

Australasian Hydrographer

May 2026



AUSTRALIAN
HYDROGRAPHERS
ASSOCIATION

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Australian Hydrographers Association

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Acknowledgement of Country

The AHA acknowledges the Australian Aboriginal and Torres Strait Islander peoples of this nation. We acknowledge the traditional custodians of the lands on which our association is located and where we conduct our business. We pay our respects to ancestors and Elders past, present and emerging. The AHA is committed to honouring Australian Aboriginal and Torres Strait Islander peoples' unique cultural and spiritual relationships to the land, waters and seas and their rich contribution to society.

Contents

From the Editor-In-Chief	3
From the President	5
Passing on the Torch	8
Practical Monitoring. Real Data. Real Conditions. AHA Technical Workshop 2026, Bringing Hydrography into the Field	10
Automated Pumping of Constructed Canal Based on Water Quality – Pelican Waters, Sunshine Coast	12
A 'New' Data Trove; Treasure or Trash	14
Just a Fill-In Job	31



From the Editor-In-Chief Zac Ward



Much to my amazement we're now approaching the middle of 2026 which brings with it an exit from some northern wet-seasons and delivers us to the equally exciting winter/wet months for the expansive central & southern parts of Australia. Time to finalise review of those Rating Tables, prep gauging equipment and ensure those technical skill-sets are all up to date for Hydrographers.

It is with this nicely timed segue that I would like to welcome Matthew Pilkington into the role of Training Manager at the AHA (more on that below). Additionally, as we say farewell to the previous Training Manager John Skinner, I'd like to personally express my thanks and gratitude for all John has done for the AHA, industry and hydrographic training in general. No doubt we will cross paths (or rivers) again John. All the best with your future endeavours and well-deserved R&R

We have a mixed bag of submissions in this months Australasian Hydrographer with a few new contributors who I would like to sincerely thank for their time, effort and articles. Ray Boyton has done an amazing deep-dive into historical river records which is both thought-provoking and something we're all no doubt very passionate about as Hydrographers and self-confessed data nerds (at least in my case). Additionally, there is a more informal piece from Alex Springall who many Hydrographers may be familiar with or have had dealings with in the past. A great look into the origin story of a Hydrographer and one some people may be able to relate too. Fun fact, Alex was the first editor of the AHA Journal and also had the pleasure (or displeasure) of marking many of my personal Hydrography assignments back when I was obtaining my qualifications through OTEN TAFE prior to the AHA having their current Diploma of Water Industry Operations (Hydrometric Monitoring). A blast from the past and no doubt one which you may hear from going forward. Thanks again guys.

Keep those articles and submissions coming and as a side note, the CPD Tracker on the AHA Website is now live, <https://www.aha.net.au/membership/certification>. Please be sure to check it out

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Cheers,

Zac



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From the President Arran Corbett



As we move into Winter, Australia's hydrological picture continues to remind us just how variable – and at times contradictory – this continent can be. Across the country we are seeing sharp contrasts in conditions, with some regions still grappling with intense drought while others continue to deal with flooding, saturated catchments and ongoing recovery efforts.

The Bureau of Meteorology (BoM) continues to flag the increasing likelihood of an El Niño pattern emerging later this year, although the signals remain mixed and far from straightforward. Historically, El Niño has brought drier conditions to large parts of Eastern and Southern Australia, however the BoM continues to remind us that ENSO is only one part of a highly complex climate system. Indian Ocean influences, local sea surface temperatures and longer-term climatic trends are all interacting in ways that make seasonal forecasting increasingly challenging.

At the time of writing, large parts of South-East Queensland, New South Wales, Victoria and South Australia are forecast to experience below average rainfall through Winter, while some Northern and inland catchments remain highly responsive after recent flood events and elevated soil moisture conditions. As Hydrographers and water professionals, we continue to sit at the frontline of observing and understanding these shifts. Whether it is flood response, drought monitoring, environmental flow management or long-term trend analysis, the importance of accurate field data and skilled practitioners has never been greater.

On behalf of the Association, I would also like to acknowledge and sincerely thank our Treasurer, Wally Varela, who will soon be stepping away from the Hydrography sector to take up a senior leadership role with a major pump manufacturer. Wally has played a critical role in strengthening the Association's financial position over recent years and has consistently provided steady, thoughtful guidance to the committee. Importantly, he has also agreed to support a structured transition process to ensure continuity moving forward. We thank Wally for his dedication, professionalism and service to the AHA, and we wish him every success in the next chapter of his career.

A reminder also that our next AHA Technical Workshop and Field Regatta are fast approaching. This year's event will be held in the Victor Harbor and Coorong region of South Australia and promises to once again deliver the highly practical, hands-on learning environment that these workshops are known for. Across the program there will be technical sessions, live demonstrations and the always-popular controlled-flow gauging regatta at Salt Creek.

These events are one of the great strengths of our Association. They provide an opportunity for experienced Hydrographers, early-career professionals, suppliers and students alike to come together, share knowledge, test equipment and continue building the strong professional network that underpins our industry. If you have not yet registered, I strongly encourage you to do so and support what is shaping up to be an excellent event.

Finally, I would like to thank all members who continue to contribute their time, expertise and energy to the Association and to the broader water monitoring community. The work undertaken by Hydrographers across Australia often occurs in difficult environments and under challenging conditions, yet it remains fundamental to sound water management and informed decision-making across the country.

Stay safe in the field and I look forward to catching up with many of you in South Australia later this year.

Best regards,

Arran Corbett

President, Australian Hydrographers Association



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Passing on the Torch

Matthew Pilkington – Training Manager (AHA)

AHA Training has been servicing the Australian hydrological community with nationally accredited training for decades. Over these years, technology has changed, improvements made to our monitoring landscape along with new and innovative approaches to hydrography. Keen learners have become masters of the hydrographic craft, with deep knowledge of monitoring systems, techniques and the theory that allows us to maximize our hydrological understanding of this beautiful nation.

Australian Hydrographers work in hot, cold, tropical, arid, wet and dry seasons, and even snow; and little does the rest of Australia realise, that Hydrographers around the country toil determinedly to quantify and manage our water resources. AHA Training has been facilitating the continued learning and development of Hydrographers from East to West and North to South, and the man behind AHA Training for the last 10 years, John Skinner, has overseen students starting their hydrographic careers. Developing them into qualified professionals through nationally recognised training and assessing programs. John has worked resolutely to bring students, trainers and organisations together to engage, train, assess and continuously improve hydrological monitoring here in Australia.

John has been nothing but generous and supportive of me (Matthew), for five years now, from when I started my Diploma of Hydrometric Monitoring, through to my first training delivery. John has passed on both knowledge, skill and a keen understanding of/and commitment to our students, and their respective learning outcomes. It has been an honour to work with John, and incredibly humbling that he has shown the support for me, passing on the torch of the Training Manager role at AHA Training. It is a heartfelt goodbye we must say to John in May 2026; however we are sure he'll enjoy the time with his family, travelling around the country and of course, loving more time with a fishing rod in hand.

AHA Training will continue to deliver competency-based training and assessments to Australians across the nation, from cadets and trainees, through to seasoned veterans who may be looking to obtain the formal qualification. We'll continue to offer our training products via mixed learning environments, combining both field and virtual classrooms to suit all learners and skill levels.

This week marked my first week as Training Manager, and what a week to kick things off. We have been busy training students in Southeast Queensland in the practical components of gauging. I'd firstly like to acknowledge the agencies and organisations that have made this possible, which include Department of Local Government, Water and Volunteers (DLGWV), Sunwater, Seqwater and Xylem. I would also like to thank our participants from GEO PSI, Blomfield Environmental and Hydro Tasmania. The 3 days we were able to spend together allowed us to run both theory and field exercises, using various methods and technologies to capture vital flow data. The participants showed great enthusiasm and determination in adverse conditions (with rain occurring on both field days), coming out of the course with a sound understanding of how to gauge via wading methodologies.

If you, or your organisation is interested in accredited training in either the Hydrometric Monitoring Basics Skill Set, the Diploma of Water Industry Operations (Hydrometric Monitoring), or simply interested in a particular unit of competency, please email training@aha.net.au or call Matthew Pilkington on 0405 052 622.



Practical Monitoring. Real Data. Real Conditions. AHA Technical Workshop 2026, Bringing Hydrography into the Field

The next Australian Hydrographers Association Technical Workshop is shaping up to be one of the Association's most practical and hands-on events yet, bringing Hydrographers, water monitoring professionals and industry partners together in Victor Harbor and the Coorong region, South Australia, from 14–17th September 2026.

Designed as a 'field-focused technical workshop' rather than a traditional conference, the program combines operational discussions, technical training and live demonstrations with a full-day field regatta at Salt Creek. Delegates will work alongside peers and vendors to compare methodologies, trial equipment and review real-world data collected under controlled flow conditions.

The draft program includes sessions on Rating Table development and databases, data collection methodologies, water quality monitoring, ALERT2 network transition discussions, hydrographic survey training, and technology showcases from industry partners. A number of leading vendors are already confirmed to participate, with additional technical demonstrations and "show and tell" sessions planned throughout the workshop.

A major highlight will again be the Salt Creek gauging regatta, where attendees will observe and compare multiple monitoring approaches across changing flow regimes, followed by collaborative data collation and review sessions chaired by experienced practitioners.

The workshop will be held at the Victor Harbor Convention Centre at McCracken Country Club, with field activities extending across the Coorong region and barrages. An informal networking evening and workshop dinner will provide additional opportunities to reconnect with colleagues from across the sector.

Places will be limited to maintain the practical workshop format, and strong interest is already building across agencies, consultants, vendors and regional operators.

Registrations are now open via the AHA website. Secure your place early, workshop numbers are limited to maintain the practical field-based format.



