

JAMES MICHAEL DABROWSKI
 (Ph.D., Pr. Sci. Nat. Water Resources)
 NRF Rated Researcher (C3)

☎ +27 83 5575688

✉ james@confluent.co.za

Citizenship: South Africa



TERTIARY EDUCATION

- 2002–2004 Ph.D.: Freshwater Research Unit, Department of Zoology, University of Cape Town**
"A comparison of runoff and spray drift related pesticide contamination in agricultural surface waters: exposure, effects and mitigation."
Supervisors: Prof J.A. Day and Prof. R. Schulz
- 2000–2001 M.Sc. (Cum Laude): Department of Zoology, University of Stellenbosch**
"Prediction and ecotoxicological effects of runoff induced pesticide contamination in agricultural surface waters: A risk assessment using GIS and microcosms."
Supervisors: Prof A.J. Reinecke and Prof. R. Schulz
- 1999 B.Sc. Honours: Department of Zoology, University of Stellenbosch**
Supervisors: Prof A.J. Reinecke, Prof. R. Schulz
- 1996-1998 B.Sc. in Zoology and Botany, University of Stellenbosch**

EMPLOYMENT RECORD

- Present Confluent Environmental - Co-Director:** Provision of aquatic consulting and research services to the agricultural, industrial, mining, tourism and private sectors in South Africa and the rest of Africa including conducting specialist studies for environmental assessments as required by national and international legislation (e.g. National Water Act of 1998, National Environmental Management Act of 1998).
- 2006-2017 CSIR (Natural Resources and Environment) – Principal Researcher:** Responsible for attracting funding and conducting research in the field of water quality and environmental chemistry, catchment modelling, water footprinting and aquatic ecotoxicology within the Water Ecosystems Research Group.
- 2004-2006 Department of Water Affairs and Forestry - Specialist Scientist:** Responsible for the development of procedures to assess toxicological quality and aquatic ecosystem integrity, provide scientific and technical advice on water resource quality management and development, design and implementation of the National Toxicity Monitoring Programme (NTMP), derivation of water quality guidelines for toxicants in support of the NTMP and training and capacity building of junior staff and scientists.
- 2002-2004 University of Cape Town - Scientific Officer.** PhD research work on the occurrence, mitigation and risk assessment of pesticides in the Lourens River, Western Cape, South Africa. Supervision of Honours and Masters students and lecturing in aquatic ecotoxicology and aquatic biogeochemical cycling.

KEY EXPERTISE

- Aquatic Ecology
- Water Quality
- Ecotoxicology
- Ecological Risk Assessment
- Geographical Information Systems
- Field & Catchment Scale Water Quality Modelling

RELEVANT PROJECT EXPERIENCE

- **An integrated approach to managing and mitigating the risk of agricultural nonpoint source pesticide pollution to the aquatic environment** (*Project Leader*) Develop monitoring, modelling and risk assessment approaches to identify specific management and farming practices aimed at reducing the impact of waterborne agricultural chemicals on water resources. *Client: Water Research Commission (2017-2022).*
- **Incorporating environmental fate models into risk assessment for pesticide registration in South Africa** (*Project Leader*) Development of an improved aquatic risk assessment framework that integrates exposure and hazard for the purpose of registering pesticides for agricultural use in South Africa. *Client: Water Research Commission (2016-2019).*
- **Development of ecological risk assessment tools for protection of ecosystem health:** (*Project Leader*) Development and application of risk indicators, passive samplers and catchment modelling approaches to protect aquatic ecosystem health from agrochemical use, with a case study on the endangered Twee River Redfin (*Barbus erubescens*). *Client: CSIR (2015-2017).*
- **Quantifying and managing agricultural non-point source (NPS) nutrient pollution from field to catchment scale** (*Principal Researcher*) Responsible for application of the SWAT model in the middle Olifants catchment and student supervision. *Client: Water Research Commission (2015-2018).*
- **Developing a siltation strategy for the purpose of assisting dam basin management** (*Principal Researcher*) *Client: Department of Water and Sanitation (2016-2017).*
- **Revision of the 1996 South African Water Quality Guidelines: Development of risk-based approach using irrigation water use as a case study** (*Team Member*). Responsible for development of irrigation guidelines for herbicides. *Client: Water Research Commission (2014-2016).*
- **Investigation of the contamination of water resources by agricultural chemicals and the impact on environmental health** (*Project Leader*) Risk assessment of agro-chemicals (including fertilizers and pesticides) on human and environmental health, including prioritizing pesticides for human health effects and development of pesticide use maps. *Client: Water Research Commission (2010-2015).*
- **AquaBASE: Understanding and managing freshwater ecosystems in South Africa.** (*Project Leader*). Modelling the network of relationships between freshwater management options, ecological features and biophysical processes to produce “ecological production functions” that allow for the quantification of ecosystem services needed to restore water quality in the Upper Olifants River catchment of South Africa. *Client: CSIR (2012-2014).*
- **Linking land use to water quality for effective water resource and ecosystem management** (*Project Leader*) Development of a decision support system aimed at facilitating decisions on how

changes on land use impact on water quality and aquatic ecosystem health. *Client: Water Research Commission (2010-2013).*

