Title	**Demonstrate knowledge of nutrient management in commercial forestry**		
Level	**5**	**Credits**	**4**

Purpose	People credited with this unit standard are able to: explain plant nutrition; identify the effects of nutrient deficiencies and disorders on the management of commercial forestry; explain the impact of fertiliser applications in commercial forestry; and determine nutrient management for different sites and tree species.

Classification	Forestry > Forestry Knowledge

Available grade	Achieved

Guidance Information

1 Reference to chemical nutrients in this unit standard are by their chemical symbols as follows:

Phosphate = PO_4
Nitrogen = N
Potassium = K
Boron = B
Magnesium = Mg
Copper = Cu

2 References

Colley, M. *Forestry handbook / New Zealand Institute of Forestry Inc.* (4th ed). (2005). Christchurch: New Zealand Institute of Forestry Inc.
McLaren, J.P. *Radiata Pine Growers Manual*. (1993). FRI Bulletin 184. Rotorua, New Zealand: New Zealand Forest Research Institute.
Raven, P.H., Evert, R.F., Eichhorn, S.E. *Biology of Plants* (7th ed). (2005). New York: W.H. Freeman and Company.

3 Definition

Accepted industry practice – approved codes of practice and standardised procedures accepted by the wider forestry industry as examples of best practice.
Worksite procedures – documented procedures used by the organisation carrying out the work and applicable to the tasks being carried out. They may include but are not limited to – standard operating procedures, site safety procedures, equipment operating procedures, quality assurance procedures, housekeeping standards, procedures to comply with legislative and local body requirements.

Outcomes and performance criteria

Outcome 1

Explain plant nutrition.

Performance criteria

1.1 Elements essential to plant growth are described in accordance with the reference texts.

1.2 Sources of elements essential to plant growth are described in accordance with the reference texts.

Outcome 2

Identify the effects of nutrient deficiencies and disorders on the management of commercial forestry.

Range PO_4, N, K, B, Mg, Cu.

Performance criteria

2.1 The symptoms and effects of nutrient deficiencies are described in accordance with the reference texts and accepted industry practice.

2.2 The ongoing effect of nutrient deficiencies on the development of a tree is explained in accordance with the reference texts and accepted industry practice.

2.3 The susceptibility of major commercial forestry tree species to nutrient related deficiencies is explained in accordance with the reference texts and accepted industry practice.

Range Radiata pine, eucalyptus species.

2.4 Common disorder symptoms arising from nutrient deficiency are described in accordance with the reference texts and accepted industry practice.

2.5 Assistance in identifying nutrient deficiencies is explained in accordance with accepted industry practice.

2.6 The principles of chemical, silvicultural, and biological methods used to improve nutrient deficiencies and the physical methods used to improve nutrient uptake are explained in accordance with the reference texts and accepted industry practice.

2.7 Constraints and expected response (including time-frame) for different remedial actions are explained in accordance with the reference texts and accepted industry practice.

2.8 The effects of timing on remedial treatment are explained in accordance with the reference texts and accepted industry practice.

Outcome 3

Explain the impact of fertiliser applications in commercial forestry.

Performance criteria

3.1 The nutrient response curve in relation to fertilising forest stands is explained in accordance with the reference texts and accepted industry practice.

3.2 Explanation identifies how fertilisers can be used to correct nutrient deficiencies in accordance with the reference texts and accepted industry practice.

3.3 The impact of applying fertilisers when there are no nutrient deficiencies is explained in accordance with the reference texts and accepted industry practice.

3.4 Legislative and regulatory constraints that must be considered when using fertilisers are explained in accordance with accepted industry practice.

3.5 The active ingredients of fertilisers used in commercial forestry are explained in terms of addressing different soil nutrient deficiencies.

Range Triple super phosphate, Reactive Phosphate Rock (RPR).

3.6 Methods for correcting trace element deficiency are described in accordance with the reference texts and accepted industry practice.

Range boron, copper.

3.7 Operational considerations for fertiliser application in commercial forestry are described in accordance with accepted industry practice.

Range cost, storage, handling.

Outcome 4

Determine nutrient management for different sites and tree species.

Performance criteria

4.1 Foliage and soil samples are taken using foliage and soil sampling methodology in accordance with worksite procedures.

4.2 Nutritional deficits are determined from the analysis of foliage and soil samples in accordance with the reference texts.

4.3 Analysis determines and explains why a particular fertiliser type, and its rate and timing of application, should be used for a given site.

4.4 Application methods for the chosen fertiliser are described in accordance with the reference texts and accepted industry practice.

4.5 The cost and schedule for fertiliser application are explained in accordance with the reference texts and accepted industry practice.

4.6 A prescription that meets fertilising requirements for a forest stand is developed in accordance with the reference texts and accepted industry practice.

Planned review date	31 December 2028

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	28 January 1995	31 December 2012
Review	2	27 May 1998	31 December 2012
Review	3	27 May 2002	31 December 2014
Review	4	16 October 2009	31 December 2014
Revision	5	15 September 2011	31 December 2017
Review	6	10 December 2015	N/A
Rollover and Revision	7	28 May 2020	N/A
Rollover	8	26 April 2024	N/A

Consent and Moderation Requirements (CMR) reference	0173

This CMR can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.

Comments on this unit standard

Please contact Muka Tangata - People, Food and Fibre Workforce Development Council qualifications@mukatangata.nz if you wish to suggest changes to the content of this unit standard.