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Environment



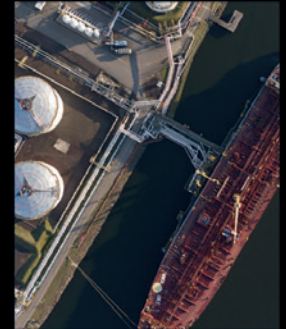
Wastewater



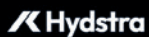
Meteorology

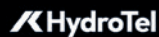


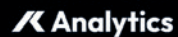
Water Quality

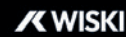


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Automated Pumping of Constructed Canal Based on Water Quality – Pelican Waters, Sunshine Coast

Josh Soutar – General Manager Analytics ANZ (Xylem)

Over the years, Australian's desire to live on or near water has seen thousands of constructed water bodies built as part of exclusive housing developments. In the past, developers simply excavated the land, built up the blocks, flooded the canal and move on to the next project.

This effective but primitive approach lacked appropriate hydraulic modelling to protect the water body and maintain its health and safety over time. With changing seasons, siltation and nutrients from storm run-off along with an overall lack of flow, these water bodies tend to become prone to toxic algae outbreaks, fish kills and offensive odour, among other things.

Local government frequently inherit such sites, and in many cases the excessive and permanent costs of their effective management

Project

A coastal council located in Queensland, Australia, manages several existing constructed water bodies and sustains their health by pumping 'fresh' seawater from the main tidal broad water with Xylem manufactured Flygt pumps. The newly pumped water provides much needed movement and transfer in the otherwise static canal.

This method, although functional, requires manual start/stop of the pumps which then run for a set period (12 hours).

To date, water quality sampling on the canal was performed weekly at a few predetermined locations, providing quite coarse spatial data with respect to

how the pumped water was being dispersed and the overall effectiveness it had on the water body.

As the council looked to find efficiencies in their operation via the smart cities initiative, Xylem was approached to propose a technology based solution.



Typical coastal constructed water body development



Real-time water quality monitoring buoy (YSI DB-600)

"By measuring water quality at both the intake and outfall the system can determine on its own when pumping is required and for how long – this has provided enormous operational savings"



Solution Overview

The technology-based solution consisted of three solar powered YSI EX03 multi parameter sondes stations providing real-time water quality data enabling full automation of the pumping schedule. All data is displayed in real-time via Eagleio cloud data platform.



YSI EX03 Multiparameter WQ Sonde

System Logic



Eagleio Cloud/Web/View/Alarm Platform

1. The system begins measuring water quality using the YSI EX03 multi parameter sonde at the broad water intake to determine if the water is within acceptable range to pump? It is not uncommon during high rain events for the broad water to run fresh – in this instance, pumping fresh low salinity water into the canal would defeat the purpose and simply waste electricity running the pumps
2. If the broad water measurement was within the pre-determined set point the system would then take measurements from two EX03's located in the canal. 1) Canal out fall via DB600 Buoy 2) Canal boat lock weir. The water quality (salinity) is then referenced against user defined set points.
3. Using basic system logic, data from all three locations is analysed every 30 mins to determine if pumping is required.
4. Once conditions are met to pump, the system checks if power is on or off peak? If the power is on peak the system will delay the automated pump start up.
5. Once pumping begins, the system continuously samples all three locations to monitor progress. Once acceptable results are measured at the boat lock weir site the pumps are automatically stopped.
6. At all times the council can view real-time data, track the system status, set up SMS/email alarms/notifications & remotely start/ stop the pumps remotely via Eagleio.

Summary

This small yet powerful end-to-end solution provided by Xylem demonstrates the effectiveness of adopting a technology-based approach focusing on improving and refining operations.

End user: Coastal Council Client:

Design, manufacture, installation and commissioning of the real-time automated water quality pumping system for Pelican Waters, Sunshine Coast.



A 'New' Data Trove; *Treasure or Trash*

Ray Boyton – Hydrographer (retired)

Over the last couple of decades, the National Library of Australia (NLA) has been scanning historical documents including newspapers and making them available on the Internet. This project is called TROVE (visit the site at <https://trove.nla.gov.au/>).

Newspapers began publishing river levels commencing with a small number around 1865. By the 1880s there were many newspapers publishing a greater number of locations. The locations were focused on the Murray, Murrumbidgee and Darling Rivers. I suspect the only purpose was to provide information on the current and likely levels so that river boats could plan voyages up and down the respective rivers.

Figure 1 – PS Lancashire Lass at Wilcannia towing a barge loaded with wool. State Library of South Australia.

This was at a time when there were no railways or telegraph lines in these remote parts of the colony of New South Wales. However, there was a large amount of wool to be shipped from outback rural locations to the woollen mills in Europe. Wilcannia on the Darling River was a major shipping port as was Bourke further upstream. The same could be said for Balranald and Hay on the Murrumbidgee and Echuca and Wahgunyah on the Murray. Knowing what the rivers were doing and likely to do was very important to the overall river trade.



Figure 1 – PS Lancashire Lass at Wilcannia towing a barge loaded with wool.

THE RIVER MURRAY.

(FROM TELEGRAMS BY OUR CORRESPONDENTS)

SEPT. 21.

	Above Summer Level.	Bar.	Ther.	Wind and Weather.
	ft. in.			
Wahgunyah ..	8 3	29.25	77	Fine, warm.
Echuca ..	18 4	—	—	—
Swan hill ..	10 3	—	—	West, fine.

WAHGUNYAH.—The Lady Darling, s.s., from Albury, arrived at two o'clock, and leaves for Echuca this afternoon. The Endeavour, from Echuca, arrived at eight o'clock last night.

ECHUCA.—The Lady Daly sailed yesterday, for Wahgunyah.

<https://trove.nla.gov.au/newspaper/article/5765777>

One of the earlier and more consistent publishers of river levels was the Melbourne Argus Newspaper. H C Russell, the NSW colony's Chief Astronomer circa 1880-1900s refers to the Argus as a source for river levels in several of his reports. Where Mr Russell actually stored any collated records is not known.

The 'first' structured table was published by The Argus (Melbourne) on the 22nd September 1865 for the previous day. Each article in the Trove Library has a numerical code which can be used to identify and quickly relocate individual document.

For Hydrographers who entered the workforce (or were born) after the 1970-80's the units of measurement in the Australian colonies were Imperial, in this case Feet (ft.) and Inches (in.), where 12 inches = 1 foot and there are 3.2808 feet in a metre.

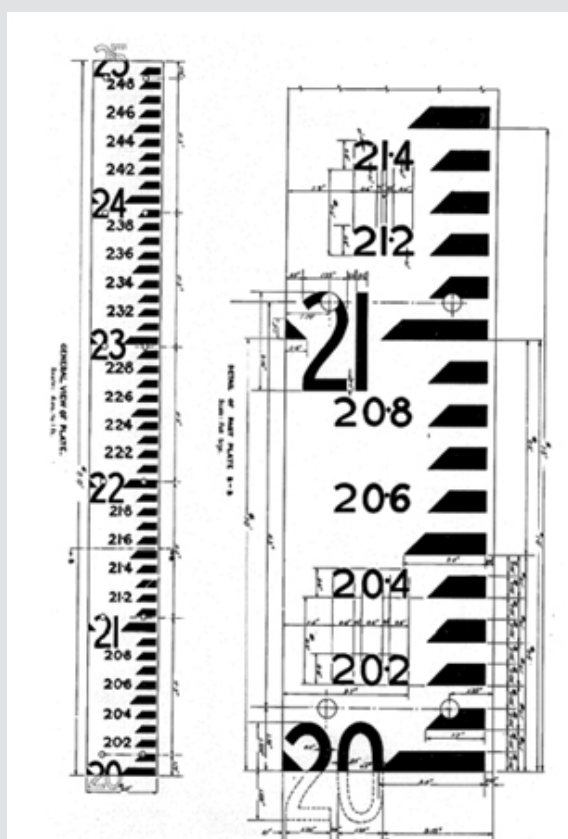
Guage Board



A section of a guage board installed at the Lachlan River at Cowra. Now part of a Hydrographic trophy.

- Guage Boards, Staff Guages, Guage Plates, Guage Ranges etc are terms that can describe a number of guages installed at a site to be read by a Guage Reader
- Prior to 1971 these guages were imperial units, after metric
- A Guage Board as the name implies is a piece of wood that had the measurement units carved into it
- Later guage plates made of steel replaced the wooden ones.

Guage Boards



Typical design of Decimal Feet Guage Plates Circa 1960s WC&IC.

- Specifications for imperial Decimal Feet flat guage plate
- Staff Gauges and Guage Ranges are collective terms for Guage Boards and Guage Plates
- Imperial Unit were feet and inches or in some cases decimal feet. An inch is 1/12 (0.083) of a foot. A foot is equivalent to 0.3048 of a Metre
- A foot is commonly annotated with a ' and an inch ".

By the 1880's the number of sites had increased quite significantly. As well as The Argus, the Daily Telegraph, Sydney Morning Herald and The Age were now publishing river levels. Regional papers were also publishing, albeit at a reduced frequency. The graphic below shows the newspaper, the number of articles in 1887 with the text Above Summer Level.

As the search results use the text from the OCR process, there are significant number of articles not shown in the image above, particularly the Melbourne Argus.