- **Land use practices that sustain water resources: Eutrophication** (*Principal Researcher*) Identification and testing of highly feasible solutions that will restore water resource quality with respect to eutrophication. *Client: CSIR (2010-2012).*
- **An overview of water quality and the causes of poor water quality in the Olifants River catchment, South Africa** (*Senior Researcher*). Analysis of water quality data and development of maps. *Client: Water Research Commission (2010-2011).*
- **Upper Olifants Risk Assessment** (*Senior Researcher*) Risk assessment of pollution associated with coal mining, agriculture and sewage in surface waters of the upper Olifants River system: Implications for aquatic ecosystem health and the health of human users of water. Included application of SWAT model to estimate spatial and temporal sources of nutrient pollution leading to eutrophication | *Client: Coaltech (2009-2013).*
- **Development of a risk indicator methodology to estimate the relative risk of pesticide contamination in South African water resources.** (*Project Leader*): Predicting the relative impacts of pesticides on the aquatic environment through the integration of application, toxicity and physicochemical data of pesticides, together with site-specific geographic and climatic characteristics. *Client: Water Research Commission (2008-2009).*
- **Waterberg Aquatic Baseline Study** (*Senior Researcher*): Characterisation of the Waterberg aquatic ecosystem and development of water quality indicators in anticipation of future coal mining developments in the region. *Client: ESKOM (2008-2009).*
- **Water and Agriculture for Food Security** (*Project Leader and Senior Researcher*). Investigation of the impact of agriculture on water use and water quality, with emphasis on virtual water trading, integrated water resource management and food security in the Southern African context. *Client: CSIR (2006-2008).*
- **Water Quality Monitoring Data and Target Users: Maximising Value** (*Senior Researcher*) Recommendations for optimal information transfer mechanisms to realise the full value of water quality monitoring in a number of scenarios relevant to Southern Africa. *Client: Water Research Commission (2007-2008).*
- **South African Mercury Assessment Programme** (*Senior Researcher*): Assessment of mercury in South African water resources and the compilation of an inventory detailing mercury emissions from coal-fired power stations in South Africa. *Client: CSIR (2006-2008).*
- **National Toxicity Monitoring Programme** (*Specialist Scientist*). Development of a national monitoring programme and aquatic ecosystem and human health water quality guidelines for organic pollutants in support of the National Toxicity Monitoring Programme. *Client: Department of Water Affairs and Forestry (2006-2008).*
- **ENVIROMAP** (*PhD researcher*): Risk assessment (including fate, exposure, ecotoxicological effects and mitigation) of pesticides in non-target water environments in agricultural areas of the Western Cape, South Africa. *Client: Volkswagen Stiftung, Hannover, Germany (2002-2004).*

RELEVANT CONSULTING EXPERIENCE

- **Olifants Water Resources Development Project** (*Senior Researcher*): Development of a monitoring and reporting system. *Client: ACER (2008)*.
- Mokolo-Crocodile Water Augmentation Project (Principal Researcher): Report on the potential effects of scour valve discharge on water quality in the Matlabas River. *Client: TCTA (2016)*.

PROFESSIONAL ASSOCIATIONS & OTHER QUALIFICATIONS

Research Affiliations

- Research Associate (Sustainability Research Unit, Nelson Mandela Metropolitan University)
- Associate (Freshwater Research Centre)

Professional Societies

- Society for Environmental Toxicology and Chemistry (SETAC)
- International Water Association (IWA)
- South African Council for Natural Scientific Professionals (SACNASP)

Scientific Review

- Associate editor (Bulletin for Environmental Toxicology and Chemistry)
- Proposal review (Water Research Commission and National Research Foundation)
- Reference Group member (various Water Research Commission projects)

SCIENTIFIC PUBLICATIONS

Petersen, F., **Dabrowski, J.M.**, and Forbes, P.B.C. (2017). Identifying potential surface water sampling sites for emerging chemical pollutants in Gauteng Province, South Africa. *Water SA*, 43(1), 153-165.

Dabrowski, J., Baldwin, D.S., **Dabrowski, J.M.**, Hill, L., and Shadung, J. (2017). Impact of temporary desiccation on the mobility of nutrients and metals from sediments of Loskop Reservoir, Olifants River. *Water SA*, 43(1), 7-16.

