



Innovative Groundwater Solutions

We work with a range of clients in the public and private sectors, using state-of-the-art scientific tools and techniques to inform sound business and water management decisions.

Groundwater Resource Assessments

The IGS team has more than 50 years combined experience in planning and executing regional-scale groundwater resource assessments. Projects range in complexity from compilations of existing hydrogeological data into conceptual models and aquifer water balances, through to field-based studies using chemical and isotopic tracers to identify groundwater flow paths and quantify residence times, flow rates, inter-aquifer leakage, recharge and discharge. We commonly use numerical models to assimilate this information and to predict aquifer responses to selected climate or management scenarios.

Salinization of groundwater resources is an ongoing problem in Australia. Addressing this process in individual areas requires an understanding of the physical and chemical controls on groundwater salinity, which may be natural or man-made. When this is achieved, methods of mitigating groundwater salinity increases can be identified. IGS has experience in characterising and quantifying natural and man-made groundwater salinization processes.

Groundwater Sustainability and Management

IGS works with both government agencies and groundwater users to establish defensible science-based groundwater management principles. We have extensive experience working at the interface between science and groundwater policy. Our services in this area may include: reviewing existing knowledge and data, collecting new field data, interpreting results in the context of groundwater management options, developing conceptual and/or numerical models of groundwater systems and providing technical advice to our clients in negotiations about water allocation.

IGS is currently working with consortiums of irrigators located in theoretically over-allocated areas to provide a technical basis for revising the groundwater allocation principles applied. In some cases, groundwater flow models developed by IGS are being used to assess alternative management approaches and as a basis for discussions with government representatives.

IGS has specialist expertise in using state-of-the-art scientific tools and techniques to understand hydrogeological controls on groundwater dependent ecosystems (GDEs). This helps to assess the risks to GDEs from future development, and to develop meaningful groundwater pumping rules, such as buffer zones and set-back distances for ecological assets.

Groundwater Development in Northern Australia

The 'White Paper on Developing Northern Australia' (18 June 2015) has identified enormous opportunities and corresponding knowledge requirements for developing groundwater resources north of the Tropic of Capricorn.

IGS has more than 10 years of experience working with State, Territory and Commonwealth jurisdictions on identifying opportunities and constraints for large-scale irrigated agriculture development in the north. We are currently working with CSIRO to assist them in delivering the Northern Australia Water Resources Assessment (NAWRA). We are also working with numerous pastoral stations and Aboriginal corporations on hydrogeological assessments to investigate water supply options and to support applications for groundwater licences.





Innovative Groundwater Solutions

Groundwater in the Energy and Resources Sectors

Establishing sustainable energy and mineral resource extraction projects requires sound knowledge and careful management of groundwater flow processes, as well as the transport of both natural salts and contaminants in complex geological environments.

IGS has particular expertise in estimating groundwater flow through aquifers and inter-aquifer leakage through aquitards (low-permeability rocks) at the formation-thickness scale, which is critical for input to models of cumulative impact assessment. We are currently working on a number of proposed or existing coalmine and unconventional gas projects in Australia.

Agricultural and Industrial Water Supplies

Traditional hydrogeological methods are generally employed to identify and assess the performance of groundwater supply options for most agriculture and mining. However, the assessment of potential constraints to groundwater pumping such as water quality, inter-aquifer leakage and impacts to existing users including groundwater dependent ecosystems, requires more specialised methods.

While IGS commonly applies the traditional methods to solve everyday problems, we also have specialist technical skills and expertise that utilise environmental tracers and various modelling approaches to assess groundwater flow paths and residence times, inter-aquifer leakage, and the level of groundwater dependence for aquatic ecosystems. These techniques can be applied to ensure that water supply objectives are met and potential constraints are identified and managed accordingly.

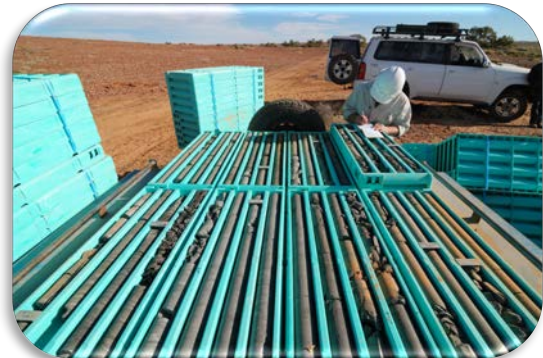
CONTACT US

Ph. 0458 636 988

Email: glenn@innovativegroundwater.com.au

Web: www.innovativegroundwater.com.au

Address: 2/162 Hindmarsh Road, Victor Harbor SA 5211



Groundwater in Belowground Waste Disposal

Deep, low-permeability geologic formations are becoming increasingly attractive targets for the long-term safe disposal of man-made waste. Classic examples include hazardous and radioactive waste repositories, and the 'geosequestration' of carbon dioxide. Such activities require the highest level of scientific rigour to carefully characterise groundwater flow processes and the potential for solute transport through these low-permeability rocks. This information is critical for understanding the potential transport and fate of the waste, or associated by-products, in the subsurface should natural or engineered containment structures fail at some time in the future.

IGS has internationally recognised expertise in the characterisation of groundwater flow and solute transport in thick aquitards. Unlike conventional laboratory techniques that measure physical and chemical properties on small pieces of drill core, our specialty is in the use of high-resolution vertical profiles of natural pore water chemistry and isotopes collected over the full thickness of the geologic formations. This provides meaningful estimates of permeability that can be used in predictive solute transport models to test various migration scenarios.

We have worked on characterising deep, clay-rich aquitards in South Australia, Queensland and the province of Saskatchewan in Canada. We have also visited the Äspö Hard Rock Laboratory in Sweden, and we maintain strong research links with international experts in the USA and Canada.

