

EMIGRANT CREEK CATCHMENT CATCHING WATER FOR EMIGRANT CREEK DAM.....



Location & Size:

Where is the catchment?

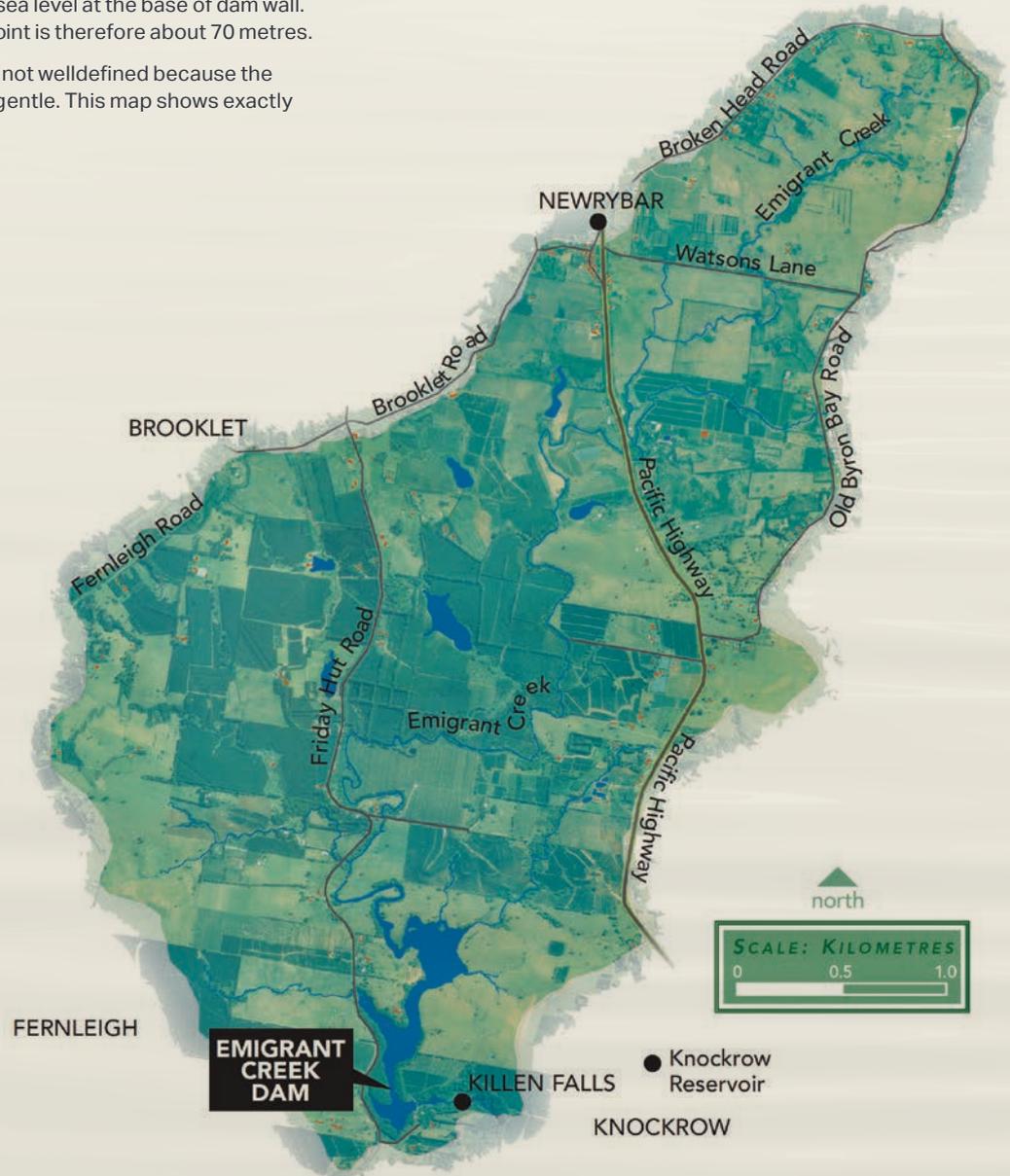
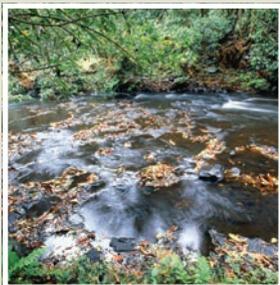
The water catchment for Emigrant Creek Dam is 1,910 hectares (about 3 kilometres by 6.5 kilometres). It stretches from the dam itself, which is located between Tintenbar and Knockrow, east of the Pacific Highway, and north past the village of Newrybar.

