualifications have been assessed by one or more of the professional regulatory bodies to determine whether the requirements for entry into the profession have been met.

Registration is the act of certifying a candidate into the profession and often includes documenting their name in a register. In the professional forestry context, registration also means the calibration of a candidate to ensure a standard. While the definition is consistent across the RPF/ing.f. jurisdictions of Canada, the point at which registration occurs is not.

A **science-based degree** is a program of study, in which the majority of time is spent exploring the natural, physical, or social sciences.

Essential elements for a Certification Standard

This document describes the minimum common requirements for admission to the practice of professional forestry across Canada. They are comprised of the following four elements, each of which must be demonstrably present:

(I) Academic credentials;
(II) Core competency standards (of which there are 7);
(III) Experience; and
(IV) Commitment to professionalism.

I **Academic credentials**

This element of certification describes the characteristics (rather than content) of the educational foundation a registrant **must** have upon entry into practice. Those characteristics include:

- At a minimum, a four-year, science-based baccalaureate degree, or its equivalent;
- Complementary studies, either within the degree (in the case of accredited programs) or through other qualification (in the case of applicants from non-accredited, recognized programs) which:
    - Demonstrably and cogently broaden understanding of at least one aspect of the Practice of Professional Forestry as defined in one or more Canadian jurisdictions.
    - Demonstrably and cogently support exploration of core competency standards. These studies can generally be considered to be the pre-or co-requisite studies that provide foundational knowledge for the core competency standard.

It is understood that, for accredited programs, the majority of the academic time will be dedicated to exploration of subject matter required by the core competency standards (core weighting). This statement is one of general intent. It will be up to an applicant for accreditation, i.e., the administrators of programs seeking accreditation, to demonstrate how they are meeting the core weighting requirements. As long as a program seeking accreditation meets the requirements of a four-year, science-based degree, meeting the core weighting requirements can be achieved either directly, i.e., within the program itself, or in the way students are granted entrance into the program from feeder institutions such as junior colleges, *Collèges d'enseignement général et professionnel (*CEGEPs), etc. In such cases, a school may have more time within its own degree program to deliver content that broadens and deepens understanding of the core requirements. (A school must be able to demonstrate that core requirements are covered appropriately in the time spent at the feeder institutions.

It is crucial to keep in mind that the knowledge and skills described in the core competency standards are not imparted to a candidate for certification in a vacuum. It is expected, in fact it is required, that the candidate will have graduated from a program of study that provides a science-based degree (or equivalent

recognized by regulatory members) that is typically four years or more in length. In most cases, the core competency standards will be met through studies towards that science-based degree[2]. In most cases also, the candidate will obtain the requisite complementary and foundational studies in the course of their degree studies.[3] However imparted, candidates for certification must be able to demonstrate that they have gained appropriate exposure to the foundational elements upon which the core competency standards rest and appropriate additional, related (complementary) studies to round out the educational experience.

The foundational studies element of a curriculum will include aspects of the arts, sciences and the humanities as described in Attachment 8, at the basic or introductory knowledge level and the societal context. There is no minimum level of exposure required for this component. However, exposure must be sufficient to impart an understanding of natural relationships and to ensure that students are able to undertake the work of the core academic requirements for certification.

The complementary studies element of a curriculum is comprised of those academic studies offered by the subject program which are over and above core and foundational requirements. They may occur individually as 'electives' or in structured curriculum groupings, generally identified as options, minors and majors. Complementary sciences and studies are to be used to provide an integrated, comprehensive academic experience which allows students to enhance and advance their forestry career interests. The component is intended to enable candidates to function at the highest levels of competence and effectiveness in the undertaking of professional activities demanded by the profession and society. There is no minimum level of exposure required for this component. However, exposure must have been sufficient to enable the candidate to fully complete the graduation requirements of the subject degree program or equivalent study.

[2] A person, while still needing the science-based degree, may be able to demonstrate that some of the core competency requirements were gained through other formal education or training.

[3] Again, while this is the expectation, a candidate may be able to demonstrate that this was gained in studies other than the science-based degree which they present to a registering body for registration. For example, they may have an undergraduate degree in terrestrial ecology, which covered some, but not all, of the core competency standard requirements and post-graduate studies through which they covered the remaining requirements.

II Core competency standards

By far the largest part of this document is dedicated to describing the seven core competency standards that form the second essential element for certification (see section titled: "In-depth analysis of core competency standards", following). The standards describe the principle, relevant components, demonstrable competency requirements, and performance indicators, arranged in a progression of understanding, for each of the following subject areas:

1. Tree and stand dynamics;
2. Forest to landscape, structure and function;
3. Forest management;
4. Economics and administration of forestry;
5. Communication, critical reasoning;
6. Information acquisition and analysis; and
7. Professionalism and ethics.

Because of the coverage, one could draw the incorrect conclusion that the core competency standards alone define the entrance standards and the practice of professional forestry. The standards contained herein describe the minimum common knowledge competencies required of all entry-level professional foresters regardless of their area of practice or specialization. They do not describe everything a professional forester knows but, rather, what every professional forester must know as they enter into practice. They do not begin to describe the range of concentrations or specializations possible within the profession.

The practice of professional forestry, as defined in legislations across Canada, is far broader than suggested by these seven standards. Professional forestry practice includes such areas of focus as operations and roads; fish and wildlife habitat conservation; water quality preservation; development and management of forest recreation opportunities; protection and enhancement of cultural values; forest products marketing; and forest economics, business and management, to name but a few.

It is crucial to keep in mind that the core competency standards are only one part of the certification requirements themselves and that they must be read in context of each of the other three elements of certification.

III Experience requirements

Every applicant must have sufficient experience to demonstrate competence in the practice of professional forestry at the entrance level. It is left to the registering body, and in some cases the provincial legislation, to specify how or when the experience requirement is demonstrated. For example, a formal period of articling or internship before writing an examination is one model for demonstration. This essential element of certification has not yet been the focus of national harmonization by CFPFA. Currently, how

this requirement will be assessed is up to each professional regulatory jurisdiction to decide. The differences between jurisdictions in the essential element of experience may influence the extent to which the CFPFA can have a common national certification standard.

IV **Commitment to professionalism**

Applicants must have a demonstrable understanding of, and commitment to, professionalism and ethics. While some of this essential element can be delivered through formal education (business and environmental ethics courses, lectures on professionalism and regulation of professions), much of it will be demonstrated through a combination of:

- articling/internship and or post-enrolment, pre-certification work experience, and/or
- a certification examination.

In-depth analysis of core competency standards

How to read and use the core competency standards.

In order to ensure that the core competency standards are understood and used correctly, definitions and context are provided here and in the example "Standard 0" which appears below.

