THE HYDROLOGICAL SOCIETY OF S.A. INC.
C/- Water Resources Branch
Box 1751, Adelaide, S.A. 5001

NEWSLETTER NO. 60
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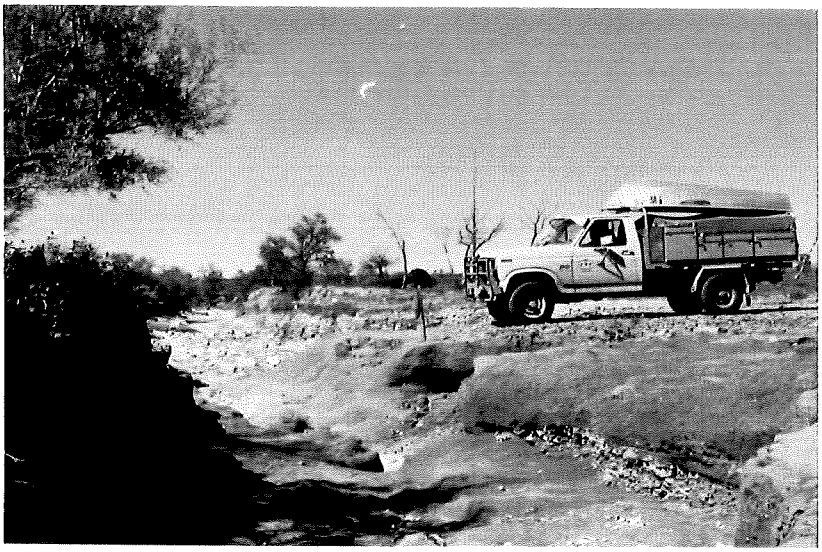
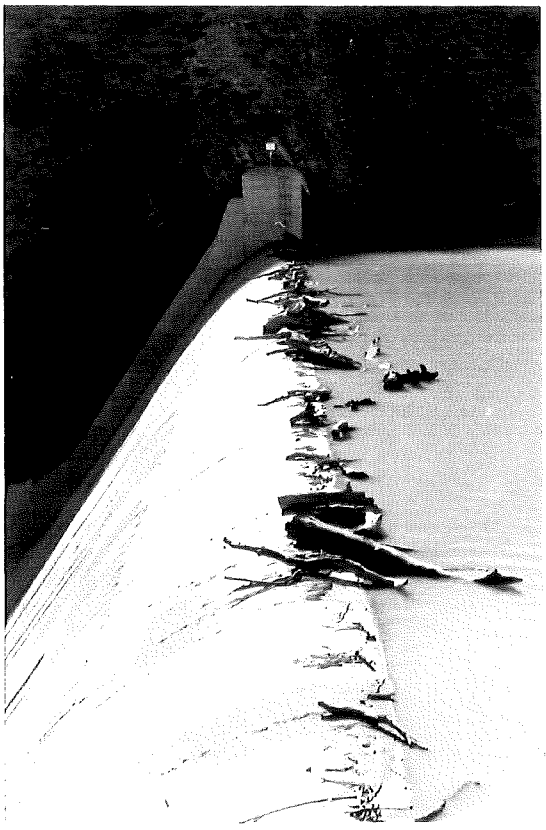
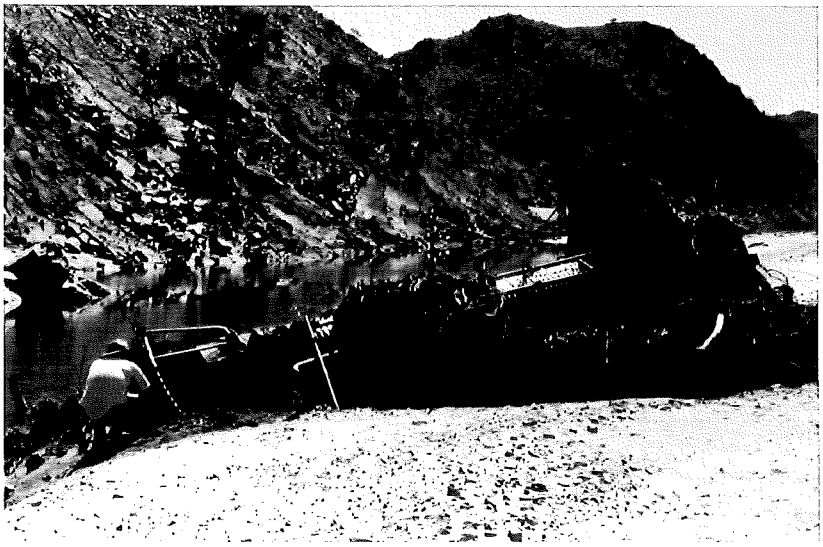
"THE BIG WET"







SPECIAL EDITION : THE BIG WET - MARCH 1989

This Newsletter departs from its usual format to bring members' accounts of events and their consequences that are themselves unusual, possibly "once-in-a-lifetime" occurrences.