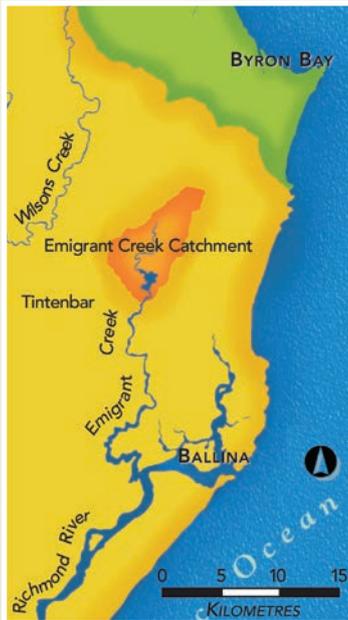
The top of the catchment, in the headwaters of Emigrant Creek at Piccadilly Hill, is 140 metres above sea level. Water flows from there down to 68 metres above sea level at the base of dam wall. The height of the valley at this point is therefore about 70 metres.

The edges of the catchment are not well defined because the slopes and ridges are relatively gentle. This map shows exactly where the edges are.

Emigrant Creek is a tributary of the lower parts of the Richmond River, which has its estuary at Ballina, 13km south east of the dam. The creek travels 40km between its headwaters and the estuary.

The creek is tidal (ie, changes level with the tide) as far upstream as Tintenbar, which is about 4.5 kilometres downstream of the dam wall.





Geology:

What's beneath the surface?

The catchment contains volcanic 'kraznozem' soils and 'basalt' rocks, mixed with older layers of sedimentary rocks (especially slate). The basalt was laid down by sequences of lava flows 20 million years ago from a huge ancient volcano, of which Mt Warning (Wollumbin) is its remaining core.

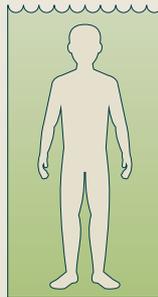
Rainwater flows across these soils as 'run-off' into the creeks. It also filters down through the soils and broken rock layers into the

groundwater that feeds the creeks and the dam. This water picks up minerals from the volcanic geology, producing water with high levels of iron and manganese.

Climate:

What's the weather like?

The catchment area has a humid subtropical climate with mild winters and hot summers. It has a high rainfall. The average rainfall each year is over 180 centimetres (which is probably taller than you!). This high rainfall means that a relatively small catchment area can catch a lot of water!



The months between January and May are the wettest. September and October are the driest. This means that more water is collected in late summer and autumn than in the rest of the year. 'Crunch time' for water collection and for the health of aquatic ecosystems is in spring (see *Info Sheet 9: Water Conservation*).

Natural Ecosystems:

The Big Scrub

The combination of volcanic geology and subtropical climate mean that the natural ecosystem that existed within the catchment at the time of European settlement was 'The Big Scrub' - a dense cover of 'lowland subtropical riparian rainforest'. As with much of the North Coast, most of the catchment was probably logged for timber between the mid 19th century and the early 20th century, before being almost completely cleared for grazing.

No substantial remnants of rainforest are left within the actual catchment. Just 400 metres downstream from the dam, however, there is an area of remnant rainforest at Killen Falls Reserve. It provides a glimpse of what the whole catchment area was probably like. Common trees included White Booyong (*Heritiera trifoliatum*), Pepperberry (*Cryptocarya obovata*), Black Bean (*Castanospermum australe*), Figs (*Ficus spp.*), Myrtle Ebony (*Diopyros pentamera*), Hairy Walnut (*Endiandra pubens*), Native Tamarind (*Diploglottis australis*), Red Cedar (*Toona ciliata*) and the Bangalow palm (*Archontophoenix cunninghamii*).

