Daniel Wohling B.Sc. M.Sc.
Senior Hydrogeologist

Overview

Daniel has 18 years' experience as a hydrogeologist working in South Australia, Western Australia, Tasmania, Queensland and the Northern Territory. Daniel joined IGS in February 2017 after 15 years working for the South Australian Government where he was responsible for managing small to regional groundwater resource assessment projects, many of which involved remote or isolated drilling, aquifer pumping test and environmental sampling programs.

Daniel is experienced in aquifer pumping test design, analysis and interpretation, hydrochemistry and environmental tracer sampling and interpretation, analytical and numerical groundwater modelling, bore and groundwater monitoring network design and the on-site supervision and management of drilling programs. Daniel has a fundamental understanding of groundwater recharge and discharge processes, groundwater flow including density dependent flow, aquifer connectivity including source water classification for groundwater dependent ecosystems and the assessment of groundwater resource capacity to inform water supply strategies. Daniel is highly organised and committed to regular communication to ensure safe, practical and cost-effective outcomes are delivered to the client's expectations.

Qualifications

2011 M.Sc. Flinders University of South Australia

Thesis: *Application of a recharge and salinisation model using field chloride inventories in the Border Groundwaters Agreement Designated Area, South-East South Australia*

2001 B.Sc. Flinders University of South Australia

Employment history

February 2017 – present
Senior Hydrogeologist: Innovative Groundwater Solutions Pty Ltd.

March 2016 – October 2016
Acting Principal Hydrogeologist: SA Government DEWNR

March 2014 – February 2017
Sub-team leader, Groundwater Investigations: SA Government DEWNR

February 2002 – February 2017
Senior Hydrogeologist: SA Government DEWNR

Licences

Drivers Licence: Class MR (South Australia)

High Risk Work Licence: Forklift (South Australia)

Front-End Loader Licence (South Australia)

Competencies

Jan 2020:	Provide First Aid (HLTAID001, HLTAID002, HLTAID003 and HLTAID005), CBD College
Jul 2019:	Screens & Gravel Pack, Australian Drilling Industry Association
Oct 2017:	Energy & Infrastructure Remote Area 2 (4WD training) (RIIVEH201D & RIIVEH305D), Adventure 4WD
Aug 2015:	Muds Techniques & Tests, Australian Drilling Industry Association
Aug 2015:	White Card (Work Safely in the Construction Industry, CPCCOHS1001A), Construction Industry Training Centre

Recent projects

Groundwater assessment for the Glendalough Irrigation Area
Oct. 2019 – current, Australian Government North Queensland Water Infrastructure Authority
Provide an independent evaluation of the sustainable extraction limit for the Glendalough Alluvial Aquifer.

Eromanga Basin Groundwater Monitoring & Management Strategy
Sep. 2019 – current, Beach Energy
Developing a groundwater monitoring and management strategy to address conditions of the Gazetted authorisation to extract additional co-produced water from the Eromanga Basin.

Olympic Dam Wellfield Expansion, Groundwater Conceptualisation
Sep. 2019 – current, BHP through EMM
Development of a conceptual hydrogeological model of the Great Artesian Basin (J-K aquifer) to support a new numerical groundwater flow model of the western Eromanga Basin. The objective of the numerical groundwater flow model is to model abstraction from BHPs Olympic Dam wellfields and the potential impacts including depressurisation and effects on flow to GAB springs.

Lucy Creek Station / KGL Resources Drilling Program
May 2019, Groundwater Enterprises for KGL Resources
Drilling supervision services for the KGL Resources water supply drilling program on Lucy Creek Station, NT.

Far North Prescribed Wells Area Groundwater Model
Nov. 2018 – current, Department of Environment and Water
Manage the development of a groundwater model of the Great Artesian Basin within South Australia, the Northern Territory and southwest Queensland including preparation of water use, water level/pressure monitoring, salinity and hydrochemistry datasets to inform model design and construction, including the interpretation of density dependent flow conditions.