The standards are organized in a progression from Standards 1 and 2, which describe required knowledge of "how the system works", to Standard 3 which describes an ability to use and apply acquired knowledge in order to design and implement forest interventions and to develop and exercise forest stewardship, to Standards 4, 5, 6 and 7, which describe the need to apply acquired knowledge in the delivery of a range of expected professional services.

Each standard is composed of a principle statement, relevant components (knowledge), demonstrable competency requirements, and performance indicators, also arranged in a progression of understanding. The principle statement describes the overarching context of a standard. The relevant components identify the knowledge areas that underpin the standard. The demonstrable competency requirements define a candidate's performance capabilities, i.e., the things that a candidate must be able to demonstrate that he or she "has done" or "can do". Performance indicators, which are integrated within the demonstrable competency requirements sections, are the means by which competencies may be measured. Standard "0", following, provides a more detailed, contextual example of this structure.

The Right Words

Specific words have been selected to guide the interpretation of the standard. When the words "describe," " prepare," "list," "defend," " apply", etc. are used in the demonstrable competencies and performance indicators, it is expected that the competency will be completed to a specified level of understanding. The levels of understanding used in this document follow Bloom (1956) (See Attachment 3). Bloom and others also identified specific verbs that characterize the ability to demonstrate an outcome in a certain manner and to a specified level of sophistication (Attachment 4).

On occasion the term "regionally specific" is used in a performance indicator. Regionally specific will mean one of two things: a) geographically represented by the provincial jurisdiction, or b) specific elements of the region that must be covered (prescriptive or permissive).

Core Competency Standards

Core competency standards are one aspect in the evaluation of candidates for certification in the profession of forestry in Canada. The standards are divided into a principle statement, a list of relevant components, demonstrable competency requirements and performance indicators.

Principles are overarching descriptions of the standard. The principle statement is intended to be an enduring and permanent statement.

Relevant Components illustrate the scope of information included within the standard.

Demonstrable Competency Requirements provide conclusive evidence of the knowledge requirements of a standard. Each competency describes the depth and breadth of knowledge or proficiency required of an entrant. The ability to demonstrate that applicants have attained the competency is the connection between the acquisition of knowledge and the measurement of the admission standard. Each competency must, therefore, be demonstrated clearly and convincingly. **Performance indicators** have also been defined. They function as reference points to evaluate whether an applicant for certification has met the evidentiary tests for the competency requirement. Performance indicators are specific statements describing exactly what a candidate is able to do in a "measurable" way. The competency statements are presented in sequential order from less to more complex. Each statement builds on its predecessor, until the final statement, which is intended to capture the completeness of the standard itself.

Standard 0: [Descriptive]

Principle

The principle statement provides context for the information in the standard. It is intended to be self-evident and enduring. The relevant components, demonstrable competency requirements and performance indicators must be considered within the context of the principle statement.

Relevant Components

Relevant components of the standard are identified by the solid bullets in alphabetic order, and are indicative of the range of knowledge in which a candidate would need to demonstrate competency for the standard itself. Relevant components suggest the scope of the standard and illustrate that there is room for context within the standard. It is not expected that all the listed subject matter within the relevant components be obtained in order to satisfy the requirements of the standard. The relevant components are designed to indicate the span and capacity of the standard.

Demonstrable Competency Requirements

The demonstrable competency requirements are the essential measurement points of the standard. The competencies are therefore, numbered within the standard so that the competency and standard can be identified as one (e.g. 1-1 is Standard 1- Competency 1). A candidate for admission to the profession shall be able to demonstrate each of the competencies to an entry-level understanding. The competency statements are presented in sequential order from less to more complex. Each statement builds on its predecessor, until the final statement, which is intended to capture the completeness of the standard itself.

There are open bullets, identifying performance indicators that are sub-headings to the competency statement. **Performance Indicators** (PI) are specific statements describing what a candidate will be able to do in a "measurable" way. They function as reference points to evaluate whether a candidate for certification has met the evidentiary tests for the competency requirement.

Bloom's Taxonomy of Educational Objectives (1956) and the associated verbs for learning outcomes are utilized within the document to express the depth of learning that is expected within the competency.

Range of Evidentiary Basis for Demonstrable Competencies

It is necessary to document and accept what is meant by "demonstrable". There is a range of potential examples and, in some cases, thresholds with which to measure the performance indicator in a defensible and creditable way. The following lists a number of things that could be included as evidentiary basis, in no specific priority:

1. Practical field tests, written tests or lab tests (e.g. plant collection and explanation of the fundamental components of plants and communities.) Alternatively, testing can take place in a practice review that incorporates interviews of candidate and employer, field reconnaissance, etc.
2. Case examples and completion of a field examination of the result
3. Knowledge. Classroom description at a simple level that is tested in an examination setting.
4. Comprehension: Set a case study problem and observe solution.
4. Submission of a plan at the stand level to meet a variety of relevant objectives.
5. Course outlines.
6. Portfolios of work or educational products such as field projects.

Standard 1: Tree and Stand Dynamics

Principle

Trees and stands are an important part of the Canadian landscape. Knowledge of tree and stand establishment, growth and mortality, forms the basis of understanding how the forest ecosystem functions.

Relevant Components

- Basic understanding of growth and yield projections; the applications and limitations of growth and yield on forest management.
- Concept of silvics, life cycle, growth, genetics of trees.
- Ecological amplitude of plant species and communities.
- Factors that influence trees and stands in order to predict future conditions.
- Identify, classify and analyze trees and stands.
- Influence of tree and stand establishment (natural or artificial), density control, planting, spacing, tree improvement, vegetation control, fertilization, drainage and pruning on stand growth, quality, and ecosystem diversity.
- Influence that landforms, landscapes, and surface materials have on trees and groups of trees over time.
- Life history of regional tree species.
- Plant and tree physiology.

Demonstrable Competency Requirements

A candidate for certification shall be able to:

1. **Identify plants and describe their physiology, growth, morphology, autecology, and synecology.**
   - **a.** Identify indicator plants in a regional context.
   - **b.** Describe anatomy, morphology and physiology of plants.
   - **c.** Explain the interaction between plants and environment.
   - **d.** Describe plant communities.
   - **e.** Explain the relationships between and within plant communities.
2. **Describe current tree and stand conditions, past conditions' and processes that lead to them as well as articulate possible future conditions.**

Tree
- **a.** Measure attributes of interest (e.g. age, form, size, leaf index).
- **b.** Determine quality (e.g. health, wood quality, snag potential, visual quality)
- **c.** Explain resource potential (e.g. habitat, shade, wood fibre)
- **d.** Explain the processes that have influenced the size, health and vigour of the tree.