This 'big wet' experienced in our State in March caused a flurry of activity for a number of HYDSOC members who used every available form of transportation to head north and see the action for themselves.

Among the airborne were Graeme Tomlinson, John Vandenberg, Jörg Hacker and Bill Lipp who, collectively, flew over Lakes Torrens, Frome and Eyre, the Flinders Ranges, Stuart Highway and the Leigh Creek Road (Hawker-Copley). On the ground, John Read observed tides (yes, "tides", not toads!) in Lake Torrens, and Chris Wright and Claus Schonfeldt monitored the progress of the monsoon as it swept across the country.

Even the "undergrounders" got into the act : Peter Smith reports on the impact of the 'big wet' in the opal fields (Coober Pedy and Andamooka), and your Editor headed north-east to inspect streambed scour at bridges on the Peterborough-Broken Hill railway line.

We are particularly indebted to John Vandenberg whose photographs are featured on the cover. These show (left column, top to bottom) :

- road from Copley to Balcanoona impassable for several weeks;
- Willochra Creek gauging station - estimated peak, 800 - 900 m^3/s;
- Hookina Creek crossing.

Right column (top to bottom) :

- Aroona Dam (28 March 1989) - evidence of silt flow (?);
- Boolcunda Creek crossing.

THE EDITOR

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24 HR. RAINFALL IN S.A. FOR 13/14 MARCH 1989 : BUREAU OF METEOROLOGY PERSPECTIVE

[Contributed by : Chris Wright]

Motpena, which is close to Commodore Swamp, north west of Hawker, now holds the record for an official rainfall station in South Australia. On the 14th March, Motpena recorded a rainfall of 273 mm in 24 hours. The previous extreme rainfall was 222 mm on 18th February 1946. This was also exceeded on 14th March, at Balcanoona, with a fall of 246 mm, and at Beltana with a fall of 236 mm.

The distribution of the heavy rainfall which fell in the 24 hours leading up to 9.00 a.m. on Tuesday 14th March is shown on the Figure. (Larger scale maps showing the rainfall can be inspected at the Bureau of Meteorology in Adelaide). The Figure also shows the satellite picture at the peak of the storm.

The official records noted above have been exceeded by unofficial readings, notably during the March 1983 Barossa storm, when a fall of 300 mm in 24 hours was recorded at Dutton, north of Truro. Recently, on 7th May 1989, in the Waikerie area, the maximum recorded rainfall was 239 mm, at Ross Lagoon, just north of the ferry. This storm occurred between 1900 on 7th May and 0200 on 8th May, approximately 7 hours, and is well documented since it fell on a populated area. The heaviest falls covered an area 12 km wide and 40 km long, but could easily have been overlooked if the storm had occurred in a more remote area. (How often has this happened and we don't know about it?). A storm of the severity of the Waikerie storm could occur anywhere in the State. Had it occurred over Adelaide, the resultant flooding could have been catastrophic. How would the residents of Waterfully Gully have fared?

Meteorologically speaking, the movement of the cyclonic depression across the continent on 13th March could very easily have been further south. The effect of more than 250 mm of rainfall in 24 hours can only be imagined - there is no precedent for an event of this magnitude in Adelaide.

METEOROLOGY SPEAKING IT'S ALL UP IN THE AIR

[Contributed by : Claus Schonfeldt]

I read a Meteorologist's report on the weather systems which produced the heavy rains over Central Australia on 13th-14th March 1989, and I must admit that it was about as clear to me as the muddied waters of the Darling in flood!

