

**THIS COPY ONLY INCLUDES THE SEVEN (7) CORE COMPETENCY STANDARDS  
FOR REFERENCE.**

***Certification Standards  
for the  
Profession of Forestry in Canada***

***Canadian Federation of Professional Foresters Associations***

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**Prepared by**

**CFPFA Members**

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.

*Ordre des Ingénieurs Forestiers du Québec have chosen not to ratify and implement the Certification Standards at this time.*

## **Essential elements for a Certification Standard**

The minimum common requirements for admission to the practice of professional forestry across Canada 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.

This document mainly describes only the Core Competency standards.

### **Core competency standards**

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.

## **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.

## **Key sections of the 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<sup>1</sup>/intervention for a given set of management objectives.

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<sup>1</sup> *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 private and public 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 where information is available.
- 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.
  - d. Describe and explain the importance of entry and quality assurance standards for professions.
- 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.