Stand

e. Measure and describe species composition, size distributions, age and spatial arrangement of plants.

f. Determine stand origin.

g. Recognize the range of values found in a stand.

h. Define succession and stand dynamics.

i. Describe and analyse the biotic/abiotic agents driving stand dynamics.

j. For a range of different stands, be able to describe the dynamics that have led to the current stand structure and be able to predict future stand structures.

3. Describe and apply models to articulate the present and predict future stand conditions.

a. Identify, use and explain predictive tools/models.

b. Explain the strengths and weaknesses of the tools/models.

4. Demonstrate the integration of the individual competencies within Standard 1.

a. Prepare a defensible stand management prescription[4]/intervention for a given set of management objectives.

[4] *The word prescription does not mean a specific professional document (referenced in some legislation) but refers to a broad document that describes a current condition and prescribes a course of action toward a future condition.*

Standard 2: Forest to Landscape, Structure and Function

Principle

Canada's forested ecosystems are diverse and complex systems arising out of the interaction between living and non-living components over time. Knowledge of composition, structure and function of forested ecosystems at scales ranging from aggregates of stands to landscapes is essential to describe and evaluate current conditions, predict the effects of environmental change, and practice conservation and management.

Relevant Components

- Appreciation of the forest health agents (fire, insects, disease, harvest etc.) and the effects of such agents to silviculture.
- Biological diversity, genetic diversity.
- Components and processes of ecosystems.
- Climate patterns and processes, causes and effects of climate change.
- Ecological concepts and principles.
- Habitats and living organisms related to the forested ecosystem.
- Interdependency and interaction between biotic and abiotic, forest and non-forest components of ecosystems.
- Natural disturbance processes and agents.
- Principles and applications of ecological classification.
- Role of agents of forest change in forest ecosystems.
- Resource cycles and their storage (e.g. Carbon, water, biogeochemical, etc).
- Soil properties, productivity, and applications for forest management.
- Watershed patterns, processes and classifications.

Demonstrable Competency Requirements

A candidate for certification shall be able to:

1. **Describe the components, characteristics and processes of forest ecosystems and how they interact.**
   - **a.** Describe living and non-living components.
   - **b.** Identify and describe major ecosystem conditions, cycles and processes within forests and landscapes.
   - **c.** Explain how the ecosystem conditions can be characterized across a variety of scales.
   - **d.** Discuss ecosystem dynamics and ecological sustainability.
   - **e.** Explain forest productivity and how it is determined.

2. **Describe and apply classification schemes using vegetative, climatic and edaphic characteristics.**

   a. Describe how a classification scheme is developed and applied.

   b. Be able to identify soils and vegetation to the degree necessary to be used in an ecological classification scheme.

   c. Describe and apply an ecological site classification system.

3. **Explain the influences and outcomes of agents of change on forests and landscapes.**

   a. Recognize and explain the dynamics and roles of insects and disease on forests and landscapes.

   b. Explain how integrated pest management can modify change on forests and landscapes

   c. Explain the role of fire and weather factors on forests and landscapes.

   d. Recognize the impact of changing climate on forests and landscapes.

   e. Discuss the influence of human activities on forests and landscapes.

4. **Explain and apply the concept and measures of diversity.**

   a. Describe the relationship between diversity and ecosystem structure and function.

   b. Describe the interaction between forests, fish and wildlife.

   c. Describe the various measures of diversity at different spatial scales.

5. **Demonstrate the integration of the individual elements of Standard 2.**

   a. Apply the knowledge of forest composition, structure and function to predict forest and landscape conditions under natural and human-caused disturbances.

   b. Identify and discuss the strengths and weaknesses of predictive tools/models at the landscape level and the implications of each in application.

Standard 3: Forest Management

Principle

Forest ecosystem management balances ecological, social, and economic demands with the capacity of forest resources to provide for present and future values.

Relevant Components

- Aboriginal Peoples' rights, claims and/or interests.
- Conservation biology concepts and principles.
- Criteria and indicators for sustainable resource management.
- Concepts of resource scarcity and trade-offs or offsets.
- Forest regulation and policy (provincial, national).
- Forest measurements, forest inventories, mensuration, and non-timber inventories.
- Forest operations and safety.
- Forest resource forecasting and supporting information technology/information management (quantitative and qualitative).
- Global perspective of forestry issues and challenges.
- Harvesting operations and planning.
- History and patterns of human activity in forests.
- Integrated forest management planning and relationships among natural resources and the range of forest values.
- Management (harvesting, roads, silviculture, etc) operations and planning.
- Objectives of forest owners.
- Principles of silviculture, silvicultural systems and spatial distributions of management activities.
- Pollution, erosion, forest fragmentation, forest landscape patterns.
- Public and stakeholder opinions and involvement: economic, social, ecological and other values.
- Requirement and characteristics of effective monitoring/adaptive management regimes.
- Stand, forest and landscape level perspectives.
- Sustained yield and sustainability.

Demonstrable Competency Requirements

A candidate for certification shall be able to:

1. **Describe the variety of values and competing interests in a forest.**
   - **a.** Identify and describe the range of values (timber and non-timber) in a forest.
   - **b.** Identify the interests and rights present in a forest including Aboriginal Peoples' rights, claims and interests in forests and the importance of implementing processes to determine and address them.

c. Describe the requirements of and interaction among these values

d. Describe the effect and implications of decisions aimed at a given set of objectives

e. Describe how values and competing interests are or can be weighed/balanced in decision-making

2. **Explain forest strategic and operational planning principles.**
   a. Explain why forest planning is required.

   b. Discuss basic principles of planning.

   c. Discuss planning tools.

   d. Differentiate among levels of planning.

   e. Describe the specific operational elements that should be included in a plan.

3. **Analyze and apply a range of forest cover manipulation strategies that effectively achieve a given set of objectives while minimizing negative impacts on other values from a perspective emphasizing:**

   a. Commercial extraction as the management objective; and

   b. Management objectives that are non-extractive.

4. **Explain the legal and policy framework.**
   a. Describe forest regulation/legislation /policies and procedures (nationally and regionally specific) and the importance to forest management.

5. **Discuss forest management concepts.**
   a. Explain various management approaches and situations where they might be used.

   b. Describe risk and uncertainty in forest management options.

   c. Describe the application, design and function of adaptive management.

   d. Discuss the cumulative impacts of forestry and other land use practices (e.g. oil and gas, urban development) on various forest resources.

   e. Describe the role and application of monitoring in forestry.

6. **Describe how global trends drive and influence forest management.**
   a. Identify global trends.

   b. Explain the influence of global trends on regionally specific forest management.
7. **Develop a resource planning document that incorporates current economic, environmental and social values into actions that lead to achieving the planning objectives and to future desired conditions and goals.**

a. Identify and describe resource abundance through time and space and determine the management activities required to provide for a sustainable supply of consumptive and non-consumptive goods and services.

b. Plan resource use decisions and determine the harvest of resources (including timber) within the context of larger, socially-defined goals.

c. Discuss the concept of sustainability and sustained yield and how they might be applied in a management context.