Title

- ☐ The Age (Melbourne, Vi... (337)
- ☐ The Daily Telegraph (S... (154)
- ☐ The Argus (Melbourne, ... (153)
- ☐ The Sydney Morning Her... (142)
- ☐ Wagga Wagga Advertiser... (141)
- ☐ The Sydney Mail and Ne... (140)
- ☐ South Australian Regis... (120)
- ☐ The Australasian (Melb... (98)
- ☐ Adelaide Observer (SA ... (94)
- ☐ Leader (Melbourne, Vic... (90)
- ☐ The South Australian A... (90)
- ☐ South Australian Weekl... (70)
- ☐ Australian Town and Co... (60)
- ☐ Weekly Times (Melbourn... (51)
- ☐ The Express and Telegr... (45)
- ☐ Evening News (Sydney, ... (42)
- ☐ The Queenslander (Bris... (42)

MURRAY, MURRUMBJIDGE, OVENS, BARWON, NAMOI, AND GOULBURN RIVERS.				
Aug. 30.				
—	Bar.	Ther.	Above Summer Level.	Wind and Weather.
9 A.M.			ft. in.	
Albury	..	..	5 0	Calm; fine.
Bairnald	..	..	10 3	Calm; like rain.
Barwon	..	..	36 6*	E.N.E.; fine.
Beechworth ..	29.05	53	..	N.E.; light; fine, cloudy.
Benalla	..	56	..	Calm; fine, cloudy.
Bourke	..	..	37 6†	N.E.; fine.
Brewarrina ..	..	..	32 0‡	Calm; fine.
Camperdown ..	..	..	..	N.W.; light; raining.
Deniliquin ..	..	..	..	Calm; dull.
Echuca	..	..	18 11	Calm; fine, cloudy.
Kuston	..	..	8 4	N.; light; fine, cloudy.
Gundagai	..	..	8 6*	Calm; dull.
Hay	..	..	8 10‡	Calm; fine, clear.
Hillston	..	..	..	N.W.; fine, clear.
Horsham	29.65	56	..	E.; light; overcast; rain, 0.16in.
Menindie	..	..	24 3	N.; moderate; like rain.
Moggi	..	..	..	N.E.; fine.
Moulameil ..	..	..	..	N.W.; cloudy.
Mungah	..	..	28 0‡	Calm; fine.
Nasteh	..	..	..	Calm; fine.
Narandera ..	..	..	..	Calm; like rain.
Pooncarie ..	..	..	21 8	Calm; dull.
Beymour	..	..	4 0	Calm; dull, cloudy.
Tilpa	..	..	37 0‡	N.; fine.
Uraana	..	..	..	S.E.; dull.
Wagga	..	..	11 3	N.E.; cloudy.
Wahgunyah ..	29.05	54	9 6	E.; fine; cloudy.
Walgett	..	..	..	E.N.E.; fine.
Wentworth ..	..	..	11 6	W.; moderate; threatening.
Wilcannia ..	..	..	32 8‡	Calm; fine, clear.
Yarrawonga ..	..	..	13 6*	E.; fine, cloudy.

* Falling. † Stationary. ‡ Falling slowly.
§ Rising. ¶ Over banks, rising.

Note.—No report has been received from Swan-hill.

<https://trove.nla.gov.au/newspaper/article/11571081>



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During the article scanning process, a text file is created for each article. While the Optical Character Recognition (OCR) software used is the best on offer it is far from perfect. On some of the older newspapers particularly those with tables it hovers around 50 percent.

Someone who corrects these text articles is called a Voluntrove, of which there are nearly 80K, many focused-on Birth, Deaths, Marriages and family history.

The NLA in Trove keep a 'Text Correction Hall of Fame'. This shows who has corrected the most lines. The good news is that most of these Leaders are still hard at it thereby giving the hope that all news articles will eventually progress to text corrected. The not so good news is that there is only one Voluntrove correcting Water Level data.

The Leader is John Warren with 8.67 million lines corrected and he still adding each month, usually in the Top 20.

Text correction hall of fame

Automatically extracting text from scans of old newspapers, gazettes, magazines, newsletters and books is extremely challenging. Although the best available Optical Character Recognition (OCR) software has been used, the condition of the images it has to process combined with the frequently small fonts used means that many errors of interpretation are made.

Thankfully, many people have stepped in to correct the text and in so doing have made a wonderful contribution to this resource, and helped to improve search results. The following table lists by month the people who've corrected the most lines of text.

Total number of lines corrected for all time : 540,989,839

Leaderboard

All time	Newspaper articles	View	Total number of correctors: 78,364
Rank	Username	Lines corrected	
1	JohnWarren	8,671,497	
2	DonnaTelfer	6,236,532	
3	Rhonda.M	6,198,851	
4	yelnod	5,372,634	
5	noelwoodhouse	4,187,144	
6	NeilHamilton	4,033,872	
7	andrewhawthorneast	3,451,864	
8	John.F.Hall	3,225,329	
9	frankstonlibrary	2,896,527	
10	bluefilly	2,821,702	

Once an article has been corrected it might look like the following:

Match text

MURRAY, MURRUMBRIDGE, OVENS, BARWON, NAMOI, AND GOULBURN RIVERS.

Aug 30.

.....|.....|.....|Above..|Wind

.....|.....|Bar..|Ther.|Summer|and

.....|.....|.....|Level..|Weather.

9 a.m....|.....|.....|ft. in..|

Albury.....|.....|.....|5.0..|

Balranald.....|.....|.....|10.3..|

Barwon.....|.....|.....|36.6.#|

Beechworth.....|.....|.....|.....|

Benalla.....|.....|.....|.....|

Bourke.....|.....|.....|37.6.st|

Brewarrina.....|.....|.....|32.0.#..|

Camperdown.....|.....|.....|.....|

Deniliquin.....|.....|.....|.....|

Echuca.....|.....|.....|18.11..|

Euston.....|.....|.....|8.4..|

Gundagai.....|.....|.....|8.6.#|

Hay.....|.....|.....|8.10.*|

Hillston.....|.....|.....|.....|

Horsham.....|.....|.....|.....|

Menindie.....|.....|.....|24.3..|

Mogil.....|.....|.....|.....x..|

Moulamein.....|.....|.....|.....|

Mungindi.....|.....|.....|28.0.*|

Namoi.....|.....|.....|.....x..|

Narrandera.....|.....|.....|.....|

Pooncarie.....|.....|.....|21.8..|

Seymour.....|.....|.....|4.0..|

Tilpa.....|.....|.....|37.0.*|

Urana.....|.....|.....|.....|

Wagga.....|.....|.....|11.3..|

Wahgunyah.....|.....|.....|9.6..|

Walgett.....|.....|.....|.....|

Wentworth.....|.....|.....|11.6..|

Wilcannia.....|.....|.....|32.8.st|

Yarrawonga.....|.....|.....|13.0.#|

Falling. st Stationary. # Falling slowly.

* Rising. x Over banks, rising.

Note -- No report has been received from Swan-hill.

Calm ; fine.

Funding for digitisation contributed by State Library Victoria

MURRAY, MURRUMBRIDGE, OVENS, BARWON, NAMOI, AND GOULBURN RIVERS.

AUG. 30.

—	Bar.	Ther.	Above Summer Level.	Wind and Weather.
9 A.M.			ft. in.	
Albury	..	..	5 0	Calm ; fine.
Balranald	..	..	10 3	Calm ; like rain.
Barwon	..	..	36 6*	E.N.E.; fine.
Beechworth ..	28 05	53	..	N.E., light ; fine, cloudy.
Benalla	..	56	..	Calm ; fine, cloudy.
Bourke	..	..	37 6†	N.E.; fine.
Brewarrina ..	..	..	32 0‡	Calm ; fine.
Camperdown ..	..	..	..	N.W., light ; raining.
Deniliquin ..	..	..	..	Calm ; dull.
Echuca	..	..	18 11	Calm ; fine, cloudy.
Euston	..	..	8 4	N., light ; fine, cloudy.
Gundagai	..	..	8 6*	Calm ; dull.
Hay	..	..	8 10§	Calm ; fine, clear.
Hillston	..	..	..	N.W.; fine, clear.
Horsham	29 65	56	..	E., light ; overcast ; rain, 0.16in.
Menindie	..	..	24 3	N., moderate ; like rain.
Mogil	..	..	..	N.E.; fine.
Moulamein ..	..	..	..	N.W.; cloudy.
Mungindi	..	..	28 0§	Calm ; fine.
Namoi	..	..	..	Calm ; fine.
Narrandera ..	..	..	..	Calm ; like rain.
Pooncarie	..	..	21 8	Calm ; dull.
Seymour	..	..	4 0	Calm ; dull, cloudy.
Tilpa	..	..	37 0§	N. ; fine.
Urana	..	..	..	S.E.; dull.
Wagga	..	..	11 3	N.E.; cloudy.
Wahgunyah ..	29 05	54	9 6	E.; fine ; cloudy.
Walgett	..	..	..	E.N.E.; fine.
Wentworth ..	..	..	11 6	W., moderate ; threatening.
Wilcannia	..	..	32 8†	Calm ; fine, clear.
Yarrawonga ..	..	..	13 0*	E.; fine, cloudy.

* Falling. † Stationary. ‡ Falling slowly.

§ Rising. ¶ Over banks, rising.

After correction, the match between image and text increases to approximately 98% or better. Alpha recognition being better than Numeric (3s and 8s being the most difficult, not usually a problem with feet more so with inches).

'Above Summer Level' is often misread by OCR as 'Above Bummer Level'. Which it is if you are doing a string search. Solution, do two searches.

