**NZQA**

**Approved**

Achievement standard: 91009 Version 3

Standard title: Demonstrate geographic understanding of the sustainable use of an environment

Level: 1

Credits: 3

Resource title: Sustainable forestry

Resource reference: Geography VP-1.3 v2

Vocational pathway: Primary Industries

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| Quality assurance status | These materials have been quality assured by NZQA. NZQA Approved number A-A-02-2015-91009-02-7245 |
| Authenticity of evidence | Assessors/educators must manage authenticity for any assessment from a public source, because learners may have access to the assessment schedule or exemplar material.Using this assessment resource without modification may mean that learners’ work is not authentic. Assessors/ educators may need to change figures, measurements or data sources or set a different context or topic to be investigated or a different text to read or perform. |

Vocational Pathway Assessment Resource

Achievement standard: 91009

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Learner instructions

# Introduction

This assessment activity requires you to demonstrate geographic understanding of the sustainable use of an environment comprising a plantation forest.

You are going to be assessed on how comprehensively you demonstrate understanding of the sustainable use of an environment. You need to show that you can process and interpret information, and prepare a presentation that includes the following information:

* why and how the selected environment is used for forestry
* the consequences of this use on people and the environment
* the extent to which continued forestry is a sustainable use for this environment.

The following instructions provide you with a way to structure your work so you can demonstrate what you have learnt and achieve success in this standard.

Assessor/educator note: It is expected that the assessor/educator will read the learner instructions and modify them if necessary to suit their learners.

# Task

The focus is on a substantial plantation forest in a New Zealand region (a substantial forest may be regarded as any forest of approximately 1000 hectares or more).

Create a presentation that demonstrates your geographic understanding of the sustainable use of this environment for forestry.

The sustainability of use means the extent to which the use can be maintained in the future to minimise environmental impacts. Sustainability can involve conserving resources, reducing pollution, and conserving biodiversity, ecosystems, and the landscape.

## Why and how

Describe why and how the selected environment is used by the forestry industry by doing the following:

* identify and describe natural and cultural features of this environment that make it well suited for forestry. Annotating a map of your selected environment will suffice
* describe forestry activities that show how people use this environment. You may use photographs to support your description.

## Consequences

Describe and fully explain the consequences on people and on the environment, of using this environment as a plantation forest, by completing the following:

* fully explain the consequences of your selected forest on people. Use supporting details, named examples, geographic terminology and concepts. Consider positive/negative/long term and short term impacts. People you could include are:
	+ forestry workers
	+ town workers
	+ local residents
	+ people passing through the area
* fully explain how your selected plantation forest impacts on the environment. Use supporting details, named examples, geographic terminology and concepts. Consider positive/negative/long term and short term impacts.

## Sustainability

Describe and fully explain the sustainability, or otherwise, of the continued use of the environment for your forest plantation. Use specific detailed evidence, geographic terminology and concepts to support your answers to the following:

* Fully explain current actions the forestry industry can take to reduce negative impacts on the environment and/or changes it can make that benefit the environment. For example, focus on the actions taken to conserve resources and reduce pollution.
* Is your selected plantation forest a sustainable use of this environment? Fully explain your decision with reference to the future use of this environment for forestry.

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Assessor/Educator guidelines

# Introduction

The following guidelines are supplied to enable assessors/educators to carry out valid and consistent assessment using this internal assessment resource.

As with all assessment resources, education providers will need to follow their own quality control processes. Assessors/educators must manage authenticity for any assessment from a public source, because learners may have access to the assessment schedule or exemplar material. Using this assessment resource without modification may mean that learners' work is not authentic. The assessor/educator may need to change figures, measurements or data sources or set a different context or topic. Assessors/educators need to consider the local context in which learning is taking place and its relevance for learners.

Assessors/educators need to be very familiar with the outcome being assessed by the achievement standard. The achievement criteria and the explanatory notes contain information, definitions, and requirements that are crucial when interpreting the standard and assessing learners against it.

# Context/setting

This activity requires learners to demonstrate comprehensive geographic understanding of the sustainable use of the selected environment for plantation forestry. The environment will ideally include the surrounding district or region rather than simply the immediate forest environment.

# Conditions

Learners could work independently or in groups to develop their geographic understanding, but they need to create their presentation independently, and will be assessed individually.

# Resource requirements

Provide access to:

* forestry insights available through FITEC (Forest Industry Training and Education Council)
* New Zealand Environmental Code of Practice for Plantation Forestry
* publications from the Ministry of Primary Industries
* any forest owner or forest operations Environmental Management or local body compliance requirement in use for a particular region or plantation forest
* the internet
* maps of the forest and surrounding area
* <http://www.mfe.govt.nz/publications/land/>.

# Additional information

Decide on the format learners will use for their presentation. It should include written descriptions and explanations supported with any combination of maps, photographs and diagrams.

A map of the selected environment could be provided to learners.