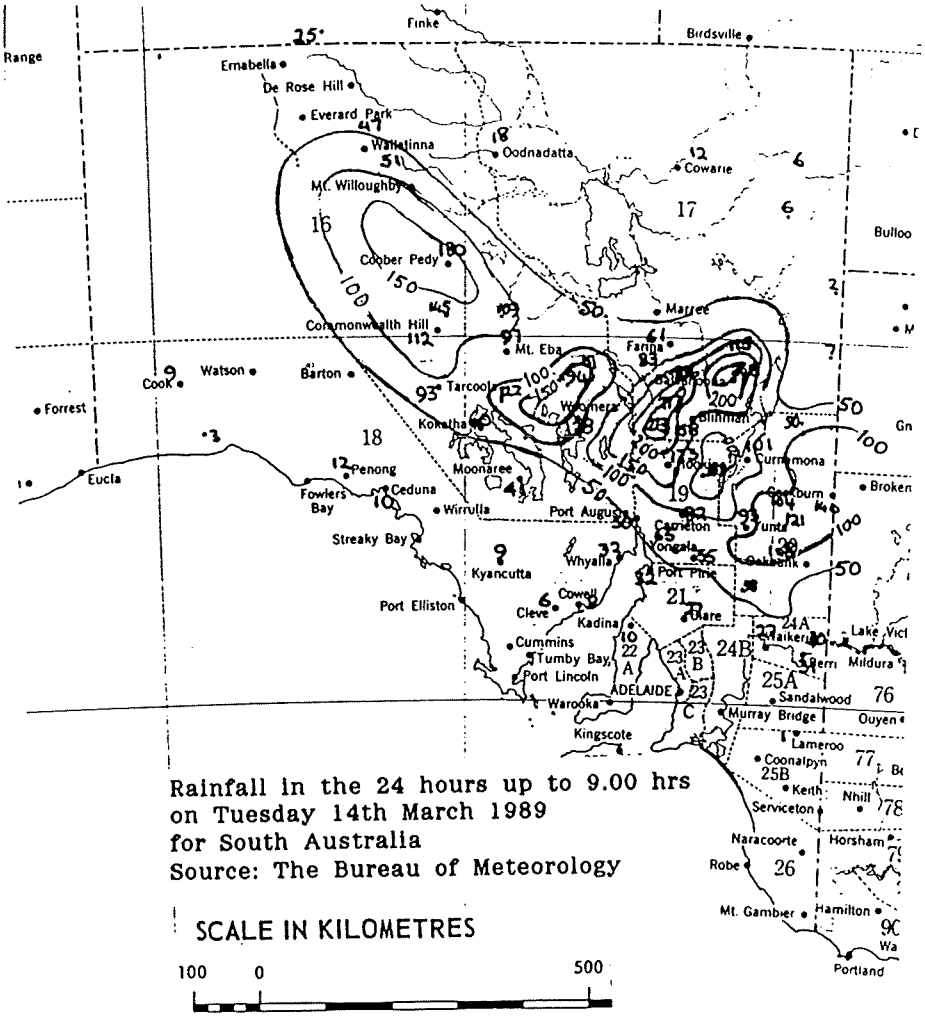
It seems that we owe it all to a well-developed active monsoon depression which was centred near Derby, W.A., on 12th March, and which moved in a generally south-easterly direction during the following days.

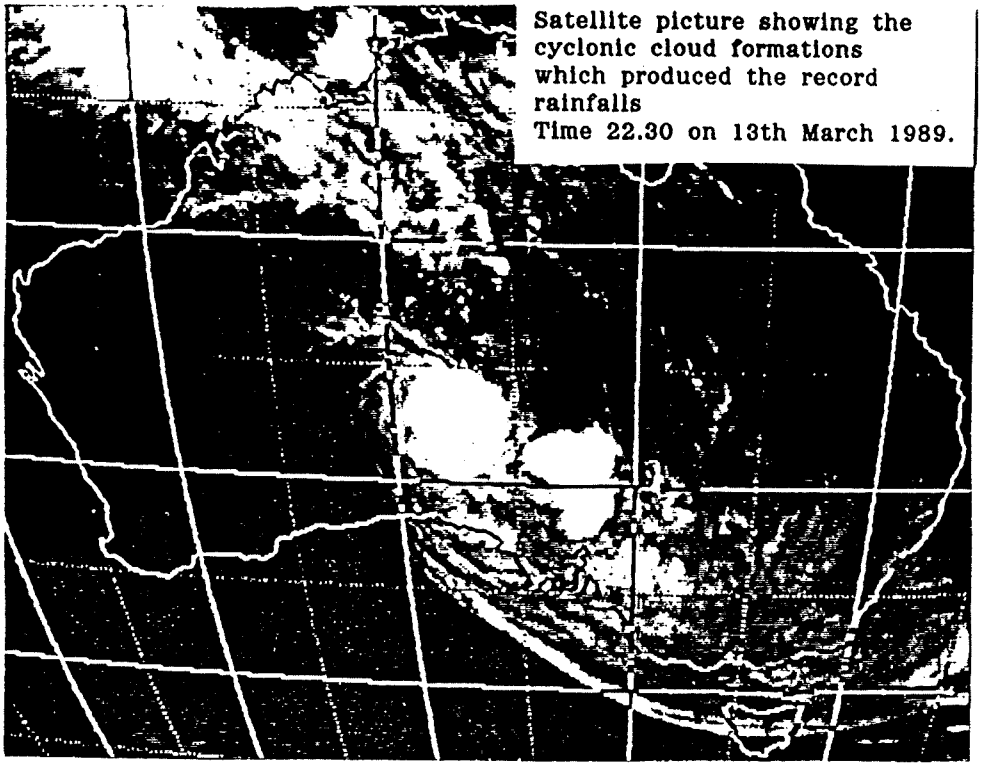
There was an abundance of moisture at all levels. The airmass was of tropical character, being virtually saturated and relatively warm.

The depression was associated with a surface trough which extended from the centre of the depression through north-eastern S.A. and into Victoria.

On 13th March, this trough had deepened and sharpened. The depression had maintained its force and moved into S.A. Most of the heavy rain occurred during this period. The Satellite picture reproduced on the figure on page 3 of this Newsletter shows the centres of heaviest rain clearly.

By 14th March the depression had accelerated its movement to be located near Moomba, but it had begun to weaken. Thereafter, there was a rapid weakening of the depression, and rain activity diminished.





