



REGENERATING RAINFORESTS TREES MANAGE WATER TOO...

Trees and other plants form a very important part of the water cycle, having an important role in influencing how water moves through the landscape.

Transpiration.

Rainfall falling in a catchment may evaporate directly off vegetation, or it might soak a little way into the ground, be absorbed by the roots of a tree and then evaporate from inside the tree's leaves back into the air as water vapour. This process is known as 'transpiration' (see *Info Sheet 4: The Water Cycle*).

Inside the tree, the process of photosynthesis converts carbon dioxide and water into food and oxygen. The plants then "burn" the food by combining it with oxygen to release energy for its growth. This process, which is called respiration, is the reverse of photosynthesis. Oxygen is used up and carbon dioxide and water are given off. (This cycle of photosynthesis and respiration maintains the earth's natural balance of carbon dioxide and oxygen.)

Through the joint processes of photosynthesis, respiration and transpiration, the water absorbed by the tree is purified.

Infiltration.

Trees, and other deep-rooted plants, assist the process of water seeping into the soil and bedrock and joining the groundwater. They therefore reduce the amount of run-off over the surface of the ground and flooding quickly into creeks which may cause erosion (washing sediments in to the water courses).

Water that seeps slowly through natural soils into the groundwater and then into creeks and other surface waters is filtered by this process, reducing the amount of sediment and run-off from human activities contaminating the resultant water.

Healthy Ecosystems.

In this region, trees also form the basis of healthy natural ecosystems, providing

habitat for many native animals and a canopy for many other plants. As you will discover (see *Info Sheet 11: Riparian Vegetation*), trees and other vegetation on the edge of waterways are vital to the health of aquatic ecosystems and therefore to the quality of the water.

Rainforest Regeneration by Rous County Council:

Creating a Buffer Zone

Ecosystem destruction and reconstruction.

Rous County Council is actively engaged in ecosystem reconstruction within the catchment areas it manages on behalf of the community. These activities aim to improve the functioning of essential natural processes that sustain water quality. A key component of Rous County Council's 'Healthy Catchments Programme' consists of the establishment and regeneration of natural habitat in 'riparian zones' (the edges of the creeks, dams and other waterways).

The first major part of this programme at Emigrant Creek consists of the reestablishment of a rainforest buffer zone around the dam itself.

Prior to European settlement, the area where Emigrant Creek Dam is now situated was covered in lowland subtropical rainforest. It was a part of 'The Big Scrub': an area of high biodiversity and a rich hunting ground for the Widjabul people.

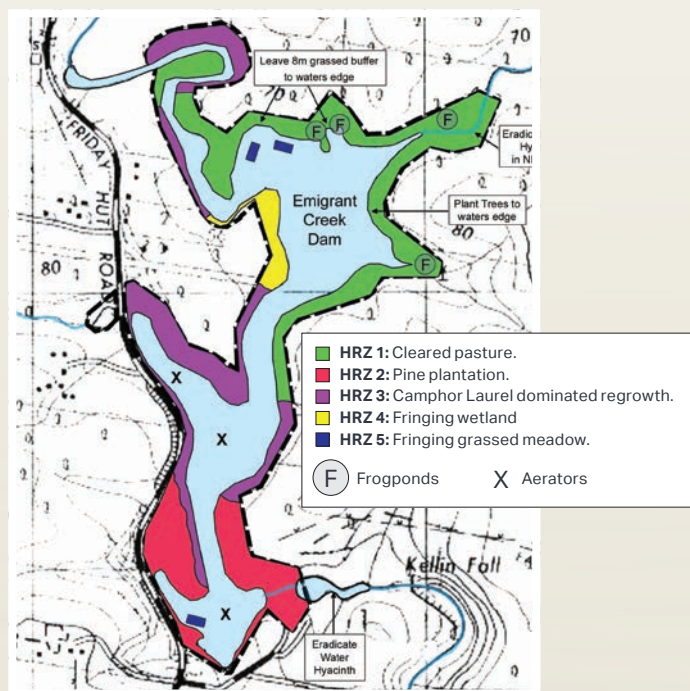
By the time that the dam was constructed in 1968, the area had been cleared and intensively used for agriculture (mainly the grazing of dairy cattle). After its construction, the dam was partly surrounded by grazed pasture, with cattle having direct access to the dam. Other areas around the dam were planted with an exotic species of tree, the Slash Pine (*Pinus elliottii*), and the native Hoop Pine (*Araucaria cunninghamii*).