# Assessment schedule: Geography 91009 – Sustainable forestry

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| Evidence/Judgements for Achievement | Evidence/Judgements for Achievement with Merit | Evidence/Judgements for Achievement with Excellence |
| The learner demonstrates geographic understanding of the sustainable use of a forest plantation by:* describing why and how people use the selected environment for plantation forestry

For example, the learner describes:* + the geographic features of an environment and how they have influenced its selection for a plantation forest e.g. Woodhill Forest to stabilise advancing sand dunes and utilise otherwise unproductive land; Mangatu Forest to recover land at risk from deforestation, heavy rain and heavy grazing that have caused slips and river sedimentation; other ideas include low fertility of land, large amount of land available, topographic features suited or not suited to competing use (e.g. pastoralism), suitable roads and access, available workforce, support industries
	+ how forestry activities use the environment e.g. clearing of scrub and unwanted vegetation including introduced noxious weeds, planting of Pinus radiata, pruning and milling of trees, clearing of area to build access roads.
* describing the consequences of this use on both people and environment

For example:* + people: plantation forests provide a range of jobs for people in the area. People are needed to plant the trees and people who are fit can do this job. People with qualifications are needed to use the machinery and look after the trees. The forestry industry offers apprenticeships and training so it is a good career chance in areas where there are few jobs. The cafes and motels/hotels are kept busy when there are big work crews in town and sometimes they need more workers. It could be a positive place to live (e.g. forest environment) or a negative place to live (e.g. allergies from pollen)
	+ the environment: it could involve stabilisation of land and/or reduce erosion on steep land; improved water quality especially when compared to farming; flood reduction due to slowing runoff; habitat for plants, birds and animals; change to soil fertility and/or structure with increasing acidity. Soil compaction can occur from the heavy machinery.
* describing the sustainability or otherwise of the selected environment with continued use by forestry

For example, the learner describes:* + methods to minimise environmental impacts (e.g. plant a variety of trees to maintain biodiversity); leave litter on the floor to protect soils after pruning, thinning and logging operations to improve soil fertility and provide wildlife habitat; limit the use of heavy machinery to reduce soil compaction; plan the logging job and choice of equipment to minimise water run-off and loss of top soil; fence livestock out; leave dead wood in the forest to decompose and contribute to soil building; remove diseased trees
	+ plantation forest operations are carefully managed through resource consents, the Resource Management Act and environmental management plans to ensure any environmental impact or harm from road construction and earthworks, chemical use and harvesting operations is minimised in the future
	+ ongoing research into improving tree growth, health and timber quality
	+ establishing buffer zones and watershed protection areas
	+ directional felling to reduce impact on surrounding forest
	+ the use of improved technologies to reduce damage to the soil caused by log extraction.

*Forestry is a sustainable use of the environment. The trees stabilise the soil and this has stopped soil erosion. The environment is in better condition now than before the forest was planted. It has created a new ecosystem and if more native trees are also planted part of the forest could be like it was before. By planting a forest and replanting after felling this area will be sustainable. Forestry management must use methods like planning the logging and disposal of waste products safely so that the ecosystem stays healthy.**The above expected learner responses are indicative only and relate to just part of what is required.* | The learner demonstrates in-depth geographic understanding of the sustainable use of a forest plantation by:* describing why and how people use the selected environment for plantation forestry

For example, the learner describes:* + the geographic features of an environment and how they have influenced its selection for a plantation forest e.g. Woodhill Forest to stabilise advancing sand dunes and utilise otherwise unproductive land; Mangatu Forest to recover land at risk from deforestation, heavy rain and heavy grazing that have caused slips and river sedimentation; other ideas include low fertility of land, large amount of land available, topographic features suited or not suited to competing use (e.g. pastoralism), suitable roads and access, available workforce, support industries
	+ how forestry activities use the environment e.g. clearing of scrub and unwanted vegetation including introduced noxious weeds, planting of Pinus radiata, pruning and milling of trees, clearing of area to build access roads.
* explaining the consequences of this use on both people and environment

For example:* + it could involve stabilisation of land and/or reduce erosion on steep land; improved water quality especially when compared to farming; flood reduction due to slowing runoff; habitat for plants, birds and animals; change to soil fertility and/or structure with increasing acidity. Soil compaction can occur from the heavy machinery
	+ consequences for people’s health over a large region beyond the actual forest can be increased (e.g. hay fever symptoms in spring and early summer when the pines flower and release large amounts of pollen)
	+ there are a lot of jobs available in the forest. There are opportunities for people with few skills like planting out the seedlings. This requires a high level of fitness as it involves planting seedlings by hand on steep land. There are jobs in the nursery and tending the trees, but these jobs are for trained foresters. Apprenticeships in forestry are available through timberlands and these involve on the job training which can be done in a local forest. The forest industry also employs heavy machine operators for logging and processing. Local mechanic businesses often support the forest industry in this area with doing things like replacing or sharpening chainsaw blades.
* explaining the sustainability or otherwise of the selected environment with continued use by forestry

For examplethe learner explains:* + the relevant practices that the forest plantation needs to adopt to ensure it remains sustainable in order to minimise future negative impacts on the environment.

