



## Fast Facts: Forests and their impact on water quality and quantity



Photo:  
M. Ryan

### Year 12 Agriculture

#### Outcomes

H1.1 explains the influence of the physical, biological, social, historical and economic factors on sustainable agricultural production

H2.1 describes the inputs, processes and interactions of plant production systems

#### Students learn about:

- Factors contributing to the degradation of soil and water
- Practices that have contributed to changes in water quality and availability

#### Students learn to:

- Describe farming/agricultural practices that have affected water quality and quantity including fertiliser usage, the effects of stock, effluent management, chemicals, grassed waterways, riparian zones, dam construction and irrigation methods.



## Activity 1

### FACT SHEET: FORESTS AND WATER

#### A) Changes in land use

Over the last decade there has been a significant change in land use by the agricultural industry. One of the major changes has been to use more perennial species and maintain more permanent ground cover by different grass and tree species.

These changes have been implemented as there is increasing scientific evidence that this strategy maintains soil structure, prevents/slowers erosion of topsoil, increases the use of ground and surface water and improves the quality of water in particular areas by preventing runoff of soil and chemicals.

The conversion of areas from agricultural grazing or cropping to forestry can have both positive and negative effects on water quality and quantity. Significant research is currently being conducted by many sectors to assess the effects of these changes and consequently guide the management of water so that all potential influences are addressed.

Examples of the potential effects of plantation forestry include:

- **Positively** reduce salinity issues in waterways and soil. Trees act to intercept more recharging water and prevent the water table from mobilising salts in the soil.
- **Negatively** result in less groundwater and stream flows if water is scarce as trees use more water than the pasture grass species. This can potentially impact other water uses and the environment.

#### B) Forests and Water Quality

- A forests' most significant **positive** effect on water is to minimise erosion and reduce runoff of sediment into waterways, improving its quality. They also act to moderate the peaks and troughs of rainfall.
- Some of the negative effects of sediments on waterways include;
  - can reduce the holding capacity of waterways,
  - reduce a waterways quality for consumption, and
  - alter the aquatic habitat which negatively effects plant and animal species.
- Forest cover provides an effective barrier to natural erosion, especially on



land with significant gradients.

- Timber harvesting, where it causes exposure of the soil surface, can increase the risk of erosion. The forestry industry therefore applies ‘best practice management practices’ to prevent and minimise effects on waterways. Examples of these practices include: the maintenance of undisturbed streamside filter strips, use of silt fencing, construction of appropriate road drainage and stream crossings and limits placed on road use during wet weather.
- Where log harvesting occurs, care is taken to prevent contamination by machinery chemicals.

### Activity 1

Using the supplied factsheet and the website links below, annotate the diagram of a forest, road and waterway to highlight some relevant features of forests and water quality and quantity that you have read and researched. Use one colour to outline potential positive impacts of forestry and a different colour to outline potential negative impacts. Draw a key on your diagram.

### Website Links:

1. Plantation forestry and water management guide.

[https://www.water.wa.gov.au/\\_data/assets/pdf\\_file/0004/5539/89745.pdf](https://www.water.wa.gov.au/_data/assets/pdf_file/0004/5539/89745.pdf)

*Notes:*



2. Forest Education Foundation

[http://www.forest-education.com/sites/forest-education/files/2.5\\_how\\_do\\_we\\_apply\\_scientific\\_findings-water\\_quality.pdf](http://www.forest-education.com/sites/forest-education/files/2.5_how_do_we_apply_scientific_findings-water_quality.pdf)

