sunwater

Paradise Dam

Fact Sheet: palaeoflood study for the Burnett catchment at Paradise Dam—accessing local Indigenous knowledge and science to improve our understanding of the Burnett catchment.

July 2020

Sunwater is conducting a study to better understand Burnett River flood history and to gather information that will assist in planning the long-term remediation of Paradise Dam. This leaflet shares information about the study for landholders whose properties we seek to access for soil samples and for indigenous communities whose knowledge we seek.

Study purpose

Understanding the flood history of the Burnett is critical to designing and planning dam infrastructure within the catchment and how to manage it during an emergency event. Both science and local Indigenous knowledge are key to our understanding of the catchment flood behaviour over time.

What is a palaeoflood study?

A palaeoflood study looks for evidence of flood events that occurred before written records were kept (pre-record) using information about deposited flood sediments. Sediment is typically transported during large flood events and deposited in areas where water velocities are lower (e.g. backwater locations up gullies and in sheltered areas). Over time, multiple flood sediment deposits are overlayed within the soil profile. An example of this is shown in Figure 1 over page.

These preserved sediments and their locations (both in relation to the river and vertically in the depth underground) provide useful information about how large pre-record extreme floods were in catchment and when they occurred.

Palaeoflood studies have been undertaken in many locations around Australia and internationally to aid in catchment management and infrastructure projects.

Phone: 3120 0270
Email: paradise.dam@sunwater.com.au
Visit: sunwater.com.au/projects

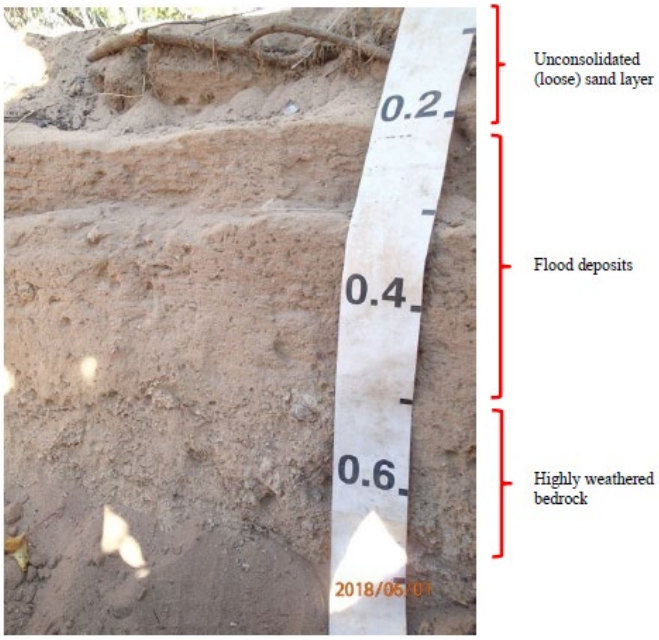

Figure 1: An example of the soil strata used to identify previous flood events

How is a palaeoflood study completed?

Several locations are selected by interrogating satellite imagery, survey data, numerical modelling and a preliminary site visit for suitability. In selected sites, and with landholder permission, a small trench is excavated (approximately 1m deep, 1m wide and 1m long) using hand tools only (shovel and crowbar). Each site takes approximately half a day to excavate. Soil samples are taken from the suitable flood deposits for analysis to determine when flood events were likely to have occurred.

The site is reinstated (excavation refilled) after the samples have been taken. An example of a previous site excavation is shown in Figure 2.

Figure 2 Typical excavation at a palaeoflood site

What are the benefits of a palaeoflood study?

Stream records in the Burnett catchment are some of the longest in Australia, but only provide an insight into a small window of time (approximately 107 years at Mount Lawless, which is the longest timeframe).

Typically, large dam infrastructure is required to be designed to safely withstand forces from a flood event that may only occur once every few thousand years. Extrapolating likely flood scenarios from streamflow records that only have data for just over 100 years means that there is significant uncertainty.

A palaeoflood study provides several benefits for planning the long-term remediation of Paradise Dam, and also for downstream communities through:

- an increased understanding of flood risk in the Burnett catchment, and
- increased confidence in flood estimates within the Burnett catchment.

Figure 3 highlights the value of a palaeoflood study on the flood analysis for a catchment. While it may only look like a minor change, this can have huge implications in the overall understanding of flooding within the catchment and can greatly boost the confidence we have in engineering investments and evacuation planning.