Note: Standard 3 Forest Management contains sociological information that is subject overlap with Standard 6. The overlap demonstrates the flow between the standards and the completion of capstone competencies.

Standard 4: Economics and Administration of Forestry

Principle

Canada's forest resources provide a wide variety of goods and services. Utilizing forest resources requires knowledge of the principles of allocation of limited resources among competing interests and the economic, policy and administrative forces that cause change.

Relevant Components

- Competition for resources and resource values.
- Economic tools and processes (e.g. cost/benefit).
- Economic factors affecting the forest resources.
- Forest and forest use valuation.
- Forest product value-chain and markets; non-timber values.
- Global market economy; effects of international affairs.
- Market structure and influences.
- Principles of project management.
- Production, costs, demand, supply and price of resource products.
- Production management, human resources, principles of leadership and supervision, organizational characteristics.
- Regional requirements.
- Timber/wood and non-timber/wood products/processing and their uses.
- Third party certification systems.

Demonstrable Competency Requirements

A candidate for certification shall be able to:

1. **Describe the content and importance of business and project plans.**
   - **a.** Explain the importance of business plans and project plans.
   - **b.** Identify the components of a business plan.
   - **c.** Prepare a project plan.
2. **Describe risk management relative to forest resources.**
   - **a.** Describe the limitations, including risk and uncertainty, in managing forests and forest operations.
   - **b.** Perform a sensitivity analysis for a management action or strategy.
   - **c.** Recognize the impact of natural disturbance on the availability of forest resources.

3. **Describe organizational structure and function.**

   a. Discuss social, environmental and economic effects of policies and strategies that impact forestry as developed by various organizations.

   b. Describe Aboriginal peoples' interactions with relevant organizations.

   c. Describe effects of labour relations on forestry.

   d. Explain the effects of certification programs on forestry.

   e. Describe the role of government in society as a process for establishing legislation and policy.

4. **Discuss business concepts that apply to a management plan.**

   a. Describe the business objectives that must be considered in resource management planning.

   b. Discuss the concept of balancing environmental, social, and economical considerations in resource management planning.

   c. Identify various products produced from forests and the markets they serve.

   d. Discuss concepts of best end-use and value-added products as related to forest resources.

5. **Recognize the effects of national and global trends on supply and demand, and flow of forest-based products including price and production**.

   a. Describe basic principles of macroeconomics and their application to forest resources.

   b. Discuss the effects of international policies on Canada's ability to compete.

   c. Explain Canada's evolving position in global markets.

   d. Recognize full cost analysis for multiple-use.

6. **Prepare and defend a basic operational plan for a project to achieve resource management objectives within available resources**.

   a. Plan and implement a project with emphasis on human resources, production schedules and budgeting

   b. Explain the role of performance measures (e.g. human resources, financial, timelines and production).

   c. Defend a plan of action.

Standard 5: Leadership Skills: Communication and Critical Reasoning

Principle

Professional foresters must possess critical reasoning skills to analyze and communicate complex ideas clearly and provide advice to a range of clients.

Clear and concise communication is essential for Canada's professional foresters to be able to articulate goals, objectives, information and decisions to a wide range of audiences and stakeholders.

Canada's professional foresters are required to work individually and to participate in and lead multi-disciplinary teams to address multifaceted problems.

Leadership requires the ability to effectively use communication and reasoning skills to inspire higher standards of practice and to contribute positively to society through initiative and collaborative problem solving.

Relevant Components

- Analyze problems, interpret and integrate information logically, apply judgment in making decisions.
- Business and professional and technical report writing.
- Conflict resolution, appropriate dispute resolution.
- Construct, criticize and present arguments.
- Develop a rationale, options and solutions.
- Display persistence, diligence and care in solving problems.
- Effective oral and written communication skills.
- Evaluate data in terms of relevance and sufficiency.
- Know how to debate and evaluate positions.
- Meeting facilitation, presentations, and committee participation.
- Negotiation in a variety of forms.
- Promote curiosity, creativity and innovation.
- Research techniques, scientific report writing.
- Shared ownership and collaboration.

Demonstrable Competency Requirements:

A candidate for certification shall be able to:

1. **Communicate effectively with a variety of audiences regarding forest resource issues.**
    - **a.** Demonstrate an ability to communicate resource information to a diverse range of audiences.
    - **b.** Demonstrate a range of effective listening skills.
    - **c.** Use formal reports to present data, information and opinions.
    - **d.** Prepare and deliver a presentation that incorporates concepts and terminology of natural resources.

2. **Demonstrate critical reasoning in the application of professional judgement**.

   a. Evaluate documents and computer models that pertain to complex plans.

   b. Analyse a problem or issue that includes qualitative/quantitative data collection, evaluation and analysis.

   c. Develop logical arguments and apply judgement in providing solutions in a formal written report.

   d. Construct a logical argument through group participation and discussion.

3. **Demonstrate leadership skills through collaborative decision-making, consultation and conflict resolution**.

   a. Describe how social, cultural and geographical differences apply to this topic.

   b. Facilitate collaborative decision-making.

   c. Apply conflict resolution skills.

   d. Organize a group to achieve a goal.

   e. Defend a resulting plan of action.

Standard 6: Information Acquisition and Analysis

Principle

The management of Canada's natural resources requires the acquisition and analysis of quantitative and qualitative data. Developing comprehensive measurement and sampling skills provides professional foresters with an ability to collect information and understand sources of uncertainty that affect data reliability.

Relevant Components

- Computer modeling and analysis.
- Construction and use of databases and spatial information/analytical tools.
- Field measurement tools, techniques and procedures for the suite of forest values.
- Mapping technology, drafting techniques, photogrammetry, remote sensing.
- Orienteering, field navigation.
- Principles of surveys.
- Public inclusion process.
- Sampling design, and methods.
- Social surveys, questionnaires, public opinion, media.
- Survival and safety skills.

Demonstrable Competency Requirements

A candidate for certification shall be able to:

1. **Demonstrate an ability to apply basic orienteering and surveying techniques.**
   - **a.** Read and follow a map, use aerial photographs, use a compass and global positioning technology to navigate in the forest.
   - **b.** Demonstrate an ability to measure distances and angles.
2. **Use measurement tools for collecting forest resource data.**
   - **a.** Describe the commonly used tools and procedures, appropriate application and associated accuracy.
   - **b.** Employ a variety of measurement and identification tools.
3. **Design and implement sampling strategies.**
   - **a.** Demonstrate knowledge of fundamentals of statistics.
   - **b.** Differentiate among sampling strategies.
   - **c.** Analyze data collected using simple sampling strategies.