*The plantation forest has developed unproductive land into a productive forest. It is a sustainable use of this environment as it has planted trees to stop the erosion and the soil has been improved. As the forests have become established other plants have grown and more wildlife, especially native birds, has moved in. It is important that the Environmental Code of Practice is followed to monitor risks to the environment. It covers the protection of streams, soil, native species of plant and animal, historic and cultural sites etc. If the plantation forest complies with the code of practice it will clearly be a sustainable use of the environment.**The above expected learner responses are indicative only and relate to just part of what is required.* | The learner demonstrates comprehensive geographic understanding of the sustainable use of a forest plantation by:* describing why and how people use the selected environment for plantation forestry

For example, the learner describes:* + the geographic features of an environment and how they have influenced its selection for a plantation forest e.g. Woodhill Forest to stabilise advancing sand dunes and utilise otherwise unproductive land; Mangatu Forest to recover land at risk from deforestation, heavy rain and heavy grazing that have caused slips and river sedimentation; other ideas include low fertility of land, large amount of land available, topographic features suited or not suited to competing use (e.g. pastoralism), suitable roads and access, available workforce, support industries
	+ how forestry activities use the environment e.g. clearing of scrub and unwanted vegetation including introduced noxious weeds, planting of Pinus radiata, pruning and milling of trees, clearing of area to build access roads.
* fully explaining consequences of using the selected environment for a plantation forest on both people and the environment, using geographic terminology, concepts and specific evidence, showing insight

For example, the learner: * + uses relevant concepts related to the environment, such as change, interaction, processes, and sustainability to fully explain, with examples and references, the consequences and/or impacts of the forest plantation on people and the environment e.g. plantation forests require a large workforce across a wide range of skills and qualifications. The forestry industry provides a range of skilled and unskilled employment opportunities to people in the community and apprenticeships, which are sought after by school leavers in the area. Planting crews require fit people who can work in difficult conditions. They plant the seedlings of eucalyptus, larch, Douglas fir and a range of pine trees, which have been grown in the tree nurseries near the forest. The foresters have many jobs including improving tree quality, dealing with insect infestations, disease and generally maintaining a healthy forest ecosystem. Foresters are trained in understanding the interaction between the environment and the exotic forest. Skilled workers are required to operate the heavy machinery like slashers, log loaders and delimbers; which are maintained by special crews of mechanics. For mechanical and parts requirement the forest company relies on local businesses, e.g. chainsaw repairs and blade sharpening. Providers of recreation opportunities have also developed business based on the forest e.g. Equestrian, trail bike and 4WD clubs. The economic opportunities in the area are extensive when direct and indirect employment is considered which provides prosperity for the local communities
	+ fully explains that harvesting involves removal of trees and heavy machines e.g. use that may cause significant soil disturbance with possible impacts on natural drainage and named waterways
	+ uses evidence to explain those machinery options available for log extraction that can reduce environmental impact by comparison of track machines, wheeled machines and cable hauler machines.
* fully explains the sustainability, or otherwise, of the selected environment with continued use by forestry, using geographic terminology, concepts and using specific evidence showing insight

For example,the learner fully explains:* + the relevant practices required to maintain sustainability of the environment
	+ practical steps the forest plantation could adopt to meet the future requirements of the legislation to ensure continued use.

*The plantation forest is a sustainable use of this environment so long as specific conditions are met. The environment was considered unproductive and it is now a productive forest. This shows an understanding of the processes and interactions occurring in the area. Soil erosion has been halted and a new forest ecosystem has been established. The stabilised soil is a very important factor of this environment, as the land can now support both exotic and native plantings and streams in the area are not blocked with eroded soil. There is an Environmental Code of Practice which sets out best practices for forest operations. Its aim is ‘To plan, manage, and carry out commercial forest operations in a way that avoids, remedies, or mitigates adverse effects on the environment.’ Some areas it focuses on ensuring future sustainability by protecting waterways, sediment control and management of fuel, oil and wastes. As well as the Code of Practice there is a range of resource consents required and the RMA regulates much of the forestry activity ensuring protection of the environment. There is potential for environmental issues such as water pollution from the machinery and fuels used, or blockage from debris after felling. Plantation forest operations are carefully managed through resource consents, RMA and environmental management plans to ensure any environmental impact or harm from road construction and earthworks, chemical use and harvesting operations is minimised. The forest is used by a diverse range of people and they all have a stake in maintaining the quality of this environment.**The above expected learner responses are indicative only and relate to just part of what is required.* |

Final grades will be decided using professional judgement based on an examination of the evidence provided against the criteria in the Achievement Standard. Judgements should be holistic, rather than based on a checklist approach.