Source Yield Investigations of Stage 4 Regional Towns Water Supply Systems – St Marys and Adventure Bay
Oct. 2018 – Apr. 2019, TasWater through WMAWater

Nita Downs Station Irrigation Development, Area B Risk Assessment
Oct. 2018 – Nov 2018, Forshaw Pastoral

Anna Plains Station Irrigation Development Risk Assessment
Sep. 2018, Anna Plains Cattle Co. Pty Ltd

Barossa PWRA and McLaren Vale PWA Groundwater Level and Salinity Status Baseline Review
Jun. 2018 – Aug. 2018, Department of Environment and Water

Nita Downs Station Irrigation Development, Area A H2 Hydrogeological Assessment
May 2018 - Nov 2018, Forshaw Pastoral Company

Willochra Basin Non-prescribed Groundwater Resources Assessment
Apr. 2018 – May 2018, Department of Environment and Water

Mowanjum Station H2 Hydrogeological Assessment
Feb 2018 – May 2018, Mowanjum Aboriginal Corporation

Shamrock Station Irrigation Project Stage 2 Preliminary Modelling
Nov. 2017 – May 2019, Australian Standard Agriculture / Argyle Cattle Company

Tanami Road Hydrogeological Assessment – Water Supply Strategy
Oct. 2017 – Aug 2018, Australian Gas Infrastructure Tanami Pty Ltd
Bore rehabilitation, drilling and aquifer pumping test program to deliver a sustainable water supply strategy to support construction of the Tanami Gas Pipeline.

Locks Well Pastoral Pty Ltd Irrigation Development
Oct. 2017 – Nov 2017, Locks Well Pastoral Pty Ltd.

Kimberley Asparagus H3 Hydrogeological Assessment
Jun. 2017 – Dec. 2017, Kimberley Asparagus.

Shamrock Station Irrigation Project H3 Hydrogeological Assessment
Mar. 2017 – Nov. 2017, Australian Standard Agriculture / Argyle Cattle Company.

Tanami Road – Scoping Study for Construction Water Supply
Feb. 2017 – Jun. 2017, NT Department of Infrastructure, Planning and Logistics.
Detailed desktop review of hydrogeological data and field audit of existing water supply assets to produce a water supply strategy

Goyder – Facilitating Long-term Outback Water Solutions: Stage 3 (G-FLOWS Stage 3)
Sept. 2015 – Feb. 2017, Goyder Institute for Water Research.
Design of hydrogeological control sites to validate Airborne Electromagnetic (AEM) data, specifically the construction and testing of groundwater bores.

Salinity Investigations and Groundwater Modelling: South Australian Riverland Floodplains Integrated Infrastructure Program (SARFIIP)
Jan. 2015 – Mar. 2016, Murray-Darling Basin Commission.
Designed and managed a drilling program that established baseline monitoring and production bores and undertook subsequent hydrochemistry (environmental tracers and isotopes) sampling and salinity sonding. As part of the management of soils and groundwater monitoring and reporting for the Chowilla Floodplain Icon Site project, managed a workshop that developed a series of recommendations for future soils and groundwater monitoring in Chowilla, Pike and Katarapko floodplains; then managed a baseline soils assessment on Pike and Katarapko floodplains. Investigation data then informed the development of numerical groundwater models for the Pike and Katarapko floodplains.

Arckaringa Basin and Pedirka Basin Groundwater Assessment Project
Jul. 2012 – Jun. 2015, Department of the Environment and Energy.
Development of conceptual hydrogeological models, identification of knowledge gaps and design of investigations to address key knowledge gaps. These investigations included several drilling and aquifer testing programs, hydrochemical and hydraulic sampling and analysis, numerical groundwater modelling and hydrogeological mapping.

Allocating Water and Maintaining Springs in the Great Artesian Basin
Jul. 2008 – Jun. 2012, National Water Commission.
Led drilling programs and groundwater assessment investigations into diffuse groundwater recharge, mountain system recharge and ephemeral river recharge.

Minimising Salt Accession to the South East of South Australia and Groundwater Salinisation in the Naracoorte Range Portion of the Padthaway PWA
Sept. 2004 – Jun. 2008, SA Department of Environment, Water and Natural Resources.
Groundwater recharge and salt flux investigations, including drilling and hydrochemistry sampling programs, to understand the long-term sustainability and viability of existing and future groundwater users and ultimately more effective groundwater management strategies.

Publications

Innovative Groundwater Solutions, Groundwater Logic, WatershedHG and EMM (2019). Olympic Dam Wellfield Expansion: Groundwater Conceptualisation and Modelling. A report prepared for BHP.

Keppel M., Sampson L., **Wohling D**., Osei-Bonsu K., Charles A., Magarey P., Novak M., Sansome A. (in press). Far North Prescribed Wells Area Groundwater Model project: Volume 1 – Data and gap analysis. DEW Technical Report, Department for Environment and Water, Adelaide.