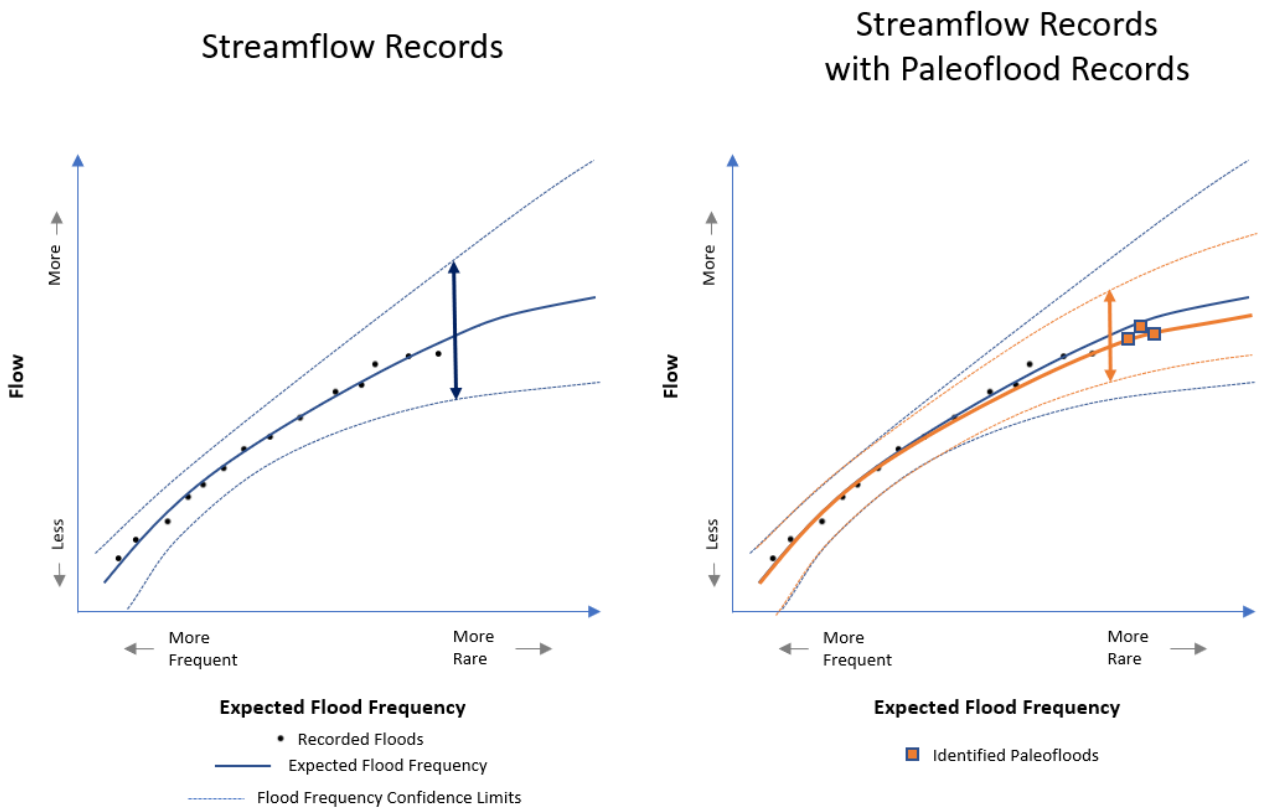

Figure 3 - How palaeoflood information assists in flood estimation

Seeking local indigenous knowledge

The original inhabitants of the region have an understanding of the Burnett catchment that extends back in time for tens of thousands of years. Gaining an insight into this history of flooding within the Burnett catchment will provide another piece of information into the expected flood frequencies of the Burnett. Any information of past flood heights anywhere in the Burnett catchment can be used to improve our flood knowledge.

Stories of past floods can be used in the flood analysis and provide the better understanding of flood risk and increase confidence in flood estimates that impact local communities. Figure 4 shows how local indigenous knowledge can refine the confidence we have in expected flood frequencies over very long timeframes.

Sunwater would like to meet with anyone who has local indigenous knowledge of the Burnett catchment and would like to participate in the study. The inclusion of data from the palaeoflood study and local Indigenous flood knowledge will lead to a more robust understanding of flooding within the Burnett and make it one of the best understood catchments in Australia.

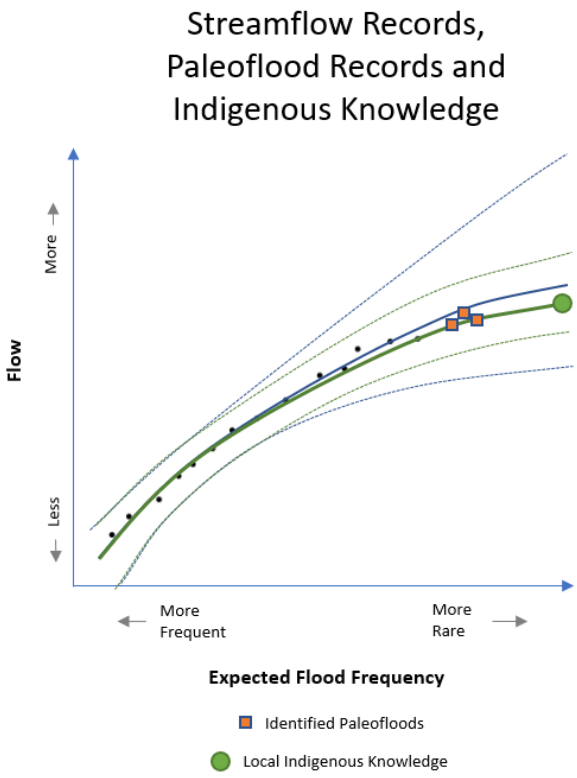

Figure 4 - incorporation of local indigenous knowledge in expected flood frequency estimates

Study timeframes and findings

This study is anticipated to be completed by late 2020/early 2021. Sunwater will share the findings of this study, and how it influences our long-term remediation plans for Paradise Dam, with study participants and the broader community.

Study implications for Paradise Dam

Essential Works to lower the Paradise Dam spillway by 5.8 metres are underway as a short-term risk reduction measure whilst the long-term remediation of the dam is planned. The spillway lowering is scheduled to be completed by the end of 2020.

Further significant strengthening and improvement works are anticipated to be part of the long-term dam remediation, pending options assessment and scoping from the Detailed Business Case led by Building Queensland.

Sunwater will ensure that the scope of further works at Paradise Dam takes into account the findings of the Burnett catchment palaeoflood study. The outcomes from this palaeoflood study will be incorporated into the design flood estimates for Paradise Dam. While the exact outcomes of the palaeoflood study won't be known until after the study has been completed, we do know that the study will improve our confidence in flood estimates for the dam, particularly around extreme flood events.