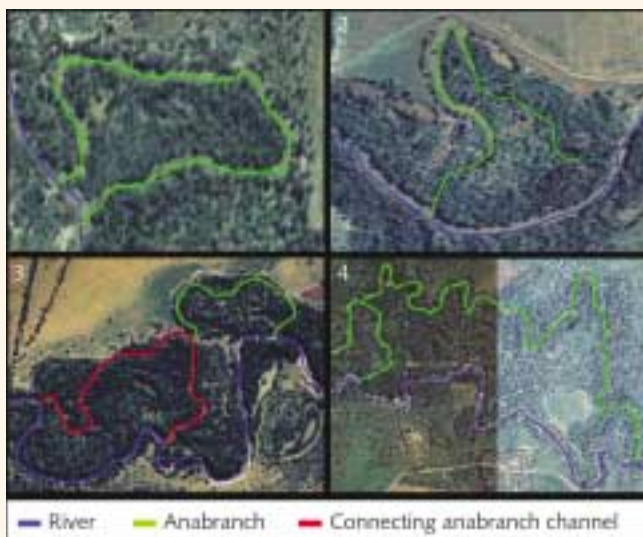


Anabranh channels of the Macintyre River

Anabranh channels are channels that branch off the parent river and rejoin it some distance downstream. Often called 'flood runners', or 'breakouts', they are common features of the floodplains of Australian inland rivers, including the Macintyre River near the NSW/Queensland border.

Four types of anabranh channels have been identified, based on shape, origin and flow characteristics. They are shown in the photos below.



Anabranh types. 1. Single entry **and** exit into the river; 2. Single entry **or** exit into the river; 3. Single entry into the river and exit into another anabranh of distinctly different channel dimensions; 4. Multiple entry or exit into the river.

Sixty-nine anabranh channels are associated with the reach of the Macintyre River between Goondiwindi and Boomi. They have a combined length of 236 km, which is 62% of the total channel length along the reach (including the main river channel). Individual anabranh channels range in length from 0.3 to 112.5 km, and occupy areas of between 1 ha and 279 ha. Individual anabranh channels are therefore smaller in size than the main river channel, which occupies 658 ha within the reach, but combined they occupy 585 ha and are an important floodplain feature.

Flow in anabranh channels

Anabranh channels on the Macintyre are generally dry because the water level in the river is generally too low to reach their openings.

The range of flows needed in the Macintyre River before the water is high enough to flow into anabranh channels is from 74 to 57,401 megalitres (ML) per day (at Goondiwindi gauge) for the Goondiwindi–Boomi reach.

Anabranh channels become inundated in steps. Small increases in flow initiate the flooding of groups of anabranh channels. Computer analysis (using the program 'SPELL') over a 98-year period shows that anabranh channels that flow when the Macintyre has little discharge (less than 7000 ML per day) experienced the greatest number of wetting events (394), lasting around 6.5 days for natural flows. By comparison, channels that only flow at higher river discharge (more than 40,000 ML per day) experienced around 64 wetting events (over the 98 years modelled) with a median duration of 2.8 days each.



Anabranh 'exit point', downstream, back into the Macintyre River



Anabranh 'entry point' off the Macintyre River

Macintyre River

Anabranche channels of the Macintyre River

Although the river flows from upstream to downstream, flow in the anabranches can occur in either direction, depending which end of the anabranch is nearer to river-level.

Anabranches as sources of resources

When dry, anabranches are similar to the rest of the dry floodplain, with plants, insects, animals, dung, tree litter, and organic matter on and in the ground, undergoing normal cycles of renewal and breakdown. Wetting, whether by rain or floods, mobilises energy (as organic carbon such as sugars) and nutrients released by the breakdown processes. They become available for use by living plants, insects and animals, though some elements are lost to the air, as carbon dioxide or nitrogen for example.

When flooded, anabranches are part of the main river, and the waters flowing through them potentially carry fish and other forms of river life, as well as fresh and partly decayed organic matter and sediments. Flooding could be expected to release the energy and nutrients from anabranch sediments and organic matter, making them accessible as a source of food for river life, and possibly stimulating river productivity in both short and long term.

Therefore, by controlling river-level and anabranch flooding, water resources managers in the region may have the capacity to stimulate productivity in the Macintyre River.

To learn more about the role of flooded anabranches as sources of energy and nutrients, and their effects on river productivity, a study is in progress measuring the sediments and organic carbon characteristics of Macintyre River anabranches.

The study aims to answer these questions:

- How large are the stores of energy (organic carbon) in the anabranch channels of the Macintyre River, in relation to those available in the main river channel and the surrounding floodplain?
- What happens to the energy resources in the anabranches and the main river when anabranch channels are flooded?
- What are the costs and benefits of anabranches being left dry?

This sheet reports studies by postgraduate students Mark Southwell (Honours, supervised by Assoc. Prof. Martin Thoms) and Heather McGinness (PhD in progress, supervised by Assoc. Prof. Martin Thoms and Dr Fran Sheldon).



Photo Heather McGinness



Photo Heather McGinness

Two sources of organic carbon: algae and leaf litter

Further information

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Photo Heather McGinness



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