4. **Analyze simple mathematical models.**

   a. Express the relationship between variables using mathematical models.

   b. Interpret output provided by statistical packages.

5. **Analyze and display both qualitative and quantitative data.**

   a. Describe techniques for synthesizing data.

   b. Demonstrate the use of a range of analytical techniques.

   c. Develop displays, such as maps, relational data bases, graphs, or GIS that are appropriate to a particular use.

6. **Demonstrate the integration of the competencies identified in this standard, to achieve a given set of objectives.**

   a. Design and implement a rudimentary sampling plan.

   b. Analyze and interpret the results.

   c. Assess whether objectives were achieved.

Standard 7: Professionalism and Ethics

Principle

Canada's professional forester serves the public interest and understands the role of the profession. Professional foresters have integrity, are competent, independent and accountable for their actions and decisions. They maintain professional standards and conduct based on ethical principles including life-long learning and continuing competency requirements.

Relevant Components

- Commitment to life long learning and career development.
- Contact with the professional forestry regulatory body.
- Conflict of interest.
- Knowledge of professional regulation and history.
- Moral and ethical questions in forest resource use.
- Professional character includes independence, integrity, competence, respect and accountability.
- Professional ethics, obligations and codes of conduct.
- Standards of professional practice.
- Understanding of due diligence, limits to competence, law of professional negligence, duty of care, accountability and professional liability.

Demonstrable Competency Requirements

A candidate for certification shall be able to:

1. **Describe the role of self-regulating professions in society.**
   - **a.** Identify the primary functions of professions.
   - **b.** Explain the structure and functions of the forestry profession
   - **c.** Describe the role of the forestry profession within the context of other professions.
2. **Describe a range of duties and obligations imposed on, and by, professional regulatory bodies.**
   - **a.** Identify the purpose and function of a professional regulatory body.
   - **b.** Describe the obligations expected of a professional forester.
   - **c.** Describe the reasons for discipline and complaint resolution processes.[5]
   - **d.** Describe and explain the importance of entry and quality assurance standards for professions.[6]

[5&4] For accreditation purposes it is sufficient that at the time of graduation, students from the program proponent be able to describe concepts and processes within professions generally. Provincially specific knowledge will be imparted through other avenues and examined or adjudicated by the provincial regulator at the time of or before full licensure is granted.

[6] (as above). [The content of these two footnotes is to be incorporated into the CFAB Questionnaire as part of its revision. It may be appropriate to leave them here for now as guidance but will eventually be removed.]

3. **Explain competency limitations.**

   a. Describe how to determine personal competence.

   b. Describe ones own particular areas of competence.

   c. Recognize situations when outside expertise is required.

4. **Describe the characteristics and attitudes of a professional forester.**

   a. Explain the purpose of a code of conduct.

   b. Illustrate personal accountability for decisions.

   c. Recognize the potential differences between technical, social, professional, ethical and scientifically sound practice.

   d. Recognize similarities and differences between approaches (e.g. cultural, scientific, legislative).

   e. Differentiate between service to the public, profession, employer and resource.

   f. Describe the importance of and demonstrate the application of professional documentation.

   g. Explain what is meant to work in the public's interest.

   h. Explain the variety of ethics that are applied in the profession of forestry.

Attachment 1

Participant Lists of Main Meetings

Standards Meeting
August 24, 2005 Prince Albert, Saskatchewan
Participant List

Association of British Columbia Forest Professionals – **Jerome Marburg**
College of Alberta Professional Foresters – **Doug Krystofiak**
Association of Saskatchewan Forestry Professionals – **Michael McLaughlan**
Ontario Professional Foresters Association – **Tony Jennings**
Ordre des ingénieurs forestiers du Québec – **Pierre Breton**
Association of Registered Professional Foresters of New Brunswick – **Daniel Rogers**
Registered Professional Foresters Association of Nova Scotia – **Ian Millar**
Newfoundland and Labrador Registered Professional Foresters **– Len Moores, Wayne Kelly**
Canadian Institute of Forestry – **Roxanne Comeau**
Canadian Forestry Accreditation Board- **Lorne Riley**
University of Northern British Columbia – **Paul Sanborn**
University of British Columbia **– Peter Marshall**
University of Alberta **–Alex Drummond**
University of New Brunswick – **Thom Erdle**
Lakehead University – **Nancy Luckai**
Consultant Inclusivity Project – **Mike Larock**

Performance Indicators Workshop
June 12-14, 2006 Toronto, Ontario
Participant List

Association of British Columbia Forest Professionals – **Jerome Marburg**
College of Alberta Professional Foresters – **Doug Krystofiak**
Association of Saskatchewan Forestry Professionals – **Michael McLaughlan**
Ontario Professional Foresters Association – **Tony Jennings**
Ordre des ingénieurs forestiers du Québec – **Jacques Moisan, René Doucet**
Association of Registered Professional Foresters of New Brunswick – **Anne LeBrun Ruff**
Registered Professional Foresters Association of Nova Scotia – **Ian Millar**
Newfoundland and Labrador Registered Professional Foresters **– Wayne Kelly**
Canadian Institute of Forestry – **Roxanne Comeau**
Canadian Forestry Accreditation Board- **Lorne Riley**
University of Northern British Columbia – **Paul Sanborn**
Thompson Rivers University – **John Karakatsoulis**
University of British Columbia **– Peter Marshall (**Monday-Tuesday**)**
Université Laval – **Michel Beaudoin**
University of Alberta **– Uldis Silins, Alex Drummond, Peter Blenis**
University of New Brunswick – **Charles Bourque**
Université de Moncton – **Roger Roy**
Lakehead University – **Nancy Luckai**
University of Toronto – **Tat Smith** (Tuesday-Wednesday)
University of Toronto – **Andy Kenney** (Wednesday)
Consultant Inclusivity Project – **Mike Larock**
Facilitator **- Charlotte Young**

Inclusivity Meeting – Certification Standards v. 4.2
October 5, 2006 Timmins, Ontario
Participant List

Association of British Columbia Forest Professionals – **Jerome Marburg**
College of Alberta Professional Foresters – **Doug Krystofiak**
Association of Saskatchewan Forestry Professionals – **Roman Orynik**
Ontario Professional Foresters Association – **Tony Jennings**
Ordre des ingénieurs forestiers du Québec – **Jacques Moisan, René Doucet, Pierre Mathieu**
Association of Registered Professional Foresters of New Brunswick – **Anne LeBrun Ruff**
Registered Professional Foresters Association of Nova Scotia – **Ian Millar**
Newfoundland and Labrador Registered Professional Foresters **– regrets**
Canadian Institute of Forestry – **John Pineau**
Canadian Forestry Accreditation Board- **Lorne Riley**
University of British Columbia **– Peter Marshall**
Université Laval – **M. Éric Bauce, M. Denis Brière**
University of Alberta **– Alex Drummond**
Lakehead University – **Nancy Luckai**
Université du Québec à Montréal – **Christian Messier**
Consultant Inclusivity Project – **Mike Larock**

