

Report on ISAR4

'Management of Aquifer Recharge for Sustainability' was the theme of the 4th International Symposium on Artificial Recharge held in Adelaide, 22-26 September 2002. Attended by 200 people, from 27 countries, with 100 from Australia and large contingents from The Netherlands, Germany, USA and India, where intentional recharge enhancement is widely practiced.

John Williams, chief of CSIRO Land and Water, opened the conference with an exposé of Australian water issues and highlighted the importance of integrated management of surface water and groundwater resources. The keynote paper by Bill Mills (former General Manager of Orange Country Water District, in California) gave a 25 year history of operation of a highly constrained water supply in an arid area. This involves infiltration of Santa Ana River water (mostly treated effluent) from ponds and injection of water reclaimed in Water Factory 21 into lines of wells in the coastal aquifer to prevent saline intrusion to the city's drinking water supply wells.

The 4 papers that followed, covered sites with 20 to 50 years of operating experience of intentional recharge where extensive monitoring has provided evidence of issues needing to be mastered to sustain operation. Over the symposium, sessions covered water quality changes in the subsurface, water reuse via aquifers, geochemistry of aquifer recharge, environmental applications of recharge projects, fate of pathogen and organics, holistic urban water management, health issues, arid zone water management, groundwater hydraulics and storage recovery, land subsidence mitigation and thermal energy storage.

In addition to the 50 oral papers, 50 poster papers were presented, covering the themes above and additional themes such as agricultural practices and recharge, injection well and pond and bank filtration issues and solutions, regional issues and recharge site selection, and recharge enhancement in fractured rock aquifers.

One of the invited papers given by Takashi Asano, 2001 Stockholm Prize Winner, was on health risk management of groundwater recharge with reclaimed water, using three trace organic compounds to exemplify the issues in assessing risks. Peter Fox of Arizona State University presented the other invited paper, on an assessment of sustainability of soil-aquifer treatment of treated sewage effluent.

Pieter Stuyfzand of KIWA in The Netherlands won the Herman Bouwer Award for best paper for his paper on quantification of hydrogeochemical impact and sustainability of artificial recharge systems. This was one of many papers that reflect an improved understanding of processes occurring within the mixing zone. Efforts are emerging to integrate physical, chemical and biological knowledge to improve predictions on water quality evolution and clogging processes.

The Ivan Johnston Award for best poster paper was given to Corrine Le Gal La Salle of Flinders University for her paper on isotope evaluations of aquifer storage and recovery. ASR was a feature of the mid conference field trip where stormwater and reclaimed water ASR sites were inspected along with wetlands used to improve urban stormwater quality. Best paper from a young scientist went to Stephanie Rincke-

Pfieffer for a paper on clogging processes and best paper from a developing country was awarded to Surene Zeelie of Namibia Water Corp. for her paper on the Omdel dam recharge system in the Namib Desert.

Papers are recorded in Proceedings which are available from Balkema: www.balkema.nl - (click on IAH under specialist organisations) – for IAH members a 60% discount applies – and can be ordered on-line.

The conference failed to draw out papers on community involvements and information, or on policy and regulatory aspects, (such as ownership of recharge water), nor was there serious consideration of any impacts of recharge on downstream environmental flows.

One success of the conference was in cross-pollinating advances in process understanding between groups working in pond infiltration, bank filtration and well injection.

The next symposium (ISAR5) will be held in June 2005 in Berlin and current research on water quality changes during bank filtration in Berlin will be a feature of the conference.

On 21-22 Sept, preceding ISAR4, was a successful UNESCO-IAH workshop on evaluating the performance of recharge enhancement projects in arid and semi-arid areas. This was attended by 50 hydrogeologists from 20 countries. Outcomes of this workshop were acted on in the IAH-MAR plenary.

The International Association of Hydrogeologist Commission on Management of Aquifer Recharge held its first plenary as a commission on 24 Sept during ISAR4. Important actions arising from that plenary were the formation of 3 new working groups; 'Training' (led by David Pyne, USA), 'Regulations' (Theo Olsthoorn, NL), and 'Inventory' (Albert Tuinhof, NL). An existing working group to develop a publication on 'Wise strategies for recharge enhancement' was reconstituted. During the plenary the Deputy Chair, Ian Gale (BGS, UK) gave a demonstration of an on-line searchable list of references on the IAH-MAR web page (www.iah.org/recharge) and launched a UNESCO-IAH brochure 'Managing Aquifer Recharge'. An email list for the Commission can be joined within the web page.

The conference concluded with a post conference tour on Fri 27 Sept to a scenic area near Adelaide involving various recharge sites, other groundwater and water management issues, lunch at a winery and lots of laughter. Smaller sequel tours were held in Perth and Townsville in the following week.

The organisers wish to thank the sponsors of ISAR4 and/or the workshop and 20 developing country delegates: UNESCO, AWWARF, AusAID, Government of South Australia, Bolivar ASR Research Project, City of Salisbury, Centre for Groundwater Studies, Volkswagen Foundation, and the endorsing organisations: IAH, ASCE, IWA, AWA, IE Aust, GSA and Hydrological Society of SA for supporting this event