Keppel M., Sampson L., **Wohling D**., Osei-Bonsu K., Charles A., Magarey P., Novak M., Sansome A., Inverarity K., Wood C., Sohrabi S. (in press). Far North Prescribed Wells Area Groundwater Model project: Volume 2 – Conceptualisation. DEW Technical Report, Department for Environment and Water, Adelaide.

Osei-Bonsu K., Keppel M., Sampson L., Woods, J., **Wohling D**. (in press). Far North Prescribed Wells Area Groundwater Model project: Volume 3 – Initial model design. DEW Technical Report, Department for Environment and Water, Adelaide.

Priestley S.C., Shand P., Love A.J., Crossey L.J., Karlstrom K.E., Keppel M.K., **Wohling D.L**. and Rousseau-Gueutin P (2019). Hydrochemical variations of groundwater and spring discharge of the western Great Artesian Basin, Australia: implications for regional groundwater flow. Hydrogeology Journal Special Edition "Advances in hydrogeologic understanding of Australia's Great Artesian Basin". https://doi.org/10.1007/s10040-019-02071-3.

Halihan T., Love A., Keppel M., Dailey M., Berens V. and Wohling D. (2019). Evidence for groundwater mixing at Freeling Spring Group, South Australia. Hydrogeology Journal Special Edition "Advances in hydrogeologic understanding of Australia's Great Artesian Basin". https://doi.org/10.1007/s10040-019-02069-x.

WMAWater, Innovative Groundwater Solutions, Austral Research and Consulting (2019). Source Yield Investigation of the Stage 4 Regional Towns Water Supply Systems – St Marys. A report prepared for TasWater.

WMAWater, Innovative Groundwater Solutions, Austral Research and Consulting (2019). Source Yield Investigation of the Stage 4 Regional Towns Water Supply Systems – Adventure Bay. A report prepared for TasWater.

Innovative Groundwater Solutions (2018). Barossa Prescribed Water Resource Area – 2018 groundwater level and salinity status report, DEW Technical report in press, Government of South Australia, Department for Environment and Water, Adelaide.

Innovative Groundwater Solutions (2018). McLaren Vale PWA – 2018 groundwater level and salinity status report, DEW Technical report in press, Government of South Australia, Department for Environment and Water, Adelaide.

Karbasi M, Kretschmer P & **Wohling D** (2018). Non-Prescribed Groundwater Resources Assessment – Northern and Yorke Natural Resources Management Region, Phase 2 - Willochra Basin, DEW Technical report in press, Government of South Australia, Department for Environment and Water, Adelaide.

Innovative Groundwater Solutions Pty Ltd. (2018). Nita Downs Station H2 Hydrogeological Assessment Report. A report prepared for Nita Downs Station by Innovative Groundwater Solutions

Innovative Groundwater Solutions (2018). Tanami Gas Pipeline Water Supply Strategy. Final report prepared for Australian Gas Infrastructure Tanami Pty Ltd by Innovative Groundwater Solutions.

Innovative Groundwater Solutions Pty Ltd. (2018). Mowanjum Station H2 Hydrogeological Assessment Report. A report prepared for Mowanjum Aboriginal Corporation

Priestley, Stacey C., Payne, Timothy E., Harrison, Jennifer J., Post, Vincent E. A., Shand, Paul, Love, Andrew J. and **Wohling, Daniel L**. (2018) Use of U-isotopes in exploring groundwater flow and inter-aquifer leakage in the

south-western margin of the Great Artesian Basin and Arckaringa Basin, central Australia. Applied Geochemistry, vol 98, pg331-344, https://doi.org/10.1016/j.apgeochem.2018.10.002

Innovative Groundwater Solutions (2017). Skuthorpe Irrigation Development: Stage 1 H3 Hydrogeological Assessment. A final report prepared for Kimberley Asparagus by Innovative Groundwater Solutions.

Innovative Groundwater Solutions Pty Ltd. (2017). Shamrock Station Irrigation Development: Stage 1 Hydrogeological Assessment. A report prepared for Argyle Cattle Company.

Wohling, D. and Fulton, S. (2017). Tanami Road Hydrogeological Assessment & Water Supply Strategy. A final report prepared for the Department of Infrastructure, Planning and Logistics, Northern Territory by Innovative Groundwater Solutions.

Wood C., Liddicoat C. and **Wohling D**. Chowilla soil and groundwater monitoring and recommendations, DEWNR, Technical Report 2017. Government of South Australia, through Department of Environment, Water and Natural Resources, Adelaide.