Trove has a sophisticated search engine. By correcting the articles this search engine can more efficiently filter on key words and strings. It is quite fast considering there are 5 billion lines of scanned text of which approximately 10% has had a degree of text correction applied. Note in the above example

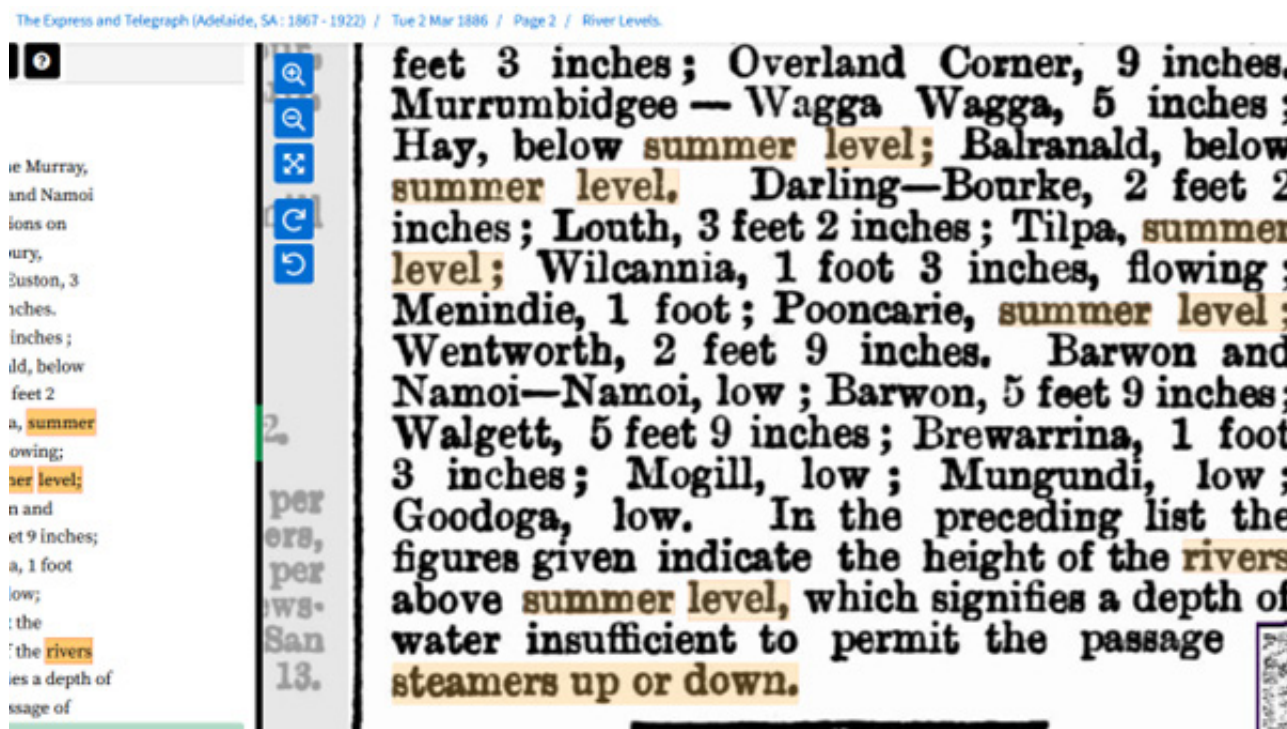
only the river levels have been corrected and air pressure, temperature and weather conditions omitted.

In the case of river heights, the words "Above - Summer - Level" are printed in nearly all articles irrespective of the paper. In some papers this text is repeated after each water level reading increasing the chances of the article being found as seen in 208431871 below.

The datum of 'Above Summer Level' (ASL) is not linked to any recognised datum, such as we have now have with Australian Height Datum (AHD). Put simply ASL is a level that approximates the level needed for vessels to navigate past that point in the river.

My best estimate is that is about 2' 6" (' = feet " = inches) above Cease to Flow.

From the Express and Telegraph of 2nd March 1886



<https://trove.nla.gov.au/newspaper/article/208431871>

It is worth noting that one of the sites of with the smallest catchment area is the Murray River, Wahgunyah (and was chosen as the pilot site partly because of this). With a catchment area of 18,800km² it may seem large, but in the context of the other locations published on Trove it is very modest. Some of the locations with a long period of data are shown below with catchment areas:

Gauging Station	Catchment (km ²)
Murray River at Albury (409001)	17,200
Murray River at Corowa (409002)	18,800
Murrumbidgee River at Gundagai (410004)	21,100
Murrumbidgee River at Wagga (410001)	26,400
Murrumbidgee River at Hay (410002)	56,700
Murrumbidgee River at Balranald (410003)	165,000
Darling River at Wilcannia (425002)	569,800
Darling River at Menindee (425001)	569,900
Darling River at Pooncarie (425005)	611,000
Darling River at Wentworth (425017)	906,000

A real positive at these sites with large catchments is that the water levels rise and fall at a stately rate, reducing any negative impact of having on average 6 daily readings per week.

There is amongst some of the wider internet audience an expectation that all data is available electronically and that Google will deliver it to their device in a simple format with one click of a button. Water Industry information practitioners are well aware this is not the case and is unlikely to be so within our lifetimes.

NSW is fortunate that in 2010 the Federal Government (through the Bureau of Meteorology, BoM) funded a NSW project to digitise historic water levels. This was almost entirely focused on Daily Read Levels stored on cards and in gauge readers books. Virtually all the long-term analogue charts (commonly referred to as A35 Strip Charts) had been digitised previously.

Sadly, Trove was happening at this same time as the official data was already being captured digitally in NSW.

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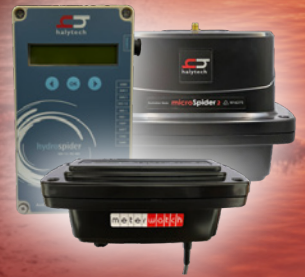
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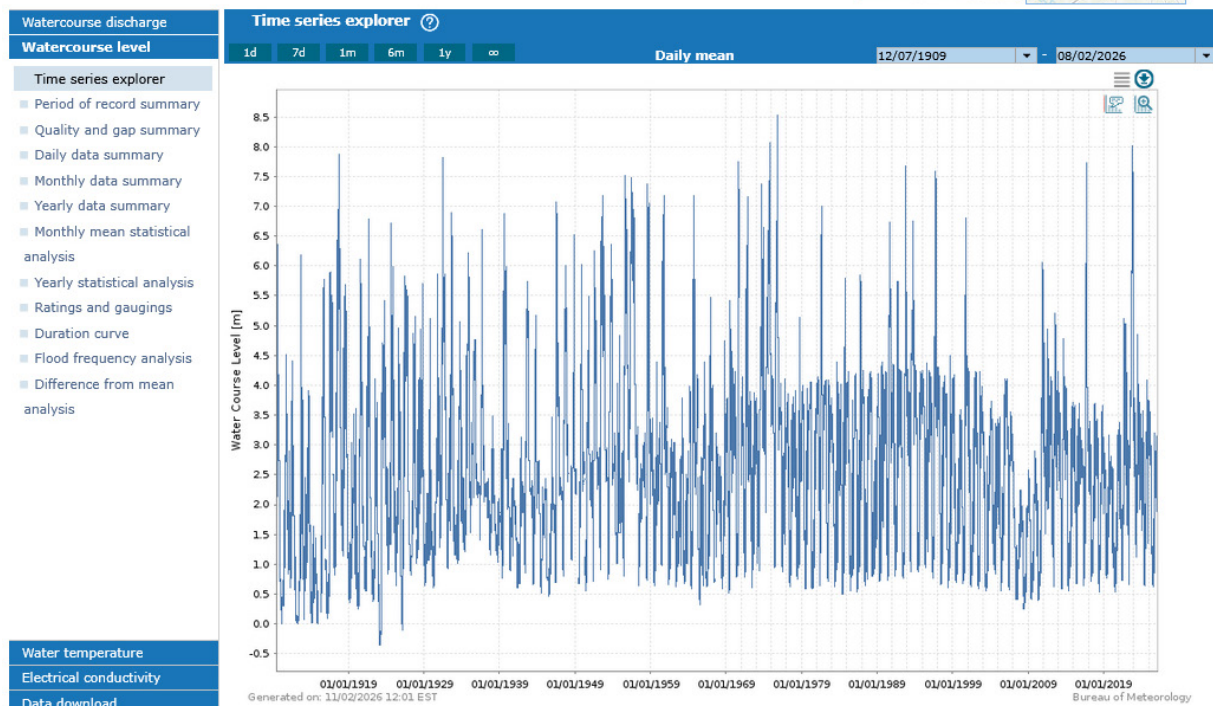


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MURRAY RIVER AT COROWA

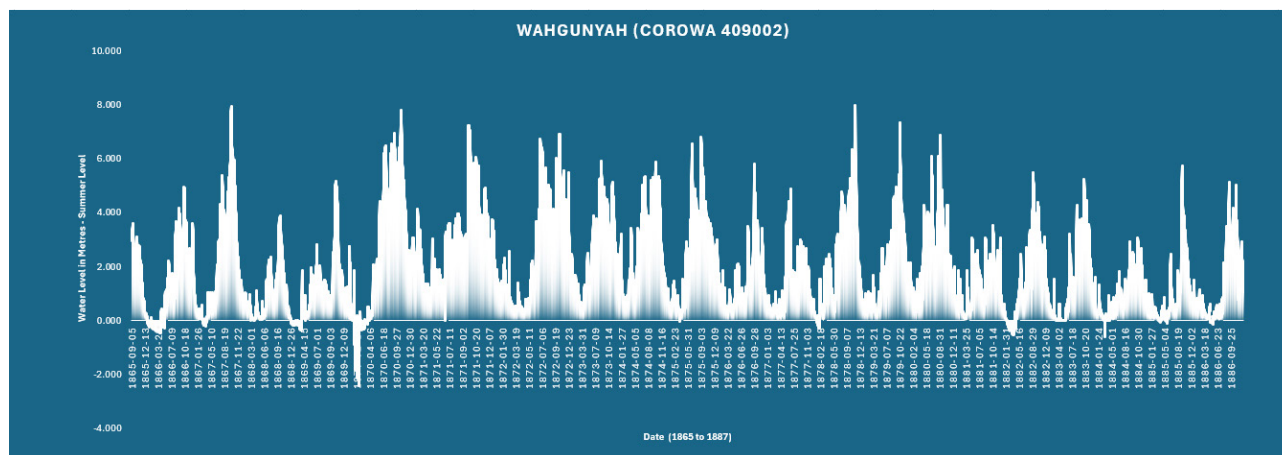
Station number 409002
Latitude -36.01
Longitude 146.40
Data owner NSW - Water NSW



Please refer to [Water Data Online](https://www.bom.gov.au/waterdata/) Copyright terms and conditions for using this data.