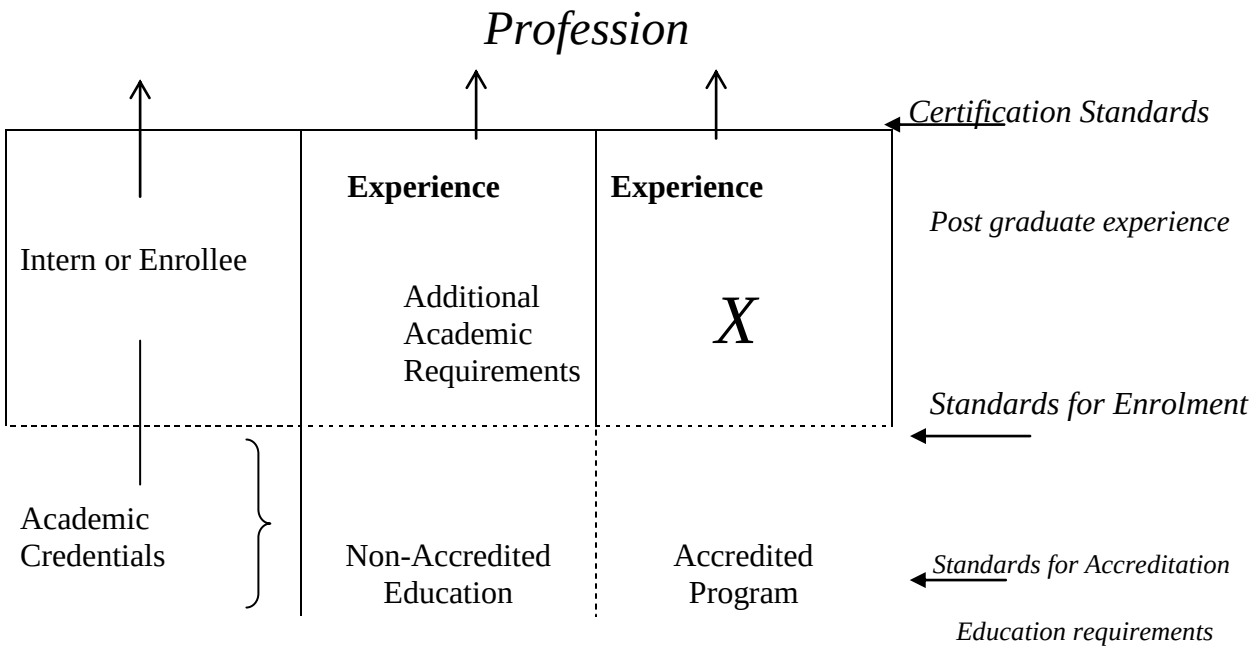
Additional workshops or meetings for specific purposes during the certification standard development were held in Vancouver BC, Edmonton Alta and Quebec City.

Attachment 2

The Role of Standards in Professional Licensure

Dr. P. Marshall provided this diagram at a CFPFA workshop in Vancouver. The diagram is meant to illustrate the relationship between the standards developed for certification, enrolment and university accreditation.

A candidate that applies to a regulatory body for entry into the forestry profession must meet a standard of enrolment. Candidates apply from accredited and non-accredited programs.



The CFPFA are currently working on the standards for entry to the profession because

a) They realize that not all required knowledge may be achieved by enrolment
b) The standards for certification must begin with each professional association mandate
c) The standards for certification can provide guidance about the respective roles and responsibilities of the various parties in Professional Licensure

Blooms Taxonomy[7] for Learning Outcomes

Bloom's levels of educational learning provide a framework to consider what applicants know and where the educational effort should be targeted in order to further promote additional, and more sophisticated, learning. The levels are summarized below:

Category	Keywords
I. Knowledge: remembering information *(The learner first must be made aware of the situation)*	Define identify label state list match *(rote memory)*
II. Comprehension: explaining the meaning of information *(The learner must then comprehend the value of situation)*	Describe paraphrase summarize estimate *(translate to your words)*
III. Application: using abstracts in concrete situations *(The learned must be able to consider what they have learned in one situation and use it in an other different situation)*	Determine chart implement prepare solve use develop *(apply general principle)*
IV. Analysis: breaking down a whole into component parts *(The learner acquires additional information about the situation, and begins to look at the different pieces of information that comprise the whole story)*	Point out differentiate distinguish discriminate compare *(break down into parts)*
V. Synthesis: putting parts together to form a new and integrated whole *(The learner then develops the skills to assemble that information in new ways, rather than simply reflecting back what they have learned)*	Create design plan organize generate write *(create a whole from parts)*
VI. Evaluation: making judgements about the merits of ideals, materials or phenomena *(The learner is able to judge the information and make decision for him/herself about its (good or bad) value based on criteria)*	Appraise critique evaluate judge weigh select *(judge according to standards)*

[7] Bloom BS, editor. 1956. Taxonomy of educational objectives: the classification of educational goals. Handbook 1: Cognitive Domain. White Plains, NY: Longman.

Attachment 4

Verbs[8] to Specify Performance Indicators

Bloom identified verbs that could be used for each of the categories of learning outcomes.

For Knowledge

arrange	order	define	recognise	duplicate
label	recall	list	repeat	memorise
name	state	relate	reproduce	

For Comprehension

classify	locate	describe	identify	discuss
report	explain	restate	express	review
translate	select	indicate		

For Application

apply	operate	choose	practice	demonstrate
schedule	dramatise	sketch	employ	solve
illustrate	use	interpret	write	

For Analysis

analyse	differentiate	appraise	discriminate	calculate
distinguish	categorise	examine	compare	experiment
contrast	question	criticise	test	

For Synthesis

arrange	formulate	assemble	manage	collect
organise	compose	plan	construct	prepare
create	propose	design	write	

For Evaluation

appraise	judge	argue	predict	assess
rate	attach	score	choose	select
compare	support	estimate	evaluate	

[8] *Jenkins A and D. Unwin. 2001. How to Write Learning Outcomes.*
http://www.ncgia.ucsb.edu/education/curricula/giscc/units/format/outcomes.html

Methodology to Determine Core Knowledge

The Project utilized a multi-phased approach to develop draft Standards, including a consultation questionnaire, an example curriculum and a series of workshops.