Satellite picture showing the cyclonic cloud formations which produced the record rainfalls
Time 22.30 on 13th March 1989.

FAR NORTH FLOOD EVENT, MARCH 1989

[Contributed by : Graeme Tomlinson]

A party of E. & W.S. hydrologists/hydrographers accompanied by a Lands Dept. photographer flew into the far north of South Australia following the heavy rains of 13/14 March to identify the nature and extent of flooding before it dissipated.

The areas of intense rainfall were quite clear from the air. While there was little evidence of rainfall south of Port Augusta, to the north, the streams, although in recession, were still flowing strongly and ground depressions were holding water. Around Motpena, where record rains had been reported, the ground was extremely wet with considerable ponding between the dunes. There was further evidence of heavy rain at Leigh Creek where Aroona Dam was full and spilling and, across to the east, there obviously had been high flows in the streams heading towards Lake Frome. Between Moolawatanna and Lake Eyre the rainfall appeared to have been considerably less than further south, but, judging by the flows and the amount of water lying to the west of Lake Eyre and northwest of Lake Torrens, there must have been some very heavy falls of rain in that area also.

Streams were more difficult to assess but most appeared to have carried very high flows. Those flowing towards Lake Torrens generally dissipated on the plains between the mountains and the Lake, spreading out and filling depressions and backing up against road and railway embankments. Even Willochra Creek, which was still carrying a considerable flow and is confined to a channel for part of the way across the plain, dissipated rapidly and probably contributed little to the Lake.

There is very little defined drainage around Motpena, but the ponding there bore testament to the sheer volume of rain which must have fallen in this area; while at Parachilna the creek fans out into numerous channels and disperses onto the plain.

Further north, the extent of flooding of Emu and Windy Creeks (which flow into Aroona Dam) could be seen from the 200-250 metre wide silt marks at the road crossings.

Mt. McKinlay and Big John Creeks were flowing strongly and most of the streams, up to Hamilton Creek, which drain into Lake Frome, were carrying significant flows. Lakes Frome and Callabonna appeared, in the distance, to contain water but time precluded a closer look. As I have already mentioned, the area southeast of Lake Eyre appeared to have missed out on the rain, although waterholes in the Frome River were full and the stream was possibly flowing.

As we approached Lake Eyre from the southeast it could be seen that both North and South Lakes contained water, but of a milky colour and apparently from rainfall earlier in the year.

On the other hand, the Neales River to the west was flowing strongly and had already delivered a large volume of muddy water to the Lake. Although the river had passed its peak, the flow was estimated to be still in excess of 600 cumecs. There were further large flows into Lake Eyre South, and both railway bridges and road crossings at Curdimurka were under water.

Surprisingly, Lake Torrens was virtually full. Large inflows were observed to be coming from the northwest, north of Andamooka. This again is surprising as most streams in this area have relatively small catchment areas. Another front of muddy water could be seen advancing across the Lake from the east, probably from Depot Creek, the overspill from Aroona Dam.

Clearly we were privileged to witness a rare hydrological event. However, while arid area hydrology is poorly understood, I am concerned, as a hydrographer, at our inability to properly monitor such events and thus improve our knowledge. Our technology is not up to the task, and field mobility is difficult. Arid area hydrology has few demonstrable short term benefits and, as we face increasingly tighter financial constraints, it falls increasingly lower on our list of priorities.

Does arid area hydrology have any real value or is it just another esoteric field of study? Can it ever be cost-justified for communities whose population is 1 per 1,000 square kilometres or less? Do you have any views on the subject? If so I would be interested to hear them (through this Newsletter of course!).

FROGS, SHRIMPS AND TIDES IN THE FAR NORTH

[Reporter : John Read]

Following the recent heavy rains in the far north of South Australia, many forms of aquatic life have rapidly colonized temporary pools in the region. The most noticeable of these animals are tadpoles of the Trilling Frog (Neobatracus centralis) and Shield Shrimp (Triops australiensis), both of which have aroused considerable interest amongst school children and the wider community.

Trilling Frogs spend the greater parts of their life buried in the sand, often to depths in excess of one metre. These frogs are able to survive by shedding their skin to form a "cocoon" which prevents them from desiccating during

harsh drought periods. Following rains, such as the recent inundations, these frogs are aroused from their subterranean slumber and crawl their way to the surface where they congregate around ponds and attract partners with their characteristic "trilling" call. The eggs and tadpoles develop very quickly and young frogs were observed leaving ponds only 5 - 6 weeks after the rains. These frogs, along with their parents, then dig into the sand with their specially adapted feet and await the next rain.

The lifecycle of the shield shrimp is even more astounding. The eggs of these crustaceans lie dormant in claypans and interdunal regions, sometimes for several years. When sufficient rain has fallen to saturate the eggs, dormancy is broken and rapid development occurs. Within 3 - 4 weeks the shrimps mature at lengths of 6 - 10 cm, and the females lay 50 - 100 eggs. These eggs remain on or near the surface of the mud as the lakes dry and are left to blow around in extremely harsh conditions until the next rain. Apparently the eggs have to dry out before they can develop, which explains why Shield Shrimp are confined to temporary water bodies and are not found in permanent rivers or lakes.