<https://www.bom.gov.au/waterdata/>

The graphic above shows the official record at 409002, the pilot site for this article, starting in July 1909.



The graphic above shows the river levels from 1865 to the beginning of 1887 as taken from Trove. A cursory inspection of the newspapers between 1887 and 1909 shows that a full water level record from 1865 to 2026 is possible. The data used in Trove graphic has not had obvious data errors removed. However, the errors are few and very obvious making it simple to delete or rectify.

(As I am not a CPH or the operator of the site, it is above my pay grade)



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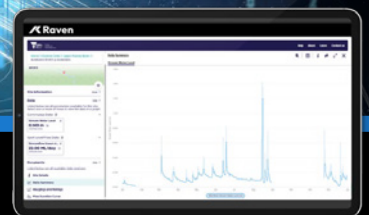
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In the NSW portion of the Murray Darling Basin where most of the sites are located, official records did not commence until well after river levels were published. A ballpark figure is 40 years on average.

Of the 40+ locations in NSW to have published river levels 1865-1885 there are potentially 1,300 years of water levels that can be captured digitally if the newspapers continue to publish river levels until the official records commence.

No serious attempt has been made to quantify periods where the official record has periods of missing records that could be filled with Trove data. Anecdotally, only a small number of data gaps could be filled. Gundagai (410004) being one location worth further investigation.

AWRC No	Stream	Station	Archive Data Start - Level (100.00)	National Database (WDO)	Trove data Start	APPROX Years of data
409001	Murray	Albury	01/01/1885	01/01/1885	01/07/1869	16
409003	Edward	Deniliquin	1/09/1889	01/09/1889		0
409014	Edward	Moulamein	1/08/1921			30
409002	Murray	Wahgunyah	12/07/1909		02/09/1865	44
409202a	Murray	Tocumwal	1/01/1980	#####		40
???	Murray	Yarrowonga	at road bridge		05/06/1886	30
410001	Murrumbidgee	Wagga	01/10/1868	01/10/1868	01/10/1868	0
410002	Murrumbidgee	Hay	1/01/1956		05/10/1865	40
410003	Murrumbidgee	Balranald	1/01/1907	#####	16/06/1869	40
410004	Murrumbidgee	Gundagai	02/08/1886	02/08/1886	03/02/1872	14
410005	Murrumbidgee	Narrandera	01/06/1891	01/06/1891		20
410006	Tumut	Tumut	1/01/1935	2/04/1970		50
412001	Lachlan	Euabalong	01/01/1893	None		0
412002	Lachlan	Cowra	01/03/1892	01/01/1893		10
412005	Lachlan	Booligal	01/07/1893	1/03/1945		10
412006	Lachlan	Condobolin	01/01/1896	01/01/1896		15
412003	Lachlan	Hillston	01/04/1893	None		15
416001	Barwon	Mungindi	1/02/1973	1/02/1973	Mar 1883	50
416002	Macintyre	Boggabilla	22/04/1982	#####		50
418010	Gwydir	Bingara	1/01/1937	None		30
419001	Namoi	Gunnedah	2/12/1968	2/12/1968		50
419009	Peel	Tamworth	20/07/1993	#####		50
419091	Namoi	Walgett	18/11/1996	#####	29/06/1876	50
421001	Macquarie	Dubbo	27/05/1966	#####		50
422001	Barwon	Walgett	9/08/1972	9/08/1972	1883-03	50
422002	Barwon	Brewarrina	17/04/1892	17/04/1892	30/06/1876	15
425001	Darling	Menindie	01/01/1881	01/01/1881	10/03/1879	2
425002	Darling	Wilcannia (total)	1/08/1932	--	11/01/1879	50
425003	Darling	Bourke	31/10/1980	??	07/01/1876	50
425004	Darling	Louth	10/06/1980	1/01/1904		50
425005	Darling	Pooncarie	1/01/1913	1/01/1913	1879-03-10	30
425008	Darling	Wilcannia (main)	1/08/1932	1/08/1932	1879-03-10	30
425017	Darling	Wentworth (Darling)	None	None	15/01/1877	50
425900	Darling	Tilpa	10/05/1995	#####		50
412004	Lachlan	Forbes (Cottons)	1/01/1927	01/04/1893		
412901	Lachlan	Forbes (Iron)	01/04/1893	01/04/1893		40
422030	Narran	New Angledool (2)	11/04/2002	#####		
422032	Bokhara	Goodooga	9/12/2009	9/12/2009		40
422004	Barwon	Mogil Mogil	10/06/1980	#####		40
422003	Barwon	Collarenebri	31/10/1980	#####		40
412005	Lachlan	Booligal	01/07/1893	#####		40
416058	Macintyre	Yetman	27/03/1997	7/05/1998		50
						1331.00

The graphic above is updated when a new site is printed in the newspapers.

As new sites are published in the newspapers the years of potential additional record is likely to increase.

Without the starting date of the official records in Victoria and South Australia it is not possible to estimate total years of river level data held only in Trove. By 1890's there are regular reports of river levels in Queensland.

THE FLOODS. WATER 30FT. OVER THE BURDEKIN BRIDGE. THREATENED SCARCITY AT CHARTERS TOWERS. FLOODS RISING AT NORMANTON. | [BY ELECTRIC TELEGRAPH.] | (FROM OUR OWN CORRESPONDENTS.) ROCKHAMPTON, January 10.

 **Article** - The Brisbane Courier (Qld. : 1864 - 1933)  **Saturday 11 January 1890** - Page 5

... using inch in hour, weather threatening; Chue, about 30ft. **above summer level**, still rising. The Weather Stormy. Clunes Water 18ft. **above summer** IOAPI and using, (Gilbert River 3ft. lOWer. Weather line ... 630 words

The primary purpose of this article is to make the Hydrographic practitioners aware of its existence.

Now that we are aware of this dataset what do we do about it? But before we come to some possible answers let's explore this dataset, it's worth or lack of it, and the cost of capturing it.

If it were added to the NSW database, it would add approximately 1-2% to our overall knowledge of rivers levels. At individual sites 30%. Almost all the locations are still in operation with several moved relatively small distance downstream (e.g. Balranald and Hay) with no real change in catchment area.

Historic water level data cannot be generated. However, I suspect some in the modelling fraternity may have a different view...

The river levels in the Trove dataset were obtained well before any structures were built to manage the flow of water. That is, no dams and weirs. All natural flows. Note - I am not suggesting here that water was not extracted for the purpose of irrigation.

To capture, digitise and archive a year of historic data will be significantly less than the current cost. Moreso if there is a single csv/txt file with 40 years of data at one location. How much less I am not prepared to speculate.

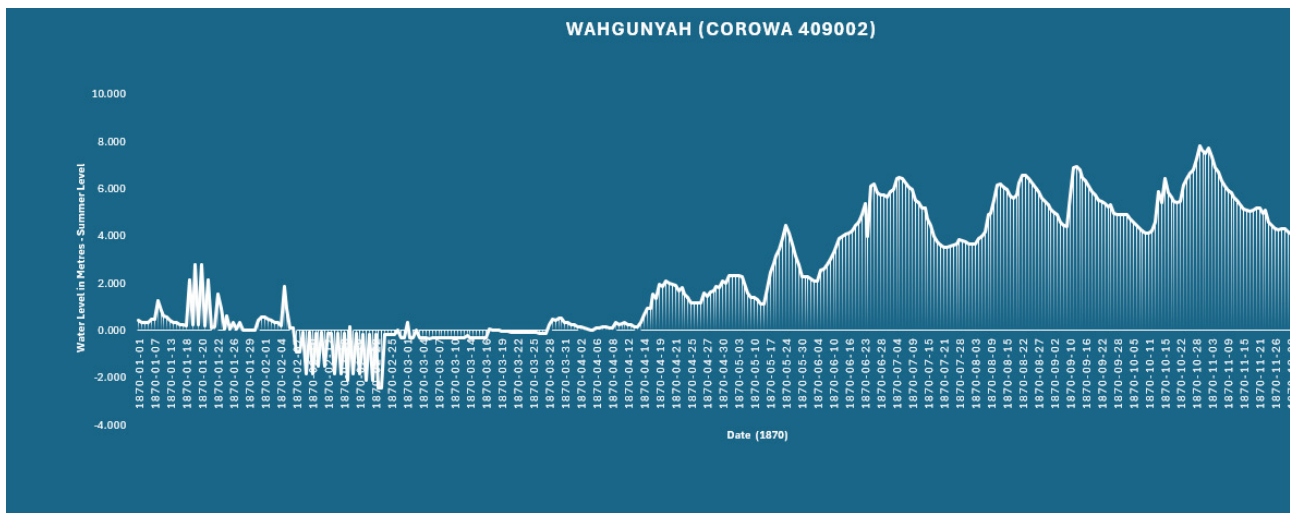
Is adding +40 years of water level data to sites with over 100 years already even worth considering?

Many countries have water level data going back hundreds of years.

Was the data from the flood in the Darling in the 2020's any more or less important than those prior to 1900 (i.e. the flood of 1890 potentially the highest with water level records and second highest known flood)?