The questionnaire was developed using, as a base, all of the attributes of the current academic standards and recommended knowledge areas from regulatory members (as defined in the main document). The questionnaire was distributed to users and providers of professional services and to educators in each of the provinces and territories of Canada. Questionnaire results provided opinions regarding the core knowledge required for the practice of professional forestry at an entry level.

The University of Northern British Columbia (UNBC) Curriculum Committee, the UNBC External Advisory Board and several invited guests, developed a model curriculum. Using a base document "*Developing New Admission Standards for Registration of Professional Foresters*" (BOE-ABCFP 2004) the program identified courses and subjects of study for a four-year degree. The curriculum results provided an indication of how the concept of core, complementary and supplementary knowledge components might be applied to the development of a professional curriculum and the impact it might have on flexibility in program delivery.

CFPFA members considered the results of the consultation and of the model curriculum at a workshop in Toronto in June 2005. The workshop led to the core and complementary knowledge requirements assembled in draft Standards v.1.0. CFPFA members and representatives from some of the accredited university forestry programs attended a meeting in Prince Albert, August 2005 to discuss and critically review the content of the draft. Recommendations from that meeting led to the preparation of draft Standards v.2.0. A second workshop held in Toronto in June 2006, at which all CFPFA member agencies and all accredited schools of the Association of University Forestry Schools in Canada (AUFSC) (and representatives of some other, related, schools) were present, completed the performance indicators and provided complementary component recommendations that were incorporated into version 3.0 of the standards. A meeting in Quebec City (July) and a workshop in Vancouver, BC (August) provided amendments for version 4 of the standards. The meeting in Timmins, October 2006, reviewed the completion of the complementary requirements and provided additional edits for version 5.

It is expected that the professional associations will individually approve the updated Certification Standards in much their current form and will initiate a transition period leading to their use nationally for entrance into professional practice. Once approved, the CFPFA member agencies will work with the CFAB to establish verification standards for use in the national accreditation review process.

Example of a Certification Standard Bylaw

Because of the differences in regulatory formats throughout Canada, it is expected that regulatory members will adopt the certification standards in a variety of forms. This attachment is one example of the manner in which the Certification Standards can be actualized.

The full Certification Standard document (version 5.1) can serve as a common interpretive record (guideline, bulletin, etc.) but should not be perceived as the formal legal document.

The following is a first attempt where the standards might inform the content of a by-law for the OPFA. It is intended to minimize the wording in "law", while capturing all the key elements we have discussed. It is also intended to give the required flexibility of interpretation to the relevant body. The 7 core standards would be added at the end as part of this by-law.

Certification Standard

The following Standards are adopted by the *Ontario Professional Foresters Association*, according to statutory requirements, to establish the requirements for certification as an R.P.F. (Registered Professional Forester) in the Province of Ontario. To facilitate mutual recognition and thus, mobility of R.P.F.s within Canada, these standards were developed as a joint effort of all Professional Forestry regulatory bodies, through the CFPFA.

Part 1 – Education

A candidate accepted for certification will have demonstrated achievement of the Core competencies set out in Part 2 to the satisfaction of the Registration Committee.
A candidate accepted for certification will have graduated from a four-year science based degree program which adequately covers the Core competencies set out in Part 2 or be able to clearly prove equivalency to the satisfaction of the *Registration* Committee and supplements this with further depth in at least one aspect of the Core competencies. A significant part of the balance of the individual candidates study will supplement the core focus in a way demonstrably relevant to the Practice of Professional Forestry.

In the case of accredited programs, the majority of the academic time will be dedicated to exploration of subject matter required by the core competency standards. Graduates of programs for which current accreditation recommendation of the CFAB has been accepted by the Association will be considered to have met Part 1.

Candidates, with R.P.F. status in good standing in another Province will be considered to have met the requirements of Part 1.

Part 2 – Core Competencies

A candidate accepted for certification will be able to demonstrate at least the minimum level of competency: knowledge and its application, reflected in each of the following seven core competency standards set out below.

Graduates of programs for which current accreditation recommendation of the CFAB has been accepted by the Association will be considered to have met standards 1 to 6 of Part 2. While Standard 7 will have been covered in the course of study in an accredited program, the Association will assess this competency through exams and or sponsors assessments.

Candidates, with R.P.F. status in good standing in another Province will be considered to have met the requirements of Part 2.

Part 3: Work Experience

A candidate accepted for certification will have 18 months post graduate work experience within Ontario in aspects of Forestry, a sufficient portion of which will have been performing duties at a professional level, under appropriate supervision of a certified member of the Association, to satisfy two sponsoring Members adequately familiar with the work, and the Registration Committee of the competency of the Candidate.

In exceptional circumstances, the Registration Committee has the authority to accept experience obtained in another jurisdiction that is considered suitably relevant to Ontario.

Candidates, with R.P.F. status in good standing in another Province will be considered to have met the requirements of Part 3.

Part 4: Sponsorship

A candidate accepted for certification will be sponsored by two Certified Members adequately familiar with the candidate's work and character to be able to attest in a required form to, and satisfy the Registration Committee regarding, the appropriateness of membership for the candidate.

Candidates, with R.P.F. status in good standing in another Province will be considered to have met the requirements of Part 4.

Part 5: Registration Examination(s)

The Registration Committee may, at its discretion, require one or more examinations of any or all candidates.

The Inclusivity Project - Historical Background

The profession of forestry in Canada is a provincial jurisdiction that, at present, separately conveys different mandates across the country. The variation between provinces includes jurisdictions without legislation governing professional forestry to those with full professional legislation carrying rights to title and rights to practice. The CFPFA is the collective organization that includes all provincial associations of forest professionals in Canada. The mandate of the CFPFA includes advising on the content of a certification standard for entry into the profession of forestry in Canada.[9]

The history of the development of certification standards began as academic standards that described the educational requirements to be delivered by accredited university forestry programs. The original academic standards were modeled after the British Columbia Academic Standards for Professional Forestry. Developed in 1982 and amended in 1990, the academic standards described 26 subject areas. The subjects were content driven and often linked to specific courses of university study. By 1990 it was recognized that attributes of the subjects were becoming integrated and no longer linked to one course of study. The standards became increasingly difficult to apply to programs that covered one subject area over several courses of university study.

The National Forest Strategy of 1992, *Sustainable Forests: A Canadian Commitment*, articulated a concern by directing in Point 6.3 that "*post-secondary technical and professional education institutions will review and where necessary revise their programs and courses to ensure that they meet the broader needs of sustainable forest management*." As a result, the Canadian Forest Service funded a symposium for the Association of University Forestry Schools of Canada (AUFSC) May 12-14, 1994 in Quebec City to discuss among other issues, the emerging economic, social and environmental demands on the forestry profession and the role of the professional forester in society. (The AUFSC itself was founded August 19, 1973 in Quebec City, as a forum for discussion and exchange of forestry education and research)[10]. A summary of the presentations was published in the Forestry Chronicle Vol 71 #3, May/June 1995 under the title "Educating the 21st Century Forester." There was the theme that forestry curricula needed to keep pace with changes in practice.[11] This increased focus on changes to forestry education led some faculties of forestry to conduct formal reviews forestry program content.

