

Groundwater Management and Water Licensing

Newsletter

July 2011

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The Victorian pilot of the National Groundwater Information System nears completion

The Victorian pilot of the National Groundwater Information System (NGIS) was completed in June, and a funding bid is underway to further develop aspects of the project.

The Bureau of Meteorology (BoM) is responsible for compiling Australia's water information under the *Commonwealth Water Act 2007*. So it can meet its obligations, the BoM is developing the National Groundwater Information System (NGIS). This is an ambitious project.

The NGIS aims to provide nation-wide information on aquifer boundaries and layers, aquifer characteristics, hydrogeologic units, groundwater management areas and bore characteristics and all of their inter-relationships. This information will be used in many ways to assist groundwater managers.

In 2010 the BoM provided funding to the Groundwater and Licensing Branch to develop the Victorian component of the National Groundwater Information System (V-NGIS).

Jill McNamara, Manager for Groundwater Monitoring and Reporting, said that the project has been undertaken in three stages.

In Stage 1, information previously stored across five different databases was consolidated. Groundwater data is currently stored in a number of databases, each for different purposes. This includes the Groundwater Management System, Water Register, State Monitoring & Maintenance

database, Rural Water Corporation licensing information and Catchment Management Authority database.

"The aim of this component was to improve data and ensure the best possible information available was consistent across each source," Jill said.

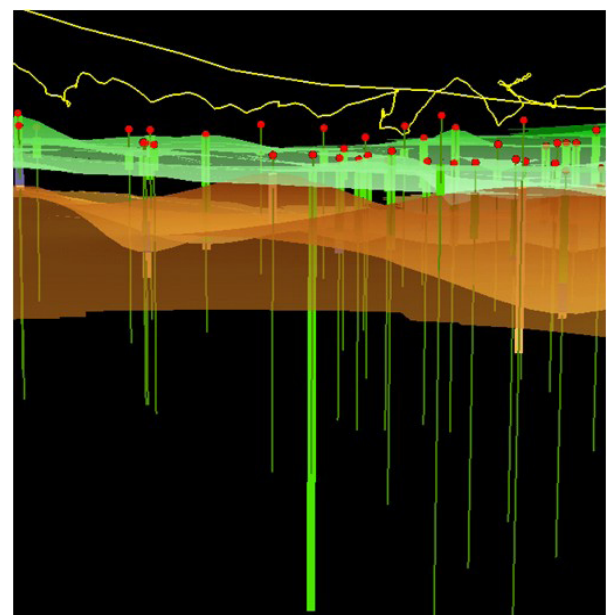
"This improved set of data will be incorporated into Victoria's new Water Management Information System." (For more information on the Water Management Information System, see page 3).

However, the V-NGIS is currently a stand-alone dataset only. Because information required to populate the fields is held within live DSE systems, keeping the V-NGIS data set current would require major system changes within DSE.

In Stage 2 a database of over 20,000 interpreted bore logs was generated. This database will form the basis for generating 3D aquifer layers covering the entire state.

Stage 3 involved an evaluation of the tools in the ArchHydro package which the BoM requires to be used to manage and visualise hydrogeological data in 2D and 3D.

An output of the project is shown in the figure below. Victorian data has been entered into ArchHydro and tested on the Leongatha Groundwater Management Area. The hydrogeological units in the Leongatha GMA are shown. The Leongatha boundary is in yellow, the green represents the top of the Older Volcanics, whilst the brown is the top of the basement unit. Bores used to generate these layers are also pictured.



Jennifer's desk



With groundwater resources largely being unseen groundwater managers are very reliant on data systems for the accurate recording and storage of groundwater information.

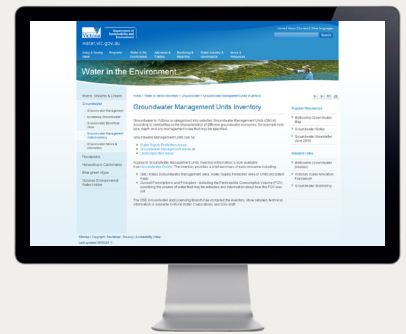
Being able to access reliable data about bore location and depth, drilling records, water use measurements, current and historic water level readings and water quality records is key to any study of a groundwater system.

The Water Group has recognised this and in recent years has placed greater emphasis on ensuring accuracy of data and the development of systems to ease and reduce manual data entry (see the newsletter from August 2009).

The inclusion of groundwater licences on the Water Register, the development of the Groundwater Online website

(www.water.vic.gov.au/environment/groundwater/gmu-inventory), the development of 3D aquifer mapping projects across the state and the replacement of antiquated, hard to use information management systems should mean that information about groundwater is more accessible in the future.

This issue is focussed on a number of information projects underway.



Groundwater Online website

Flood Recovery Funds set to restore the water-logged State Observation Bore Network

The Groundwater Monitoring team successfully bid for funding to repair flood impacted parts of the State Observation Bore Network. The funding will commence in July 2011.