How significant is not having a full range of water level readings at some locations?

While contemplating these questions prior to putting pen to paper, an almost retired Hydrographer living on the banks of the Murray asked me (through MateNet, a forerunner TikTok) if the river levels were available for Corowa (409002) back in 1867, 1870 and 1917. Yes, they are, and the Trove links were sent. It seems that river levels back that far are referred to in recent flood studies and are still relevant today. A graph of the 1870 river levels was also sent.



Corowa is one of the locations where the gauge reader was willing & able to measure the water level below summer level. Note; At Summer Level the gauge is assumed to be zero.

Very recently I was asked how big the flood down the Darling was in 1886 (MateNet again). My gut response was big, but not as big as the one in 1890's. As I was

recording the levels at Corowa for 1886 at the time for this article, it was not a huge task to record those on the Darling.

Some of the locations with river levels where official records are not available follow (with blue-green background) for the calendar year of 1886, in stream order top to bottom.



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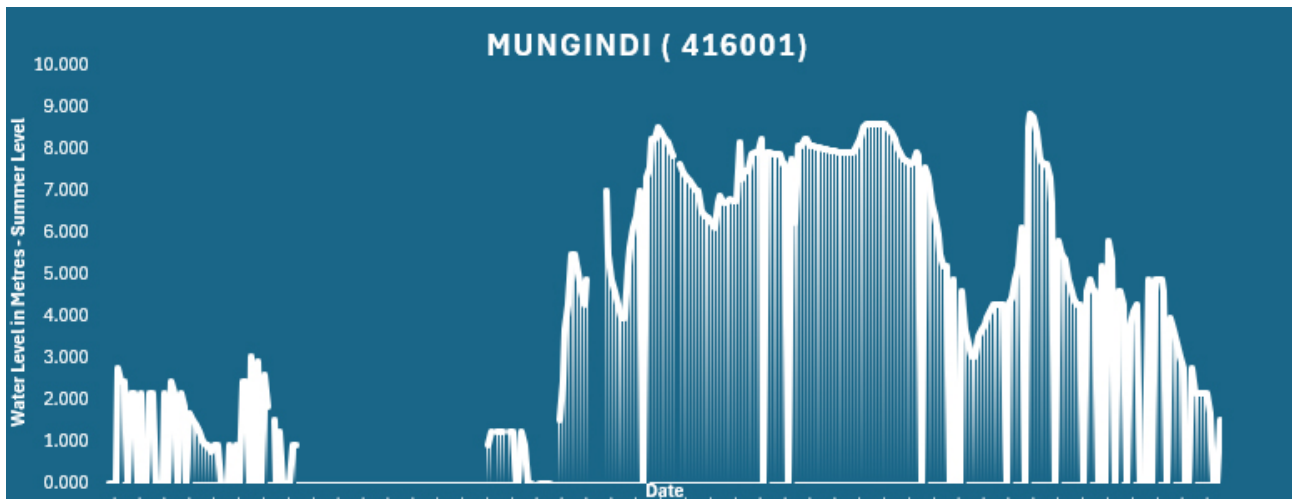
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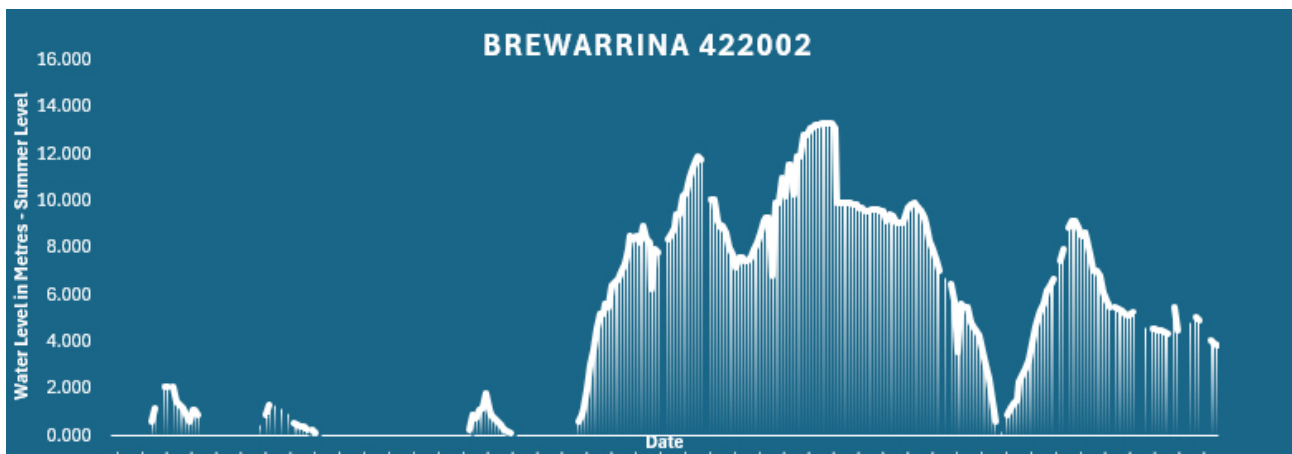
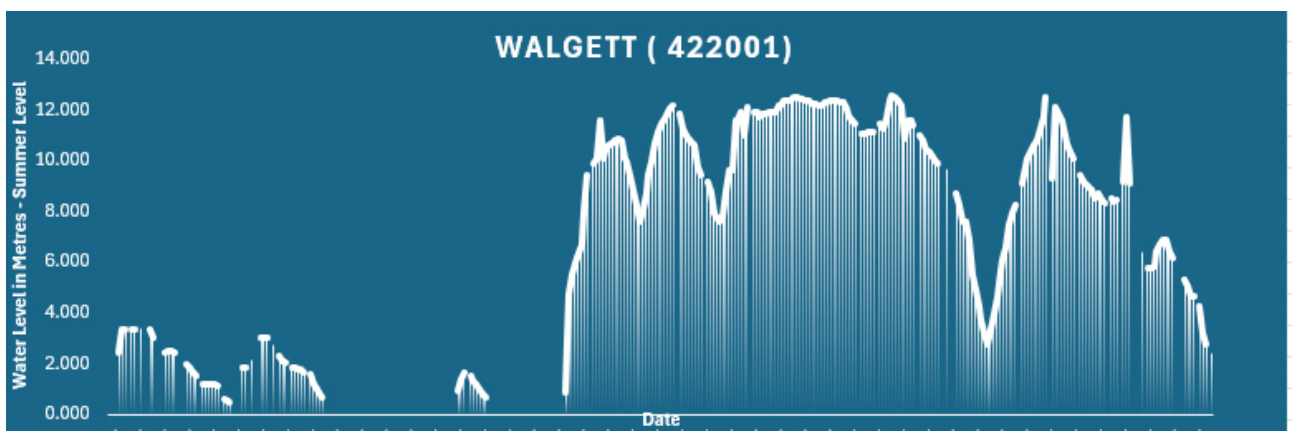
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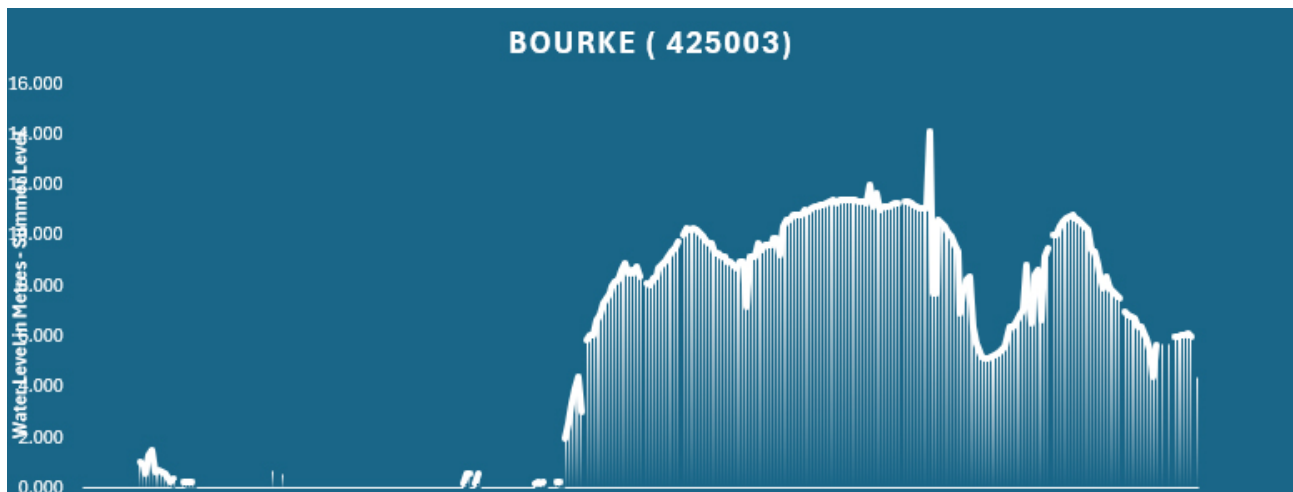