In 1995 there was substantial discussion and concern over the education of professional foresters. In January 1995, the CFAB completed a briefing for the professional associations that called for the need of increased flexibility in core subject areas of the academic standards and consideration of be given to competencies. The University of British Columbia faculty of forestry had established a task force in the previous year to review the forestry curriculum and pursue the need for educational change. The Task Force used a questionnaire to define the knowledge and skills required by a professional forester. In 1995 the Task Force recommended program change and produced the document *Forest Management Education in Transition -Interim Report of the Task Force to Review the UBC Management Curriculum.* [12] At the same time the Association of BC Professional Foresters produced *"Defining and Measuring the Target Graduate"* a companion document

[9] CFPFA 2006.
[10] Nordin 1984.
[11] Naysmith and Crichlow 1994.
[12] UBC 2004.

to the Interim Accreditation Determination for the University of Northern British Columbia – Natural Resource Management program. In the document the ABCPF identified the need to review the academic standards and related concepts in other jurisdictions.[13]

The United States has undergone similar reviews of forestry education. The Society of American Foresters (SAF) embarked on a review of Forestry Education Accreditation in 1998. The SAF Task Force, established to review accreditation, recognized that there were significant forces shaping forestry and forestry education. Natural resource management was more challenging and complex and society was demanding much more of professional foresters. The SAF decided that it was "important to assess whether or not the current accreditation standards are resulting in professionals who are equipped to deal with this increasing complexity."[14]
The recommendations of the Task Force led to new curriculum standards and an evaluation that puts the burden of proof on the educational institution. Most professional organizations have been focusing on learning outcomes as a measure within the accrediting procedures.[15] The institution must present "meaningful evidence that student performance demonstrates that the standards (core competencies) are being met or exceeded."[16]

By 2000, the professional forestry associations in Canada, through the CFPFA, met for three days in Edmonton, to agree on baseline areas of competence and corresponding skills for each competence. The intent was to identify measurable attributes for a previously drafted skills matrix. The vision of defined competencies and measurable attributes has led to a call, by some, for National Forestry exams. The exams would "establish a clear understanding of what is required in forestry education in Canada."[17] Despite the focus on education and standards there was no sustained momentum to achieve change in Academic Standards for entry to the profession of forestry. Efforts were often softened by leadership change in the organizations and a continual process of re-discussion and rebuilding the vision was necessary. In the summer of 2003 the CFPFA agreed to increase the effort in achieving new or revised professional entrance standards. In Quebec City, Sept 2003, the CFPFA agreed on a working definition for the Inclusivity project.

The Inclusivity Project began January 2004 and identified three over arching desires, 1. A Desire to bring currency to the Academic Standards, 2. An interest in maintaining the strength and rigor of admittance to the profession, but flexible enough to allow for broadened university forestry program preferences, and 3. A desire to have diligent national consultation.

References

Association of British Columbia Forest Professionals. Defining The Target Graduate. A Companion document to the Interim Accreditiation of the UNBC Forestry program. 1998.

Canadian Federation of Professional Foresters Associations. Terms of Reference. Oct, 2006.

Naysmith, J.K. and J.J. Crichlow. Educating the 21st Century Forester. The Forestry Chronicle, Vol. 71, No. 3. May/June 1995. pp345-352.

Nordin, V.J. The Canadian Schools of Forestry Retrospect and Prospect. Lecture University of Alberta. January 19, 1984.

Society of American Foresters. SAF Task Force on Forestry Education Accreditation: A Report to the Council of the Society of American Foresters. Bethesda. MD. 2000.

Nordin, V.J. The Canadian Schools of Forestry Retrospect and Prospect. Lecture University of Alberta. January 19, 1984.

Tombaugh, L. Changing Standards for a Dynamic Profession. Journal of Forestry. Sept 2001

University of British Columbia. Forest Management Education in Transition. Interim Report of the Task Force to Review the UBC Management Curriculum. 1995.

Weetman, G.F. The Case for National Forestry Examinations. The Forestry Chronicle. Vol. 76, No 5. Sept/Oct 2000. p701.

[13] ABCFP 1998.
[14] SAF 2000.
[15] Tombaugh 2001.
[16] SAF 2000.
[17] Weetman 2000.

Foundational Studies

Art, Science and Humanities

Knowledge of arts, science (social, biological and physical) and the humanities is foundational to a university bachelor's degree and provides the necessary exposure to principles that underpin the practice of professional forestry.

A candidate for certification as an RPF or ing.f. must have had exposure at the basic/introductory undergraduate level to a variety of disciplines such as:

- Anthropology
- Art
- Biology
- Chemistry (organic, inorganic)
- Economics
- Geography
- Geology
- History
- Languages
- Literature
- Mathematics
- Philosophy
- Physics
- Political Science
- Sociology
- Statistics

Societal Context

Forests in Canada form part of the life and culture of Canadian society. Society has a right and obligation to identify what it values and how it wishes to benefit from the forest resources. Professional foresters need sufficient grounding in social sciences and humanities to discharge their duties as forest stewards mandated to act in interest of the public.

Knowledge from the arts, science and humanities are essential to understanding and contributing to the societal context within which foresters work, as described by:

- Aboriginal rights, values, interests
- Civics (legislative development, governance systems)
- Development of forest policy

- Global environments, economic structures, human population centres and industry services
- Public and stakeholder interests and methods for determining public forest resource values/interests
- Social systems and change, concepts of property, cultural resources and social forces
- Social impact analysis and planning

A candidate for certification[18] shall be able to:

1. Describe local, regional, national and international values, social forces and political systems.

2. Acquire a sufficient level of humanities and social science knowledge to support forestry core learning and professional forestry practice.

3. Describe the components, patterns and processes of biological systems, and the properties, structures and states of matter.

4. Acquire, and be able to defend and demonstrate the use of, a sufficient level of scientific knowledge to support core forestry learning and professional forestry practice.

5. Describe concepts of social and economic structures, processes, and institutions of importance across a broad range of societies.

[18] Pre-or co-requisite studies that provide foundational knowledge for the core competency standards are acquired either within the degree (in the case of accredited programs) or through other qualification (in the case of applicants from non-accredited, recognized programs). When it comes to accredited programs, the CFAB will determine whether the program itself provides sufficient exposure to the foundation knowledge. When it comes to applicants from non-accredited, recognized programs, the onus is on the candidate to demonstrate achievement of the numbered requirements as stated above.