Another interesting observation from this region is that the water level of Lake Torrens, which is a very large shallow lake, is affected by tides in a similar way to the world's oceans. The water edge was observed to wax and wane over 20 metres, probably equivalent to a depth of less than 10 cm, on a diurnal cycle while the wind was constantly blowing from the same direction.

NORTHERN HIGHWAYS AND THE 'BIG WET'

[Contributed by : Bill Lipp]

The Highways Department has constructed two major sealed roads in the far north where the drainage infrastructure was "engineered" to a particular standard. This is in contrast to the unsealed road network where, given the nature and function of such roads, minimal provision is made for drainage with the result that they are very vulnerable to large rainfalls and subsequent long closures.

The two roads are the Stuart Highway (Port Augusta - N.T. border) and the Leigh Creek Road (Hawker-Copley). The Stuart Highway is in the advantageous situation, as regards drainage, of broadly following the major drainage divide in the north of the state between the Lake Eyre Basin and the Great Victoria Desert. By contrast the Leigh Creek Road traverses the Flinders Ranges and is very vulnerable as it crosses the major watershed draining to Lake Torrens.

The Stuart Highway was designed to a 50-year (flood frequency) standard with all flows up to the standard passing under the road. By contrast the Leigh Creek road was designed to a lesser standard for minor drainage under the road (20-years) and with floodways at all major watercourses. The performance of each road during the March 1989 flooding reflects these differences.

Broadly speaking the rainfall was of low average intensity spread over periods roughly from 24 to 60 hours. As such, no major problems were experienced on smaller catchments on either road, which is to be expected as such catchments are sensitive to higher intensity, short duration storms.

Major flows occurred from the larger catchments on both roads. On the Stuart Highway, problems were experienced at Eucolo Creek road bridge : Eucolo Creek is an arm of Island Lagoon receiving runoff from a large area of the Arcoona tablelands west of Woomera. Flows estimated to be in excess of 100-years ARI occurred at this structure. Observations made at the site have enabled revised estimated of RORB parameters for this catchment to be made. k_c values are higher than previously assumed, probably due to the large amount of storage available along this particular length of creek.

At Marla, problems were experienced when another large, long duration storm occurred at Easter following the more widespread rainfall two weeks earlier. The second storm was sufficient to cause extensive flooding of Marla which is partly situated in a broad, very ill-defined watercourse. The local police declared a state of emergency to authorise the breaching of the Stuart Highway in an attempt to alleviate this flooding.

The Leigh Creek road has a history of flooding problems associated mainly with small catchments. During March, problems were generally confined to larger creeks crossed by floodways. Partial structural failure and/or silting occurred at a number of structures. It is proposed that a revised floodway design based upon research undertaken in Western Australia be used as the basis for reconstruction where required. Flows in the creeks in the immediate vicinity of Leigh Creek were less than those experienced further south. Further RORB analysis of the flows in Emu and Windy Crereks have confirmed the low k_c values derived from previous events.

UNDERGROUND FLOODING IN THE OPAL FIELDS

[Reporter : Peter Smith]

Monsoonal rains which extended over the Far North of the State during March caused flooding at the opal fields, occasioning a halt to mining for several weeks and damage to mines and machinery.

At Coober Pedy (average annual rainfall 141 mm), a record 243 mm of rain fell during March with a highest 24-hour reading of 180 mm. This compares with the previous highest monthly reading of 89 mm in 1921 and highest daily reading of 63 mm in 1947. Widespread flooding of underground and open-cut operations occurred, submerging plant including four tunnelling machines and ancillary mining equipment.

Ms Anne Vanajek (the Coober Pedy Miners' Association secretary) suggested that some underground areas could take 12 months to dry out sufficiently to allow work to resume or for recovery of equipment.

Loss of production might well be expected and, thus, be down on the $21 million valuation for 1988 production.

Mintabie area received a record 290 mm during March, more than double average annual rainfall of 117 mm. Many open cuts were flooded with several metres of water; pumping is progressing to dewater underground workings but water disposal has proved a problem. Damaged equipment includes four 'Bobcats', 30 jack picks, 30 air drills, blower pipe, power cords, generators and explosives.

At Andamooka, a record 230 mm was received during March (average annual rainfall 195 mm). A noodling machine, generator and 'bobcat' are reported to have been submerged, requiring stripping and overhaul. Ancillary underground mining equipment including jack hammers and piping have yet to be recovered for damage assessment.

The heavy rains and flooding of the opal fields will result in reduced production, loss of equipment, and elevated repair and maintenance costs. Opal prices might be expected to increase, at least until supply meets demand. Prospecting of new areas, particularly at Coober Pedy and on higher ground, may result as lower areas, although accessible, may not be safely dry for mining for an extended period.