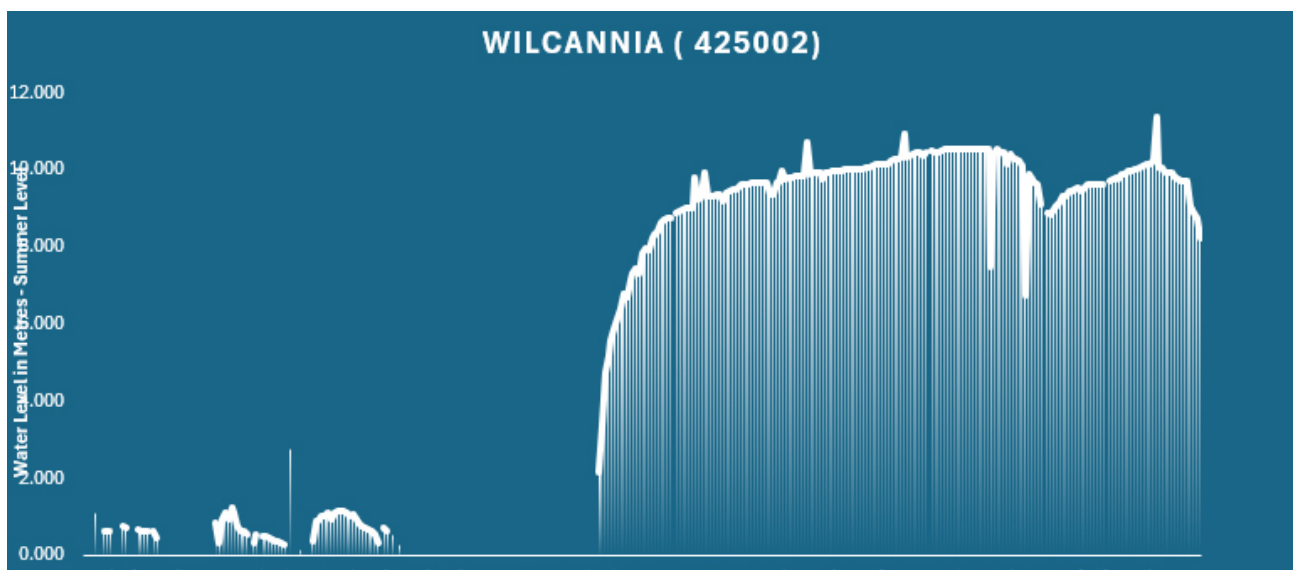
<https://www.bom.gov.au/waterdata/>



Note - At Brewarrina there appears to be a gauge zero change in the later part of the year.



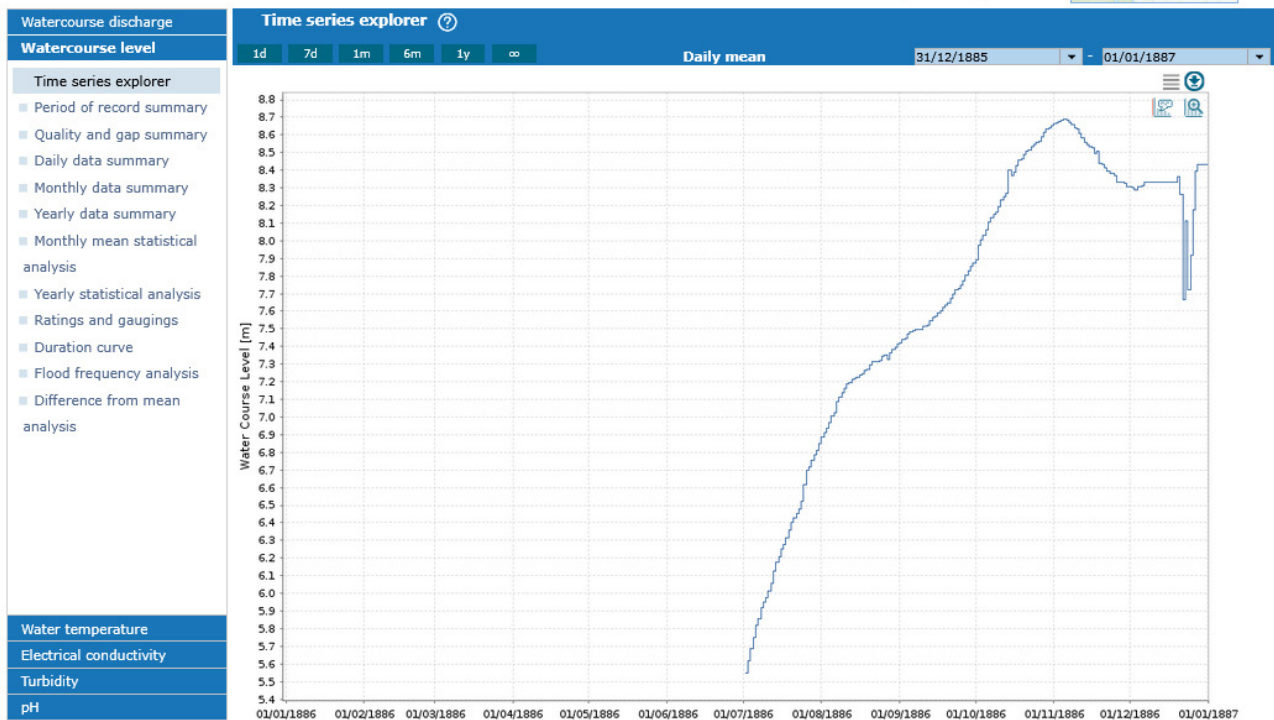
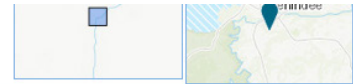
Note - There are several data errors. The very obvious are in September.



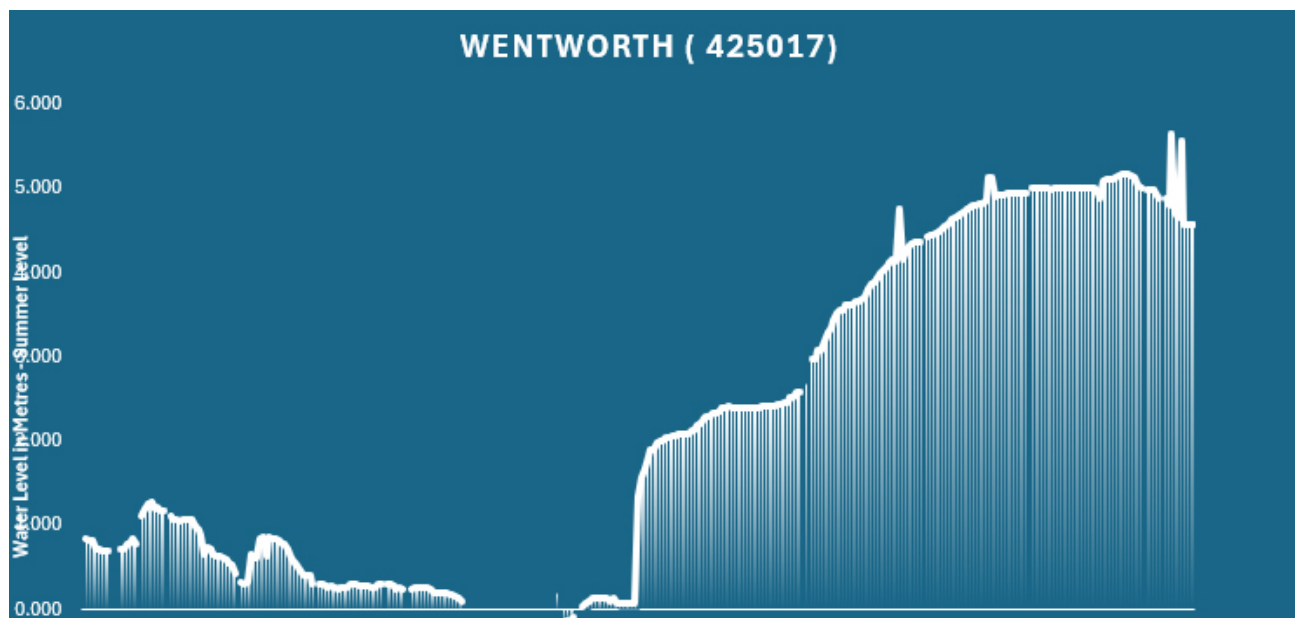
Note - 425002 is the historic location at Wilcannia. This is the Total flow site. 425008 is the Main Channel only. Not sure how relevant this is for water levels.

DARLING RIVER AT MENINDEE TOWN

Latitude -32.40
Longitude 142.42
Data owner NSW - Water NSW



Darling River at Menindee (425001). The official record at this site commences in 1881 thanks to the effort of local Hydrographers. 1886 data from the BOM is presented above. The water level was Below Summer Level for the first half of the year.



Note - This is the Darling at Wentworth site. Not to be confused with the Murray site in the vicinity.

Are these two examples of interest in the data within a one-month period just a coincidence or indicative of the usefulness of the dataset?

So, where to from here?

In my opinion Water Agencies have a number of options:

1. Do nothing and 'don't mention the war'. E.g. pretend it doesn't exist, doesn't meet current data standards and forget about it.
2. Recognise that dataset exists and make reference to it, putting the onus on individual data users to locate the data required.
3. 2 above, with an additional request for data users to forward collated data to a drop off point.
4. 3 above, with an additional small incentive (a gauge readers medallion) to provide data.
5. Develop a National-State funding bid to systematically digitise and archive the historic dataset on a site priority basis.

Of the options above 5 is ideal and 1 is the easiest in my opinion

Funds for data rescue projects tend to come along every twenty years or so. That leaves a couple of years for water data managers to write a proposal and have it waiting for the right opportunity.

After 50 years in the industry, now a retiree, it is not my problem. Over to you...



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Just a Fill-In Job

Personal account and reflection – Alex Springall

I'd left school with indifferent marks and no plans for next week, let alone for the rest of my working life. I had a few ideas about what I didn't want to do – working in an office headed that list, closely followed by working in a shop. My hopes of being a professional cyclist looked like being thwarted only by my lack of ability, and my previous work experience, mucking out stables and feeding the horses for a trainer of trotters and pacers, didn't seem like a real career. Someone told me that Qantas was hiring apprentice aircraft engineers, so I'd therefore arranged an interview, received a job offer and started work there as an Aircraft Engines/Airframes Engineering Apprentice.

