Hydrological Histories: Lindsay Rowe

My introduction to hydrology came in the 1965–66 university summer holiday, when I got a job with the Forest and Range Experiment Station (FRES), part of the New Zealand Forest Research Institute, focused on researching South Island forestry issues. I assisted Hans Keller from the Swiss Forest Research Institute with studies of rainfall interception and downstream changes of water parameters at Camp Stream, an International Hydrological Decade Experimental Basin in the Craigieburn Range.

A year later, after the 1966–67 holidays, I was offered a scientist position. My Bachelor of Science was in chemistry, so I was sent to Lincoln University for a year to learn hydrology under John Burton and Walter Boughton, and soil conservation with Brian Douglass. My classmates included Maurice Duncan, John Hayward and Terry Heiler.

Working with Colin O'Loughlin for the next seven years, our work included maintaining and analysing data from six climate stations ranging from 910 to 1800 metres above sea level, and collecting sediment from a network of runoff plots at the FRES field station at Broken River, Craigieburn Range. I also undertook streambed level surveys in the Avoca and Branch/Leatham catchments to assess gravel movements from eroding hillslopes, and continued Hans' interception study after he returned to Switzerland.

There was a change of direction in 1974 for the geohydrology team, in response to the New Zealand Forest Service's proposals to harvest large proportions of the beech, podocarp and hardwood forests in the West Coast and Nelson regions that were not reserves or national parks, and establish replacement *Pinus radiata* plantations.

To determine the effects of these native forest clearing operations on sediment yields and streamflow, we first established eight small catchments at Maimai in Tawhai State Forest near Reefton. The team expanded, with Andy Pearce then Paul Mosley joining, together with an increase in technical staff.

Figure 1. Maimai Research Area, Forest Research Institute (September 1983). Photo: Mike Stewart

Once rainfall and runoff data collection were underway, the research programme was expanded to include studies of rainfall interception and evaporation, water quality and chemistry, and water balance and yield changes. These often utilized the expertise of visiting scientists to complement our team; stream fauna was studied by Michael Winterbourn and colleagues, nutrient fluxes by Dan Neary, and dissolved organic carbon by Tim Moore.

While this work was progressing, the team was establishing additional small catchment studies, including four in evergreen native forest at Big Bush State Forest in the Tadmor River catchment, Nelson, two larger tussock-covered catchments at Glendhu in the east Otago uplands, two at Larry River north of Reefton on pakihi land, and two *Pinus radiata* catchments at Ashley Forest. Rick Jackson had joined us to lead work on the latter two sets of studies.

Initially, water samples from Maimai were sent to Forest Research Institute in Rotorua for analysis. When water sampling from all 18 catchments increased, in 1980 I set up a laboratory at Christchurch (where non-production forestry research was now based) to analyse water samples. Data from these catchments and extra sites were used by Paul Mosley to compare low-flow water chemistry from forest and pasture catchments in a longitudinal sequence down the Māwheraiti River, of which our catchments were in one headwater tributary. Paul then led the first flow pathways studies at Maimai, using troughs in pits to collect seepage above the impermeable cemented gravels.

After I came back from Brisbane where I spent a year doing a Master of Philosophy degree focused on modelling hydrologic changes at Maimai, further work on water flow pathways, source and age of water was undertaken with many collaborators, including Mike Stewart, Mike Sklash, and Jeff McDonnell and his colleagues.

One of the more unusual studies was one I undertook with Ross Woods. To assess the spatial variability of subsurface flow, we installed 30 long troughs (1.7 metres each) against a vertical face that had been cut at the base of a hillslope, just above the streambed in the lower part of Maimai catchment M8. We got a local contractor to bring in a 30-tonne digger and after about two hours there was a nice clean face to work with, although the streambed was a quagmire. The study might not be as easily set up now, as we would probably have to get a resource consent to put sediment into the stream.

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The seepage was collected at the interface with the underlying impermeable gravels, with each trough leading to a one-litre tipping bucket connected to a CR10 datalogger. The sound of 30 tipping buckets filling at up to 12 tips/minute during significant storms was something to behold. During storms, we would also go around the catchments and other sampling locations about every hour collecting samples. Work at the M8 site was continued for many years by Jeff McDonnell and his colleagues, mainly university students.

By 1999, I had become disillusioned with life as a scientist at Landcare Research. A shortfall in funding for the group I was now heading led to me working a four-day week in 1997. Enjoying life at our Kaikōura

holiday home every fifth week, interminable bidding for the small pot of commercial funds and a lot of in-house niggling during the then-MORST 1999 funding round pushed me to resign.

Early retirement superannuation, together with remuneration for Jan, my wife, and me from the New Zealand Hydrological Society for administration work, made this change of lifestyle possible. It would have been nice to write and publish many more papers using already-collected data sitting in my filing cabinets, but there did not seem to be the appetite for it, funding was not available, and the information was consigned to the ether.

However, of great satisfaction is the knowledge that Maimai papers written as far back as the 1970s and 1980s are still being cited; one came through as I was writing this document.

It's also very satisfying to see that the New Zealand Hydrological Society (whose administration Jan and I helped to reform, with strong support from the Executive) is still going strong today, if not stronger than ever.

We were able to put the society on a sustainable footing so it could fund significant projects, such as books, without financial pressures. It managed to weather the uncertainties of the late 1980s and early 1990s, despite catchment board reforms and CRI formation. It was a competitive and commercial era, in which the significant drop in staff numbers was reflected in a drop in society membership.

Today, the very strong support for annual conference and workshops, some with other New Zealand or Australian environmental societies, shows a New Zealand Hydrological Society in good health.

Lindsay Rowe's recollections are part of a New Zealand Hydrological Society series that documents the times and memories of New Zealand's senior hydrologists.