RAINFALL/RUNOFF IN THE FLINDERS RANGES - MARCH 1989

[Contributed by : John Vandenberg]

Record rains over much of the Flinders Ranges produced runoff in some catchments greater than in living memory, and also in some places where it has never been observed before.

The most outstanding aspect of this event was the extent of the coverage. Although not every catchment produced record flows, virtually every catchment produced substantial flows.

As far as the Hydrometric facilities (E. & W.S.) were concerned, record flows were recorded in three catchments.

Willochra Creek had an estimated peak flow somewhere in the vicinity of 800 - 900 m^3/sec at GS 509502. No stage record was obtained as the recorder tower was levelled. From the evidence available it seems the structure failed very early in the event, indicating that there must have been a very rapid rate of rise.

Mt. McKinlay Creek had an estimated flow in excess of 900 m^3/sec at GS 004508. The gauging station was severely damaged losing all external fittings and ending up on a lean of about 20°. Neither the peak of the event, nor any subsequent events were recorded due to the lean and to silting of the well. The hydraulic characteristics of this station have also altered dramatically with the channel being widened, the presence of large silt banks and much of the vegetation being removed.

Mernmerna Creek which combined with Wonoka Creek to form the Hookina Creek had an estimated peak flow of around 600 m^3/sec at GS 510502.

No other stations in this region produced flows exceeding those already on record. Most records commence in the early 1970's.

Rainfall data provide the majority of information available, and most assumptions made in this report are based on available rainfall figures and/or personal accounts by landholders, people stranded in different places etc., and by first-hand observations.

The most significant rainfall recording was at Motpena H.S. where the 24 hour record for South Australia was broken. In excess of 11 inches (280 mm) was recorded, and for the period commencing 12th March to 14th March, about 13 1/2 inches (340 mm) was recorded. Some similar falls were recorded in the Parachilna region with other readings being lost due to rain gauges overflowing, or as in at least one known case, water flowing over the gauge.

Easily the most significant aspect of the event was the filling of Lake Torrens. All catchments draining west from the Flinders Ranges contributed to Lake Torrens. It is difficult to assess which catchments (if any) were the major contributors. To help fill in the picture, the following personal observations were made :

- Partacoona H.S. on the Willochra Creek reported that the creek was virtually full channel at the homestead; largest flow in memory and, being full channel (severely eroded channel), was very nearly largest ever.

- People stranded at Brachina Creek overflow reported that there were two events, the second on 14 March was the larger and nearly full channel. Silt deposits showed that the flow was obviously very large and Brachina Creek is in the higher rainfall area.

- One account that Commodore Swamp was extremely wide and flowing very fast. [Personally observed that flow depth was in excess of about 1 1/2 metres (mental picture) judging by debris marks.]

- Debris marks at Hookina Creek showed flow a couple of metres below top of bridge at road crossing (established circa 1949). A large number of large gums washed out of creek bed. Combining Mernmerna Creek (about 600 m^3/sec) with Wanoka Creek (unknown) but very likely similar magnitude, it is guessed that Hookina Creek may have been largest single contributor to Lake Torrens.

- Travelling from Leigh Creek South to Hawker on Wednesday 15th March, observed that every channel had major flows and there were countless places where minor floodways, channels and undefined drainage breached the road.

There was some form of damage to every crossing and large silt banks at most.

Drainage to the east of the Flinders Ranges was also substantial with Lake Frome mostly filling. The Hamilton Creek catchment was about the northern extremity of any substantial rains. The heaviest falls and largest flows seemed to be in the general area of the Gammon Ranges National Park. Most creeks in this area recorded several large events that were mostly not experienced to the west of the Flinders Ranges.

Rainfall in the Arkaroola region totalled about 400 mm for March spread over 4 events.

On 30th March I flew over the western side of Lake Frome between Hamilton Creek and Big John Creek. It was obvious that all these creeks had carried large flows and all contributed significantly to Lake Frome.

Road damage and continued rains made travel in this part of the Flinders difficult, if not impossible, until early May. Some roads are still closed (17/5/89).

Unfortunately not a lot of streamflow data exist for the Lake Frome catchment. The E. & W.S. Dept. operates Mt. McKinlay Creek and Hamilton Creek gauging stations only. Hamilton Creek did not record any great flows (peak around 50 m^3/sec) and Mt. McKinlay Creek station was badly damaged and did not record the entire event.

The only other data that exist are from locals who say that the flows in the Arkaroola region are the biggest in memory and possibly biggest ever.

It is probably worth noting that this sort of event is a very emotional issue and that in some cases people tend to confuse hope with reality. It's always nice to be able to tell people in years to come that you saw the biggest flood ever!

The only thing that can be said with any confidence is that the flows were amongst the biggest yet, and in the case of Mt. McKinlay Creek it probably was the largest ever, based on the fact that the channel was enlarged considerably.

In trying to assess the cost of this event to the community, it is difficult to give a final figure. The obvious cost is the repair bill that the Highways Dept., Telecom, E. & W.S. Dept., Australian National, and E.T.S.A. gained which would easily exceed $10 million. Highways Dept. alone estimated it would cost more than $5 million to repair all roads.