Over 120 bores across Victoria were potentially inundated with flood waters during the heavy rainfall of September 2010, December 2010 and February 2011.

Flood waters have also caused land adjacent to some of the bores to erode, leaving them in very unstable conditions.

The flood recovery funding will be used to clean-out bores, raise head works where appropriate, stabilise surrounding land and construct concrete pads around the base of the bores.

Works proposed on flood impacted bores will improve the quality of the data captured and ensure that the data is representative of the groundwater aquifer only and not affected by flood water inundation.



On the left is a bore in the Warrion Water Supply Protection Area (WSPA) in February 2010. On the right is a photograph of the same bore in February 2011.

Trials underway to speed-up bore completion reporting

A promising trial to expedite the bore completion reporting process is currently underway.

Within 28 days of drilling a bore, the driller must provide the relevant Rural Water Corporation and the land holder with a bore completion report (BCR).

A BCR is a record of the completed bore supplied by the driller and includes information on the bore construction, drilled depth and geological conditions encountered. Currently this information is manually transposed from the drillers report into the BCR system by staff at the water corporation.

As part of the new trial, Goulburn Murray Water has asked drillers to directly upload data from the field using a wireless connection. Approximately 30 sites have so far been successfully completed using this new technology.

This follows an initial trial in 2010-11 where data was directly uploaded to a PDA.

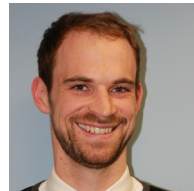
But poorer PDA technology and GPS functionality at the time meant this trial was not considered successful.

Improvements that have assisted the success of the new trial include the self population of bore construction licence information already recorded in the water register into the mandatory fields in the BCR form.

Advances in global mapping functionality mean that the bore location within the property is automatically recorded from the GPS and it is verified that the coordinates fall within Victoria. Previously the bore location was estimated based on hard-copy maps and was subject to keying errors. This has resulted in erroneous information in the Groundwater Management System where bores have been recorded as located in Papua New Guinea or Antarctica and beyond.

GMW is proposing a further trial of this application to other drillers.

Who's Who in groundwater



John Sharples
Project Officer

When John Sharples isn't out climbing rocks, he's thinking about what's way down below them – in our groundwater storages.

As a member of the Resource Assessment and Planning team John provides technical support to the Groundwater and Licensing Branch.

John joined the Department of Sustainability and Environment at the start of 2009 through the DSE/DPI Science Graduate program, which is specifically tailored to recruiting staff for technical roles and includes extensive training and work experience. Through the program John has spent time working at the Department of Primary Industries, Southern Rural Water and private consultants GHD

Recently, John has been assessing the impact climate change has on groundwater resources. He has witnessed how the drought generated a greater interest in developing an understanding of the groundwater resources in Victoria.

"For a long time groundwater has had a reputation for being "too hard", people had trouble understanding what they couldn't see," John said.

"Now, more and more people are gaining an understanding of the basics of groundwater science.

"Recent projects such as the 3D mapping of aquifers the Otway, Port Phillip and Gippsland basins, and several new Groundwater Resource Appraisals have made great headway in refining our understanding of groundwater resources."

In the year ahead, John and his team will be working on the Secure Allocation, Future Entitlement (SAFE) program, which will involve producing integrated 3D GIS layers for the aquifer structures across the entire state.

Water Management Information System development underway

A Water Management Information System is currently being developed to house the Department's groundwater and surface water data.

For groundwater, this will replace the current Groundwater Management System (GMS) and the public Victorian Water Resources Data Warehouse.

DSE has contracted software company, Kisters, to install and customise their *Hydstra* software. This software will allow DSE to manage time series, water quality and instrumentation data all within the new system.

Hydstra has a well established client base in Australia including state governments and the Bureau of Meteorology.

Telemetry trials are providing efficient solutions for measuring groundwater levels and extraction across the state

1. Groundwater Level Sensors

The days of physically trekking out to bore sites in the middle of nowhere and manually measuring groundwater levels each month could soon be a thing of the past thanks to an army of sensors in place around the state.

There are currently 31 telemetry sites across Victoria linked to 65 sensors. The sensors record groundwater levels on a regular basis, typically every 15 minutes. A limited number of sensors also record groundwater salinity (electrical conductivity). This allows for a comprehensive picture of how the groundwater level is responding to factors such as climate, interaction with waterways or groundwater pumping.

In addition, there are a further 247 sensors where information is downloaded manually at the monitoring site.

The majority of the sensors and telemetry units have been operating for up to two years. In some cases, the sensor information has negated the need to manually visit some bores on a monthly basis and the manual monitoring frequency has been reduced to quarterly.

In 2011, DSE will complete a review of the sites with sensors and telemetry units installed in 2009/10. This may further reduce the need to physically visit monitoring sites.

Below is an example of data obtained from one of the telemetry and sensor sites in the Nullawarre WSPA. This shows the groundwater response to heavy rainfall in December 2010 and February 2011.