Priestley, Stacey C. Kleinig, Tavis, Love, Andrew J., Post, Vincent E. A., Shand, Paul, Stute, Martin, Wallis, Ilka and **Wohling, Daniel L.** (2017) Palaeohydrogeology and transport parameters derived from 4He and Cl profiles in aquitard pore waters in a large multilayer aquifer system, central Australia. Geofluids, vol. 2017, Article ID 9839861, doi:10.1155/2017/9839861

Priestley, Stacey C., **Wohling, Daniel L.**, Keppel, Mark N., Post, Vincent E. A., Love, Andrew J., Shand, Paul, Tyroller, Lina, and Kipfer, Rolf. 2017. Detecting inter-aquifer leakage in areas with limited data using hydraulics and multiple environmental tracers, including 4He, 36Cl/Cl, 14C and 87Sr/86Sr, Hydrogeology Journal, doi: 10.1007/s10040-017-1609-x

Keppel M, Gotch T, Inverarity K, Niejalke D and **Wohling D**, 2016, A hydrogeological and ecological characterisation of springs near Lake Blanche, Lake Eyre Basin, South Australia, DEWNR Technical report 2016/03, Government of South Australia, through the Department of Environment, Water and Natural Resources, Adelaide

Schneider I., Costar A. and **Wohling D**., 2015, SARFIIP SMM Investigations: Groundwater monitoring on Pike Floodplain and Katarapko Floodplain 2015, DEWNR Technical note 2015/27, Government of South Australia, through the Department of Environment, Water and Natural Resources, Adelaide

Keppel, M., Inverarity, K. and **Wohling, D**., L. 2015, A hydrogeological characterisation of springs in the Neales River catchment and Lake Cadibarrawirracanna regions, Lake Eyre Basin, South Australia, DEWNR Technical report 2015/13, Government of South Australia, through Department of Environment, Water and Natural Resources, Adelaide

Kleinig T, Priestley S, **Wohling D** and Robinson N, 2015, Arckaringa Basin aquifer connectivity, DEWNR Technical report 2015/14, Government of South Australia, through Department of Environment, Water and Natural Resources, Adelaide

Keppel M, **Wohling D**, Jensen-Schmidt B and Sampson L, 2014, *A hydrogeological characterisation of the Arckaringa Basin*, DEWNR Technical report 2014/03, Government of South Australia, through Department of Environment, Water and Natural Resources, Adelaide

Fulton S, **Wohling D** and Keppel M, 2015, *Pedirka Basin Aquifer Connectivity Investigation*, DEWNR Technical Report 2014/08, Government of South Australia, through Department of Environment, Water and Natural Resources, Adelaide

Hancock M, Fulton S and **Wohling D**, 2015, *Pedirka Basin–Finke River recharge study*, DEWNR Technical report 2015/06, Government of South Australia, through Department of Environment, Water and Natural Resources, Adelaide.

Sampson L, **Wohling D**, Fulton S, Jensen-Schmidt B and Keppel M, 2014, *South Australia Arckaringa Basin Hydrogeological Map – Part 1 & Part 2*. Department of Environment, Water and Natural Resources, South Australian Government.

Sampson L, **Wohling D**, Fulton S, Jensen-Schmidt B and Keppel M, 2014, *South Australia and Northern Territory Pedirka Basin Hydrogeological Map – Part 1 & Part 2*. Department of Environment, Water and Natural Resources, South Australian Government.

Wohling, D., Keppel, M., Fulton, S., Costar, A., Sampson, L. and Berens, V. 2013, *Australian Government Initiative on Coal Seam Gas and Large Coal Mining – Arckaringa Basin and Pedirka Basin Groundwater Assessment Projects,* DEWNR Technical Report 2013/11, Government of South Australia, through Department of Environment, Water and Natural Resources, Adelaide

Wohling, D., Fulton, S., Love. A. and Scanlon, B., 2013. Diffuse recharge. In Groundwater Recharge, Hydrodynamics and Hydrochemistry of the Western Great Artesian Basin in South Australia and the Northern Territory (Eds. Love A, Wohling D, Fulton S, Rousseau-Gueutin P, De Ritter S).

Fulton, S., **Wohling, D**., Love, A. and Berens, V., 2013. Ephemeral river recharge. In Groundwater Recharge, Hydrodynamics and Hydrochemistry of the Western Great Artesian Basin in South Australia and the Northern Territory (Eds. Love A, Wohling D, Fulton S, Rousseau-Gueutin P and De Ritter S).