Between 1968 and 2003, some of the pastured areas around the dam regrew forests dominated by Camphor Laurel (*Cinnamomum camphora*) and Broad-leaved Privet (*Ligustrum lucidum*). Pioneer rainforest tree species have colonised these areas of regrowth, including Guioa (*Guioa semiglauc*) and Sweet Pittosporum (*Pittosporum undulatum*) which are common.

Trees and other plants form a very important part of the water cycle...

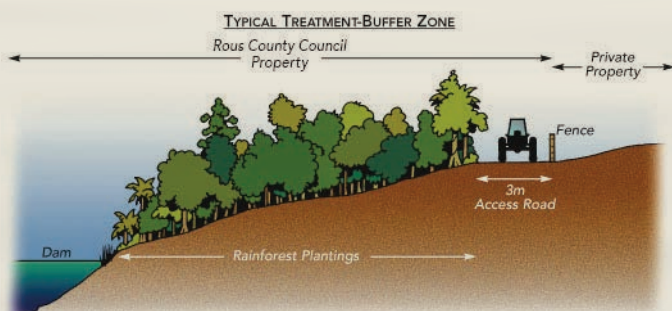
The condition of the area around the dam in 2003 is shown by the following map.



How is it being done?

Over a period of time, these areas are being replaced by a 'buffer zone' of rainforest. Cleared pastures on the edge of the dam are being replanted with indigenous rainforest. Some of the slash pine plantations were removed in 2004-05 and are being replaced by subtropical rainforest plantings. Exotic species are being removed in stages from the Camphor Laurel dominated regrowth, to promote the succession of species to subtropical rainforest.

The whole buffer zone is being fenced, with access provided to the dam to enable water testing and maintenance of the regeneration.



The first stage of replanting includes the following hardy subtropical pioneer species: Blackwood Wattle (*Acacia melanoxylon*), Duboisia (*Duboisia myoporoides*), Celerywood (*Polyscias elegans*), Pencil Cedar (*Polyscias murrayi*) and Red Ash

(*Alphitonia excelsa*). These are the same species that have been planted around the Water Walk area.

What will the buffer zone do?

This buffer zone around Emigrant Creek Dam will:

- filter runoff from surrounding agricultural land (including sediments and nutrients)
- assist bank stability
- increase the aquatic and terrestrial habitat for a range of plants and animals
- create a wind break and minimise the drift of chemical sprays into the dam
- shade the water's edge – modifying water temperature, algal growth and fish
- produce a greater variety of leaf litter & soil
- restore the original subtropical rainforest vegetation to the site.

(See Info Sheet 11: *Riparian Vegetation* for more information about how the water-side vegetation affects ecosystem health. You will also learn more about the importance of healthy catchments and their effective management in Info Sheets 14 to 16: *Catchment Management*).

[Sources: website of US Geological Survey - www.ga.usgs.gov/edu/waterdistribution.html – 14/7/03; 'Buffer Zone Improvement Programme – Emigrant Creek Dam: Review of Environmental Factors' (Oct 2002) by Rous County Council; 'Reforestation Plan – Emigrant Creek Dam' (July 2001) by Rous County Council; 'Survey and Management of Aquatic & Terrestrial Habitat at Emigrant Creek Dam' prepared by Ecos Environmental Planning, Dec 2003]

TRY THIS!

Learn with your...



"How do trees help create clean water?"



"What do you like about trees? How do you feel, knowing that many of these young saplings will grow up into very tall rainforest trees, and that one day, people will be walking on this walk underneath a shady high rainforest canopy?"



"Look around you and try to find an example of each of the species of tree listed on this fact sheet." (Hint: Look at the different leaf shapes to help identify which tree is which.)

Learning objective: To understand the special role that trees play in the water cycle; and how catchment management involves rainforest regeneration at Emigrant Creek Dam. To understand the basic outline of the 'buffer zone' project for Emigrant Creek Dam.

For further information contact:

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These information sheets were originally prepared for Rous County Council by Sustainable Futures Australia in liaison with Widdjabul elders. © Rous County Council and Sustainable Futures Australia 2007. This is an educational project for the protection of water land, and for reconciliation.

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