2. Groundwater Licensed Extraction Meters

Reading water meters in remote, western groundwater management areas can often be problematic for groundwater managers at Grampians Wimmera Mallee Water (GMMWater).

In some cases, reading a remote meter involves a seven hour round trip, an overnight stay and two staff for health and safety reasons.

To combat this, GMMWater plans on installing a total of 50 back-to-base telemetry units on groundwater bores in the Murrayville WSPA, Telopea Downs GMA and Kaniva GMA.

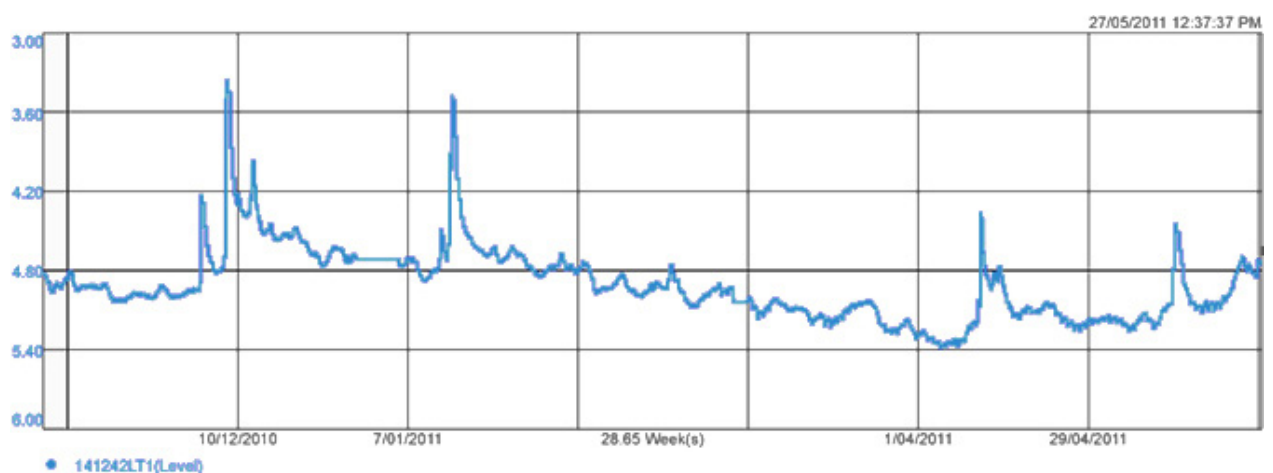
Currently 20 units have been installed within the Murrayville WSPA and regular readings demonstrating how much usage has taken place and during which period it occurred are being received

It is also hoped that having these units will provide a better understanding of how and when water is used and ensure that compliance criteria are met.

With daily readings GMMWater can now identify within 24 hrs if a meter has ceased to function allowing it to rectify the problem immediately.

The back-to-base telemetry system comprises an electronic reader which can pick up on the pulse emitted by a meter and convert it into a volumetric reading. This reading is then transmitted back to a GMMWater server via the use of Telstra's Next G network.

In the future GMMWater is also considering setting up a web interface where daily meter readings could be uploaded onto their webpage for licence holders to access. This would allow licence holders to access these readings almost instantly and see how much entitlement is remaining on their licence.



Measuring water you can't see

The Groundwater and Licensing Branch recently worked with the DSE Communications team to film a short video to educate the community about how groundwater levels are measured as part of the State Observation Bore Network monitoring program.

The video, featured on the DSE YouTube channel, shows Hydrogeologist Marcus Onken from Thiess Services talking us through how groundwater is measured, and the importance of this information for management of the resource.

The YouTube video has proved to be a hit for the DSE YouTube channel, receiving over 200 views in its first week.



The video can be viewed at <http://www.youtube.com/DSEVictoria>

Frequently Asked Questions

In a new section for the Groundwater and Licensing Branch newsletter, each issue we will answer one or two frequently asked questions.

Question of the month: what happens when a rural water corporation needs to apply for a groundwater licence to supply its urban customers?

Rural water corporations that supply groundwater to towns require a licence.

If access to new or additional groundwater is sought by a rural water corporation, the same rules that relate to any urban water corporation applying for a licence apply.

The rural water corporation must make an application to the Minister for Water and provide a hydrogeological assessment with enough information to ensure a decision about s.40 matters can be made.

These licence applications are assessed by the Groundwater & Licensing Branch which provides advice to the Minister to support his decision.

State Observation Bore Network (SOBN) Monitoring & Minor Maintenance contracts (2011-2014)

Thiess Services has been announced as DSE's Field Service Provider for the next three years.

The SOBN Monitoring & Minor Maintenance contract went to tender in November last year.

Previous contracts have concentrated on the collection of water level measurements and the Department's needs. The new contract includes all monitoring activities carried out by DSE and the Rural Water Corporations.

In addition, Thiess staff who will be collecting groundwater information from the field have all attended a short course with Dr Peter Dahlhaus at Ballarat University, to ensure a better understanding of groundwater in Victoria including bore construction and development, data collection (including sensors) and groundwater chemistry.

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