Wohling, D., Fulton, S., Love. A., Dailey, M., Hallihan, T., Berens, V., Purtschert, R. and Shand, P., 2013. Mountain system recharge. In Groundwater Recharge, Hydrodynamics and Hydrochemistry of the Western Great Artesian Basin in South Australia and the Northern Territory (Eds. Love A, Wohling D, Fulton S, Rousseau-Gueutin P and De Ritter S).

Keppel, M., **Wohling, D**., Fulton, S., Sampson, L., Karlstrom, K. and Love, A., 2013. Summary of hydrogeology and hydrostratigraphy. In Hydrogeological Framework of the Western Great Artesian Basin in South Australia and the Northern Territory (Eds. Keppel M, Karlstrom K, Love A, Priestley S, Wohling D and De Ritter S).

Sampson, L., **Wohling, D**., Jensen-Schmidt, B. and Fulton, S. 2012. South Australia and Northern Territory Great Artesian (Eromanga Basin) Hydrogeological Map – Part 1. Department of Environment, Water and Natural Resources, South Australian Government.

Sampson, L., **Wohling, D.**, Jensen-Schmidt, B. and Fulton, S. 2012. South Australia and Northern Territory Great Artesian (Eromanga Basin) Hydrogeological Map – Part 2. Department of Environment, Water and Natural Resources, South Australian Government.

Wohling, D.L., Leaney, F.W. and Crosbie, R.S., 2012. Deep drainage estimates using multiple linear regression with percent clay content and rainfall. Hydrol. Earth Syst. Sci., 16, 563-572.

Wohling, D., 2011. Application of a recharge and salinisation model using field chloride inventories in the Border Groundwaters Agreement Designated Area, South-East South Australia. *Submitted as a requirement in full for the degree of Master of Science in the School of the Environment, Faculty of Science and Engineering, Flinders University.*

Wohling, D.L., Leaney, F.W. and Crosbie, R.S., 2011. Improving confidence in deep drainage estimates, for arid and semi-arid areas using multiple linear regression with percent clay content and rainfall. Hydrol. Earth Syst. Sci. Discuss., 8, 4535-4557.

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Wohling, D., 2009. Investigations to enhance the Padthaway groundwater model. South Australia. Department of Water, Land and Biodiversity Conservation, DWLBC Report 2009/32

Wohling, D., 2008. Padthaway Groundwater Flow and Solute Transport Model (PADMOD2), New Abstraction Scenarios Requested by the SENRM Board. DWLBC Technical Note 2008/22. Government of South Australia, through Department of Water, Land and Biodiversity Conservation, Adelaide.

Wohling, D., 2007. Minimising Salt Accession to the South East of South Australia. The Border Designated Area and Hundred of Stirling Salt Accession Projects. Volume 2 – Analytical Techniques, Results and Management Implications. DWLBC Report 2008/23. Government of South Australia, through Department of Water, Land and Biodiversity Conservation, Adelaide.

Wohling, D., 2006. Minimising Salt Accession to the South East of South Australia. The Border Designated Area and Hundred of Stirling Salt Accession Projects. Volume 1 – Methods, Site Description and Instrumentation. DWLBC Report 2006/19. Government of South Australia, through Department of Water, Land and Biodiversity Conservation, Adelaide.

Wohling, D., Leaney, F., Davies, P. and Harrington, N., 2005. Groundwater Salinisation in the Naracoorte Ranges Portion of the Padthaway Prescribed Wells Area. South Australia. Department of Water, Land and Biodiversity Conservation. DWLBC Report, 2005/27.

Harrington, G.A., James-Smith, J.M., **Wohling, D**. and van den Akker, J., 2004. Hydrogeological investigation of the Mount Lofty Ranges, progress report 5, Drilling Phases 2.1 to 2.3: research and monitoring wells at Scott Creek, Balhannah, Willunga Fault, Lobethal, Eden Valley and Ashbourne. South Australia. Department of Water, Land and Biodiversity Conservation. DWLBC Report 2004/04.

Zulfic, H. and **Wohling, D**., 2004. Northern Adelaide Plains Prescribed Wells Area Groundwater Monitoring Status Report 2003. South Australia. Department of Water, Land and Biodiversity Conservation. DWLBC Report 2004/41.

Wohling, D., 2003. Groundwater (Border Agreement) Act March 2002 Full Chemical Analysis Sampling Program. South Australia. Department of Water, Land and Biodiversity Conservation. Report, DWLBC 2003/11.