Another significant loss was to the pastoral industry and tourism. It would be almost impossible to assess the dollars and cents of these aspects, and then they will be largely offset by the long-term benefits. Pastoralists are looking forward to a very good couple of seasons, and the Tourism industry also expects a rush of people wanting to see a wet and colourful inland.

There are countless other losses and gains to be considered, but the immediate cost could easily exceed twice the above figure of $10 million. It will probably take 12 months at least before a reasonable estimate can be made.

"ESTIMATED PEAK FLOWS AT E. & W.S. GAUGING STATIONS : 14TH MARCH 1989

Station		Estimated Flow m^3/sec
004502	Hamilton Creek	50
004508	Mt. McKinlay Creek	900*
508503	Saltia Creek	< 20
509501	Boolcunda Creek	320
509502	Willochra Creek	800 - 900
509503	Kanyaka Creek	130
510500	Aroona Dam Spillway	410
510502	Mernmerna Creek	560
510507	Windy Creek	110
510510	Windy Creek	230
510511	Emu Creek	200

Note that all figures are estimated and subject to change with further investigation.

* Mount McKinlay Creek, in particular, was extremely difficult to determine peak level. The above figure is considered to be a reasonable approximation.

GABIONS PROTECT A.N. BRIDGES

[Reporter : John Argue]

In the late 1970's and early 1980's, Australian National embarked on an extensive programme of scour prevention/protection works at bridges along the Peterborough-Broken Hill railway line. The main components of these works are mattress and 'block' gabions. (Gabions are strong wire "baskets" filled with rock; they are used to prevent streambed scour and embankment collapse.)

A.N. engineers have always harboured some reservations concerning the effectiveness of gabions in extreme flood conditions. The events of March 1989 dispelled these reservations : it is considered by A.N. "bridge-watchers" that at least one and possibly three railway crossings were "saved" by gabion protection.

This outcome was the most gratifying consequence of my visit to 11 bridge sites between Paratoo Creek and Broken Hill immediately following the March 13/14 event. Also rewarding was the observed close similarity between field scour processes and those recorded in the 1/10 scale model study carried out at S.A. Institute of Technology in 1979-80 in connection with A.N.'s programme.

SOME IMPRESSIONS FROM RECENT FLIGHTS OVER LAKE TORRENS AND LAKE EYRE

[Contributed by : Jörg M. Hacker]

During the last few weeks, I had the opportunity to see two of the big salt lakes in the north of South Australia from the air. Having flown across these lakes many times before, when they were either dry or had just a bit of water in them, as well as having traversed Lake Torrens by tricycle, the sight of them filled nearly to their rims was very impressive.

The southern part of Lake Torrens

The first occasion to see the water in Lake Torrens was the recent expedition by a group from Flinders University to the southern part of the Lake. As a contribution to this work, I had been asked to try an aerial survey of the Lake, measuring evaporation and the surface water temperature, as well as to map the extent of the water by using the video-camera which can be mounted underneath the wing of Flinders University's research aircraft. A pattern was flown at very low altitude (approximately 50 ft.) over the water, measuring fluctuations of water vapour and vertical wind speed which, when combined via the eddy-correlation method, give area averages of the vertical transport of water vapour and thus the evaporation from the Lake. The temperature of the water at the surface was monitored by the aircraft's infra-red radiometer.

Flying north from Pt. Augusta, we first followed a chain of lakes which are normally just dry, white salt pans. In the southern part they were inter-connected by a water-filled creek which, as far as I know, has never been given a name. There is, however, no above-surface connection between the top end of Spencer Gulf and the southern tip of Lake Torrens. If there is an exchange of water between the two, it would be a sub-surface flow.

The base camp of the ground party of the expedition had been established at the southern-most tip of Lake Torrens. The Lake there was completely full and ground observations indicated a water depth of up to two meters. Over this water we flew a number of evaporation runs. Then we proceeded along the western shoreline in a northerly direction. At this side, the water was everywhere reaching up to the shallow cliffs which led to a well-defined shoreline. This was in sharp contrast to the eastern side where we could see large muddy brown-coloured silt flats.

About forty kilometers from the southern tip, we spotted a nearly circular island in the middle of the Lake and decided to investigate this closer. When we circled it, we could identify it as the large mound spring which had been noticed before by Reinhardt Schmid, a former Flinders hydrology Ph.D. student.

Reaching Carrapateena Arm, we deviated some kilometers to the west to see that the Arm was filled with water to its very end. As the weather looked gloomier to the north, we decided to cross the Lake just north of Carrapateena Arm. This crossing coincided with the track which we drove a few years ago on tricycles on a field trip together with Reinhardt Schmid. About two kilometers before reaching the eastern shore, we could see this track emerging from the water which already several kilometers before that had become extremely shallow. In some places it was difficult to tell if the surface below was water or mud. From the patterns on the mud, we could clearly see that the water was drifting around quite large distances, partly through wind action or due to seching.