Some regrowth has occurred in the catchment since the 1970's. Secondary native rainforest species and the exotic Camphor Laurel are well represented, providing a useful nucleus for further succession and expansion of rainforest corridors throughout the catchment. The existence of the remnant rainforest ecosystem at Killen Falls Reserve is very important because it provides the genetic material to restore cleared land. It means that we are able to collect seed material from this location to ensure that the seedlings that we plant around the dam and elsewhere in the catchment are suited to the local conditions.



The Big Scrub.

The lowland region extending from Ballina to Tweed Heads, within the rim of the ancient volcano of which Mount Warning (Wollumbin) is the remaining core, is a region of global conservation significance. This is because it is one of the key refuges for Gondwanan rainforest plants and is therefore of major scientific and aesthetic value.

The Big Scrub Rainforest covered 75,000 hectares. Unfortunately, since European settlement, it has been reduced to less than 1% of its size! Only small scattered remnants remain, most less than 5 hectares in size.

Big Scrub remnants have enormous value and contain many threatened species of plants and animals. The Big Scrub region provides many opportunities to restore and rebuild the rainforests using the remnants as a solid basis.



... over a million known species of animals live in and around creek systems such as those in the Emigrant Creek catchment ...

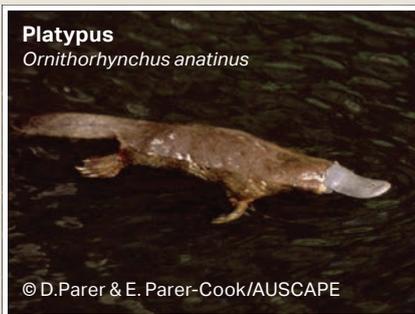


Native animals that still live in the catchment include common and hardy species of frogs: Brown-striped Grass Frog (*Limnodynastes peroni*), Common Eastern Froglet (*Crinia signifera*), Eastern Dwarf tree Frog (*Litoria fallax*), Rocket frog (*Litoria nasuta*) and Tusked Frog (*Adelotus brevis*).



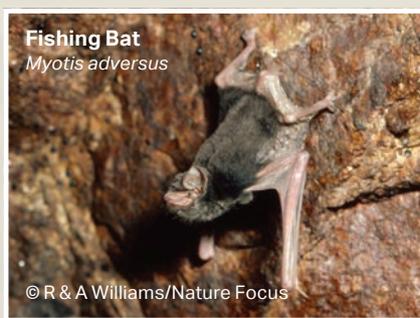
Of over a million known species of animals that live in and around creek systems such as those in the Emigrant Creek catchment, 95% are invertebrate (having no backbone such as insects, spiders, ticks, mites, prawns, lobsters and crabs), and only 5% vertebrates (such as lizards, snakes, mammals and fish). Aquatic invertebrates are an important part of the food-web in streams and play an important role in the cycling of organic matter and nutrients. Changes in the diversity and abundance of this group of animals can reflect changes in the functioning of the stream system and so they are often used to assess the ecological health of a freshwater ecosystem. Invertebrates at Emigrant Creek Dam includes a range of animals (such as the dragonfly nymph) that play an important part in the natural processes that sustain water quality.

Birds inhabiting the catchment are mostly common and adaptable species that usually inhabit disturbed areas in the region, including the Pacific Black Duck (*Anas superciliosa*). More uncommon species include the White-Breasted Sea Eagle and the threatened species Comb-crested Jacana (*Irediparra gallinacea*) which inhabits floating vegetation on the dam.



Mammals include the Platypus (*Ornithorhynchus anatinus*), bandicoot (*Isodon macrourus*), ringtail and brushtail possums (*Trichosurus caninus* and *Pseudocheirus laniginosus*), and several species of bat (many of which are threatened).