*Notes:*

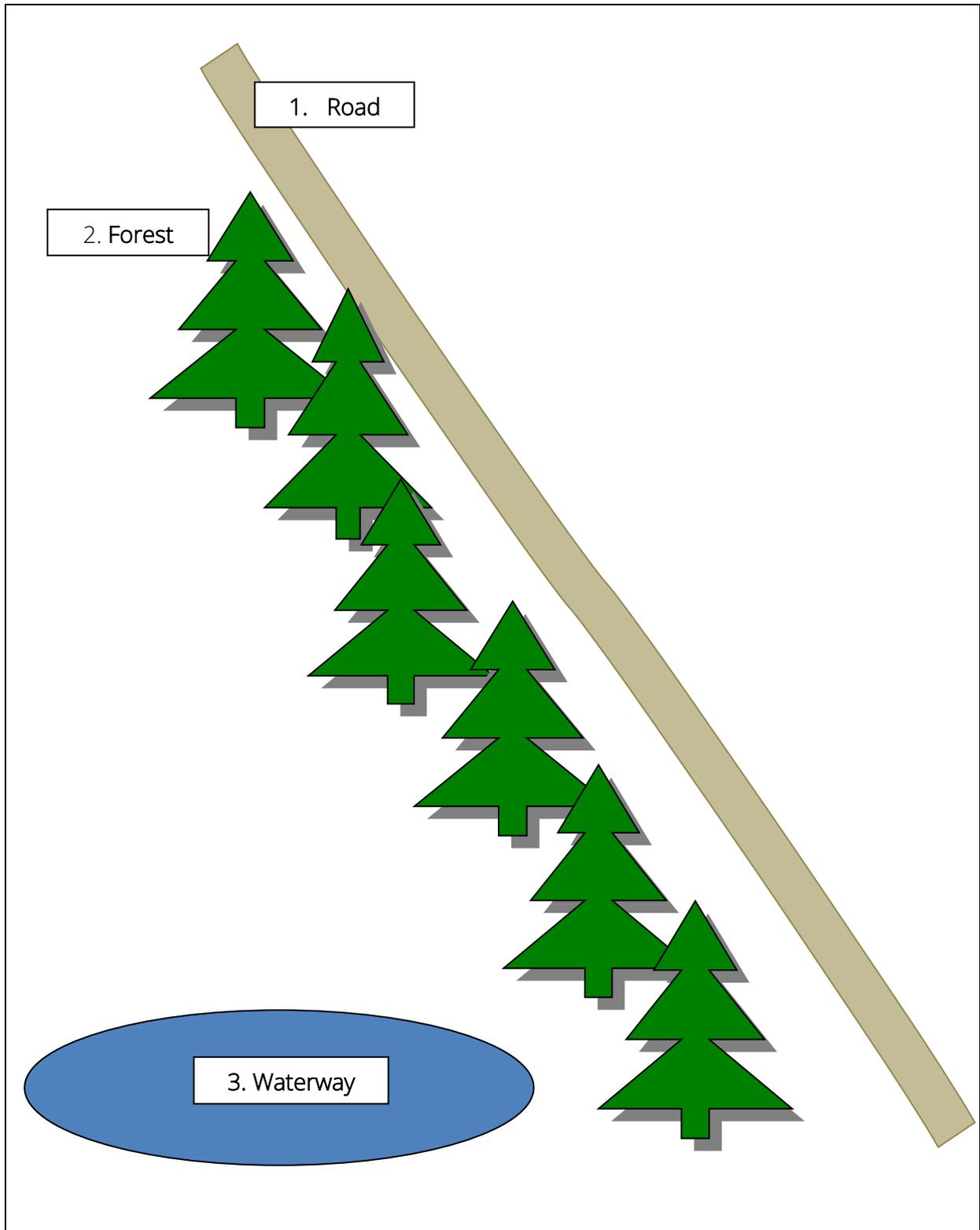
3. primefacts: Water management in native forests and plantations.

[http://www.forestrycorporation.com.au/\\_data/assets/pdf\\_file/0007/438244/Water-management-in-native-forests-and-plantations.pdf](http://www.forestrycorporation.com.au/_data/assets/pdf_file/0007/438244/Water-management-in-native-forests-and-plantations.pdf)

*Notes:*



Activity 1 - Annotated Diagram





Activity 2

Using the URL below for the Australian government’s Department of Water resource “Plantation forestry and water management guideline” (see section 5.4 - page 9), complete the table in the space provided identifying some features that cause changes to groundwater flow in forestry areas.

Select 5 features to include in your table.

**Plantation forestry and water management guideline** URL – refer to Section 5.4 Effects on available water vary (page 9 of document) - [https://www.water.wa.gov.au/\\_data/assets/pdf\\_file/0004/5539/89745.pdf](https://www.water.wa.gov.au/_data/assets/pdf_file/0004/5539/89745.pdf)

Table: Features that cause changes to groundwater flow in forestry areas.

LARGE reduction in stream flow and or groundwater	SMALL reduction in stream flow and or groundwater



### Activity 3

Throughout your study of the outcome:

“Describe farming/agricultural practices that have affected water quality and quantity including fertiliser usage, the effects of stock, effluent management, chemicals, grassed waterways, riparian zones, dam construction and irrigation methods”.  
(BOSTES, Agriculture, NSW, 2013),

you will have gained significant knowledge of the characteristics and features of some practices that impact on water in agricultural enterprises. Using this knowledge and the FACT SHEET: FORESTS AND WATER above, answer the question below, including at least three different agricultural enterprises (e.g. animal production, cropping and forestry).

### Question

- a) Discuss the effects of agricultural enterprises on water quality and quantity.
- b) Design a short management plan to promote positive water use on a cropping or animal enterprise farm.

Answer:



A large, empty rectangular box with a black border, intended for student writing or drawing.



## References

1. Plantation forestry and water management guide. Government of Western Australia, Department of Water. June 2009. Accessed on 5<sup>th</sup> June, 2017.  
[https://www.water.wa.gov.au/\\_data/assets/pdf\\_file/0004/5539/89745.pdf](https://www.water.wa.gov.au/_data/assets/pdf_file/0004/5539/89745.pdf)
2. How do we apply scientific findings, water quality? Forest Education Foundation. Accessed on 5<sup>th</sup> June, 2017.  
[http://www.forest-education.com/sites/forest-education/files/2.5 how do we apply scientific findings-water quality.pdf](http://www.forest-education.com/sites/forest-education/files/2.5%20how%20do%20we%20apply%20scientific%20findings-water%20quality.pdf)
3. primefacts: Water management in native forests and plantations. March 2010. Accessed on 7<sup>th</sup> June, 2017.  
[http://www.forestrycorporation.com.au/\\_data/assets/pdf\\_file/0007/438244/Water-management-in-native-forests-and-plantations.pdf](http://www.forestrycorporation.com.au/_data/assets/pdf_file/0007/438244/Water-management-in-native-forests-and-plantations.pdf)



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