From the eastern shoreline we flew a short deviation to the abondoned homestead of "Old Motpena". There the remnants of the wide-spread flooding were very obvious as well. All clay and salt pans were filled with water and the whole scenery was covered in a lush green carpet of vegetation.

To mark the eastern edge of the water, we then followed the waterline to the south along the eastern shore, recording our flight track as determined by the satellite navigation system on our data logger. We found the waterline in many places to be up to three kilometers west of the shoreline, so the main body of the water is obviously contained in the western part of the Lake. The deltas of the creeks flowing into the Lake from the Flinders Ranges appeared as large silt-fans. The most pronounced ones were Brachina, Moralana and Willochra Creek. The silt-fan of Willochra Creek reached nearly half-way through the Lake.

Although we did not succeed in all our aims for the survey, the evaporation and surface temperature data will contribute to the data set from the experiment, as well as the exact position of the waterline on the eastern side of the Lake.

Lake Eyre and Lake Torrens

A few weeks later, a purely touristic excursion took me to the southern part of Lake Eyre and, on the way back, along the full length of Lake Torrens. On this occasion we flew in a four-seater light aircraft from Goolwa to Arkaroola in the northern Flinders Ranges. The following day, we proceeded north from Arkaroola across the flooded Frome Creek to Lake Eyre. Again, one of the most stunning impressions was, how green the scenery was, especially as I have seen this area many times from the air in a much different condition. A feature which I did not expect was that Lake Eyre and Lake Torrens are so much different when filled with water. Lake Eyre is a vast expanse of water of more or less bluish colour, except on its edges, whereas Lake Torrens is much browner and shows much more structure and flowing patterns.

Arriving over Lake Eyre South, we could see that Goyder Channel, the connection between Lake Eyre South and North, was still flowing, although we could not say how strongly. The River Clayton at the south eastern corner of Madigan Gulf had ceased to flow. We crossed Madigan Gulf and turned back over Brooks Island. From there the waters of Lake Eyre North stretched as far north as we could see. Over the Hunt Peninsula, a row of cumulus cloud produced an eerie mirror image in the water below.

As far as we could see from the air, only some early squadrons of water birds had arrived yet, but there are probably thousands more on their way. The same, by the way, is the case for Lake Torrens, where we saw some flocks of water birds, some of them nesting on mud islands, but by far not in the numbers as have been reported during earlier flood of Lake Eyre.

On the way back along Lake Torrens we found that the water there was divided into a northern and a southern part, with a large mud flat in between. This area of mud stretches from the shore east of Andamooka to about the mouth of the Mulgaria Watercourse at a width of some two to three kilometers. South of this muddy area, the water firstly is very shallow and, as in the southern parts of the Lake, mainly confined to the western side.

During the coming months our research team is planning at least three more excursions into this general area, one to retrieve the instruments which were deployed in Lake Torrens during the first trip, another one to set up some instruments in the Innamincka area where Cooper's Creek is expected to flood within the next weeks, and a third one to Moomba and the Coongie Lakes area to study the effects of the Cooper Creek floods on this lake system, which we have studied already under dry conditions during three recent expeditions.

SECRETARY'S NOTES

The workshop on Australian Rainfall and Runoff is fast approaching, and registrations are pouring in. There are more than 35 to date. Prof. David Pilgrim and Assoc. Prof. Ian Cordery are coming over to give the workshop, and are rumoured to be travelling to South Australia via Innaminka! With the onset of the big wet in March and some additional rain since, they will no doubt be observing the local hydrology at close quarters. We understand however that if road conditions are in any way doubtful, they will fly to Adelaide. Get your registrations in soon!

The meeting on 15th June should be interesting with some exciting possibilities for better use of stormwater than the current practice of sending it out to sea along with all the detritus and pollution that it will hold. John Argue will be the lead speaker so don't miss it.

The AGM details have not yet been finalised, although unfortunately Dr. John Paterson will not be able to address the Society on that occasion due to long-standing family commitments. Information on the AGM speaker will be provided in due course. In the meantime, nominations will soon be called for positions on the Executive Committee, why not put your name forward? There are so many challenging issues in water related affairs that the next few years should be full of interest.

Hydrological Society Executive Committee, Contact 'phone numbers :

Claus Schonfeldt	Chairman	226.2500
Peter Smith	Vice-Chairman	274.7691
Zac Sibenaler	Treasurer	274.7573
Chris Wright	Secretary	366.2269
Graeme Dandy		228.5472
Steve West		226.2485
Chris Purton		223.5583
Anwen Aukland		274.7570
Bill Lipp		343.2264
Fred Leaney		274.9396
John Argue	Newsletter Editor	343.3131

Please note that John Argue will be away on Study Leave in U.K. for the next few months. Contributions to the next two newsletters should be sent to :

Dr. Peter Dillon,
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Closing dates for the next two Newsletters are :

JULY issue : 21st July 1989

SEPTEMBER issue : 22nd September 1989.