Whilst I found the practical and theoretical training at Qantas Tech and Sydney Technical College interesting, I was not a natural practical engineer. It seemed like some of the apprentice cohort had been dismantling and rebuilding cars since they were in kindergarten, while others had been building balsa and tissue paper flying model aircraft for the same time. I had learned all I knew about internal combustion engines from reading a book the night before my interview and had once assembled a plastic Airfix model aircraft. Some seemed to have a natural affinity for working on aircraft, whilst I had to be shown how to do everything. I enjoyed learning these new skills but often, the work quickly became boring. The pay was also extremely poor, at least in my opinion.

Towards the end of 1965 I responded to an advertisement in the newspaper, inviting applications from young men who wanted to become Army Helicopter Pilots. I only just met the educational requirements, the pay was better than that of an apprentice and I reasoned that it would be an interesting, well-paid career. To everyone's surprise (and my own), I passed the battery of psychological and medical assessments, and was

eventually, in February 1966, accepted into the Army for Officer Training prior to learning to fly.

At the time, National Service had just started to support the Army's involvement in the Vietnam War. The Army needed Junior Officers, so instituted a scheme to train selected National Servicemen as 2nd Lieutenants at Scheyville, outside of Sydney. During the 22-week course, adolescent male civilians would be turned into young warriors able to lead a platoon of 30 men into combat. It was convenient to slot a dozen or so 'air cadets' into these courses, so before we became pilots we had to become Infantry Officers.

Whilst I enjoyed running around the bush playing soldiers, I was thoroughly disorganised and unsuited to the discipline of military life. I accumulated a record number of 'extras', punishment drills that involved parading in full battle order 5 minutes after reveille for half an hour of drill. This of course made an already crowded timetable impossible, which in turn meant something would go undone, which in turn meant another extra drill. Eventually, the Army and I decided that we were mutually unsuited, and I was given the opportunity to take my discharge.

With still no idea what I wanted to do, I flew to New Zealand to see what jobs I might like. I still thought I might like to fly aircraft, and also thought I might like to try photography, but really I still had no idea what I'd like to do. In my nine months in New Zealand, I tried working in a camera shop, a rope and twine factory, an office and a bicycle and hobby shop. All of these were as uninspiring as I'd expected, although I did enjoy the bicycle shop and the owner was a former WW II Fighter Pilot who took me flying and encouraged my ambition to learn to fly.

When I returned from New Zealand, I'd decided that I would find a job that would allow me to save some money, then start flying lessons. Thus, I studied the Positions Vacant columns in the newspapers.

One day, I spotted an advertisement for one of three Hydrographic Assistant positions with the NSW Water Conservation & Irrigation Commission (WC&IC). There was one position in each of the Armidale, Tumut and Sydney Offices. The work involved frequent travel to the country, and applicants had to be able to swim, drive a car, row a boat, work at heights above flowing water and be quick and accurate with arithmetical calculations. On top of these conditions, the job had a better salary than anything I had earned previously and paid a Travel Allowance of \$6.60 a day whilst in the field. (This was at a time when \$3.00 would pay for Bed & Breakfast at a country pub.) Application forms could be obtained from Mr. Baker, 7th Floor, Anchor House, corner of George & Bridge Streets, Sydney.

Since I happened to be in the city with plenty of time on my hands, I decided to drop in on Mr Baker and collect an application form. Perhaps he also had a bit of spare time on his hands, as he invited me to sit at a spare desk and complete the application form. He would interview me there and then. The interview was rather less formal than most job interviews these days. I met the educational requirements as I had completed the Leaving Certificate; I held a Drivers Licence and had actually driven a Land Rover; I held a Swimming Certificate (albeit, the most basic one available), I would happily go to any of the locations and yes, I could work at heights above water (I was pretty sure I could). Confident that I would get the job, I went home and waited for the call.

When it came, the call wasn't what I had hoped for. Three other applicants had won the jobs, but if any vacancies came up in the near future, I was on the waiting list. Disappointed, I applied for a job as a Laboratory Assistant at Taubman's Paints - Chemistry had been my worst subject other than history - and to my surprise was appointed to the position. This job involved mixing and testing small quantities of paint according to formulas provided by the Chemists. Whilst I found the job interesting and learned more practical Chemistry in three months with the Chemists than I did in five years of High School, working in a laboratory sometimes felt confining. When I arrived home from work one day to be met by a telegram asking me to phone Bernie Baker, I knew that I was headed for a job that would

allow me to enjoy my work while saving for flying lessons.

I resigned from Taubman's and joined the WC&IC in July 1967 - the beginning of my hydrographic career.

The first week in the office I was introduced to the Alberta Current Meter, and shown how to dismantle, clean and reassemble it, how to compute flows from gaugings and how to calculate river discharges using river heights extracted from water level recorders or posted by gauge readers to the office. I met some of the Hydrographers and Hydrographic Assistants who weren't out in the field and learned some of the routines and peculiarities of the public service. On my first day, I was given a desk and issued with essentials for the job - red and blue pens, a calculation pad and block of paper on which to write minutes, a drinking glass, a towel and an ashtray. It was assumed, almost universally correctly, that men smoked and women didn't.

I was also shown how to use a simple Facit Mechanical Calculator. The basic operations could be carried out by entering one number via a keyboard and adding, subtracting, multiplying or dividing by turning a handle a number of times. I was later to find that the machine was sometimes used by assistants to relieve boredom, having Facit races - seeing who could turn the handle the fastest. On the Friday I was told that I would be going on a three-week field trip with Pat Pauling, one of the Hydrographers I'd met, to the upper Lachlan River.

When I was introduced to Pat, he had only two questions - could I drive a Land Rover, and could I cook. I answered both questions positively. (I had been introduced to the Land Rover by my uncle on the ball bearing-like bauxite roads of Weipa.) Pat and I went to the Arncliffe Store on Friday to load up with equipment, Pat dropped me at home and picked me up on Monday morning for my first field trip. Although we were paid a daily travelling allowance (TA) to cover the cost of accommodation and meals in a hotel, it was commonplace for Hydrographers to either camp or find cheap accommodation. Pat and I stayed for a couple of nights in hotels, then camped in a department building at Jemalong Weir, just outside Forbes. I'd been told that it was also common to come home for weekends, even though we were being paid TA.

My first weekend in the field was a long one (Monday was a Bank Holiday, which the public service also received.) On Friday evening I hitchhiked home, but on Saturday morning flood warnings were issued for western rivers including the Lachlan. Seeing my brief hydrographic career going down the gurgler if we missed any flood gauging's because of my absence, I caught the overnight train back to Forbes. As it turned out, nothing came of the rain, so we spent the long weekend in Forbes killing time. Later in the trip, we stayed at a farm, Liscombe Ponds. Pat had known the young farmer from when he was installing the gauging station at The Needles nearby, some years before. On this and future trips to the area we sometimes helped the farmer with anything we could on the farm, and on Saturday evenings we were often the beneficiaries of the hospitality and pleasant company of the farmer and his wife. I must say that her cooking was much better than mine. The last Saturday before we returned to Sydney was my 21st birthday. After doing some shopping in Canowindra we drove to Wyangala Dam, which was in the process of an upgrade. The resident Hydrographer at Wyangala, Harry Forbes and Pat spent the afternoon and a lot of the evening helping me celebrate in the country club. By the time we (they) had finished, food was no longer being served, so, barely able to walk, I was told to drive back to Liscombe Ponds, stopping for a refresher at Woodstock Hotel.

I'd quite enjoyed the outdoor work. In fact, I often pondered about how many people would pay to have a holiday like this, while I was being paid for it. True, the work was sometimes physically hard, but I'd been used to that in the Army, and most of the time there was no one shouting at you. This seemed like a good job to sit in while I saved money to complete my pilot's licence. Back in the office, I met an American Assistant, Dick Thomas, who was in Australia on a working holiday. Dick had a degree and had previously worked for the United States Geological Survey (USGS). We became good friends, and along the way he told me where the job could lead for anyone who had some qualifications and ambition. I started to mentally compare sitting in a cramped cockpit with working outdoors, enjoying fresh air and being able to see what was around me whilst travelling. A hydrographic career was starting to look attractive.

Sydney Technical College offered the only vocational Hydrographic Course in Australia, apart from a short one offered occasionally by the Snowy Mountains Hydro-Electric Authority for its own staff. The Sydney Tech Certificate Course was offered by correspondence study across Australia and was compulsory for Queensland and Western Australian state hydrographic employees. Although many of the notes had been written by WC&IC Engineers, none of the WC&IC Assistants or Hydrographers had attempted it, preferring to rely for any promotion on the seniority system then in existence. I enrolled in the four-year course, received some exemptions based on my leaving certificate results and was also eligible for a small amount of study leave based on the number of units I completed.

I found it much easier to study by correspondence, with well-written notes and people at work who could help if needed, than I had at school. I enjoyed the maths; the hydrography and surveying subjects made sense and even hydraulics was more or less comprehensible. One of the subject markers was an Engineer in the Hydrographic Investigations and Research Branch, George Whitehouse, and another was with the Sydney Water Board. Both made helpful comments and went beyond the course notes when marking my assignments. At some point my progress must have been noticed. I began a climb up the promotion ladder, and a usually enjoyable and varied hydrographic career that took me from NSW to Bougainville, South Australia, Victoria and back to NSW. Along the way I met many great and some 'unusual' characters.

One day I may set down the professional milestones and millstones I passed, bypassed or avoided during that career. But probably not. It would be pretty boring for anyone but an historian I think. Rather, I've tried to put a light-hearted take on some of the events that happened to me and others. Most of these stories have at least some basis in fact.