One threatened species of bat, the Large Footed Myotis or 'Fishing Bat' (*Myotis adversus*) is particularly interesting. It feeds on small fish by flying about 9cm above the water, sometimes catching its prey with the recurved claws of its large feet or by using its tail membrane as a scoop.

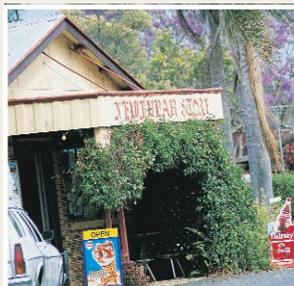


To ensure the survival of these animals, we need to make an effort to protect them and their habitat. Restoration of riparian rainforest habitats, and linking these with other native forest patches, will significantly improve existing native species' health and numbers, encourage the return of other native species and discourage introduced species.

Animals are an important part of healthy functioning ecosystems, and natural ecosystems assist in the production of good water quality drinking water (see *Info Sheet 6: Regenerating Rainforests* and *Info Sheet 11: Riparian Vegetation*). In this way, their survival is also important for our own survival.



Cattle grazing



Urban development



Roads



Horticulture

Land-use

There are 150 separate land titles in the catchment. This means that many people are responsible for its land management.

In addition to providing our water supply, the catchment is used for many things.

- **Horticulture** (including macadamias, coffee, bananas and stonefruit)
- **Grazing pasture** (for beef and dairy cattle)
- **Plant nurseries and fish farms**
- **Rural residential development** and Newrybar village
- **Tourism** (including the Macadamia Castle and animal park)
- **Roads** (including Friday Hut Road and the Pacific Highway).

Each of these types of land-use affects the health of the ecosystems in the catchment and the water quality in the creeks and dam (see *Info Sheet 8: Water Treatment*). It is very important to manage the different land-uses within the catchments because healthy catchments mean healthy ecosystems and a healthy water supply (see *Info Sheet 16: Management of Emigrant Creek Catchment*).



Tourism



Macadamia farming

TRY THIS!

Learn with your...



"Think about the different uses of land that you drove past on your way to Emigrant Creek Dam today. List the different things you saw and what you think rainwater could 'pick up' from them and 'carry' into the dam."



"How would you most like the catchment of Emigrant Creek Dam to be? What would it look like? Who and what would live and grow there? Describe how would you feel if it could be that way?"



"If you live in this area, check on the aerial photo whether you live inside or outside of the Emigrant Creek Dam catchment. Now refer to the map on Info Sheet 14. Do you live in any of the other water supply catchments on this map (Rocky Creek Dam or the proposed Dunoon Dam)? Do you live in the Richmond River catchment? If you don't live in any of these catchments, but still live on this map, where does the rainwater flow that falls in your backyard?"

"If you don't live in this region, try to imagine the way the land slopes around your area. Do you know where rainwater flows that falls in your backyard?"

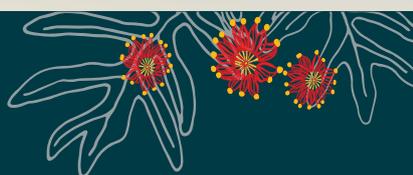
Learning objective: *To understand the nature and land-uses of Emigrant creek catchment; the effects of these characteristics on ecosystem health in the catchment and water quality in Emigrant Creek Dam; the link between ecosystem health and water quality within this catchment as a case study.*

(Sources: 'Emigrant Creek Dam – Dam Strengthening Works, Review of Environmental Factors' prepared by The Environment Works (2000) for NSW DPWS on behalf of Rous County Council; 'Survey & Management of Aquatic & terrestrial Habitat at Emigrant Creek Dam' prepared by Ecos Environmental Planning (2003) for Rous County Council; website of Big Scrub Rainforest Landcare Group – www.bigscrubrainforest.org.au; 'Stream biomonitoring using aquatic macroinvertebrates in small catchments: A Case Study in Emigrant Creek, NE NSW' by R Harlow (2003).)

For further information contact:

Rous County Council

02 6623 3800 www.rous.nsw.gov.au



These information sheets were originally prepared for Rous County Council by Sustainable Futures Australia in liaison with Widjabul 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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