Stehle, S, **Dabrowski, J.M.**, Bangert U. and Schulz R. (2016). Erosion rills offset the efficacy of vegetated buffer strips to mitigate pesticide exposure in surface waters. *Science of the Total Environment*. 545-546: 171-183.

Nsibandwe, S.A., **Dabrowski, J.M.**, van der Walt, E., Venter, A. and Forbes, P.B.C. (2015). Validation of the AGDISP model for predicting airborne atrazine spray drift: A South African ground application case study. *Chemosphere* 138: 454-461.

Dabrowski, J.M. (2015) Development of pesticide use maps for South Africa. *South African Journal of Science*. 111:1-7.

Dabrowski, J.M., Dabrowski, J., Hill, L., MacMillan, P. and Oberholster, P.J. (2014) Fate, transport and effects of pollutants originating from acid mine drainage in the Olifants River, South Africa. *River Research and Applications*. DOI: 10.1002/rra.2833.

Dabrowski, J.M. (2014) Applying SWAT to predict ortho-phosphate loads and trophic status in four reservoirs in the upper Olifants catchment, South Africa. *Hydrology and Earth System Sciences* 14: 2629-2643.

Dabrowski, J., Oberholster, P.J. and **Dabrowski, J.M.** (2014) Water quality of Flag Boshielo Dam, Olifants River, South Africa: Historical trends and impact of drought. *Water SA* 40:345-358.

Dabrowski, J.M., Shadung J. and Wepener, V. (2014) Prioritizing agricultural pesticides used in South Africa based on their environmental mobility and potential human health effects. *Environment International* 62: 31-40.

- Dabrowski J., Oberholster P.J., **Dabrowski J.M.**, Le Brasseur J. and Gieskes J. (2013) Chemical characteristics and limnology of Loskop Dam on the Olifants River (South Africa), in light of recent fish and crocodile mortalities. *Water SA* 39(5): 675-686.
- Dabrowski, J.M.** and Balderacchi M. (2013) Development and field validation of an indicator to assess the relative mobility and risk of pesticides in the Lourens River catchment, South Africa. *Chemosphere* 93(10): 2433-2443.
- Dabrowski, J.M.** and De Klerk, L.P. (2013) An assessment of the impact of different land use activities on water quality in the upper Olifants catchment. *Water SA* 39(2): 231-244
- Masekoameng, K.E., Leaner, J.J and **Dabrowski, J.M.** (2010) Trends in anthropogenic mercury emissions estimated for South Africa during 2000-2006. *Atmospheric Environment*. 44(25): 3007-3014.
- Dabrowski, J.M.**, Ashton, P.J. and Masekoameng, E. (2009) Analysis of Virtual Water Flows Associated with the Trade of Maize in the SADC Region: Importance of Scale. *Hydrological and Earth System Sciences*. 13: 1-11.
- Dabrowski, J.M.**, Ashton, P.J., Murray, K., Leaner, J.J. and Mason, R.P. (2008) Anthropogenic mercury emissions in South Africa: coal combustion in power plants. *Atmospheric Environment* 42: 6620-6626.
- Dabrowski, J.M.**, Murray, K., Ashton, P.J. and Leaner, J.J. (2009) Agricultural impacts on water quality and implications for virtual water trading decisions. *Ecological Economics*. 68: 1074-1082.
- Dabrowski, J.M.**, Bollen, A., Bennett, E.R., and Schulz, R. (2006) Mitigation of azinphos-methyl in a vegetated stream: Comparison of runoff and spray drift. *Chemosphere* 62 (2), 204-212.
- Dabrowski, J.M.**, Bollen A. and Schulz R. (2005) Combined effects of discharge, turbidity and pesticide on mayfly behaviour: experimental evaluation of spray drift and runoff scenarios. *Environmental Toxicology and Chemistry*. 24 (6), 1395-1402.
- Dabrowski, J.M.**, Bollen, A. and Schulz, R. (2005) Interception of azinphosmethyl by emergent aquatic macrophytes: Potential spray drift mitigation in agricultural surface waters. *Agriculture, Ecosystems and the Environment*. 111, 340-348.
- Dabrowski, J.M.** and Schulz, R. (2003) Predicted and measured levels of azinphos-methyl in the Lourens River, South Africa: Comparison of runoff and spray drift. *Environmental Toxicology and Chemistry*. 22 (3) 494-500.
- Schulz, R., Hahn, C., Bennett, E.R., **Dabrowski, J.M.**, Thiere, G., & Peall, S.K.C. (2003) Fate and effects of azinphos-methyl in a flow-through wetland in South Africa. *Environmental Science and Technology*, 37 2139-2144.
- Dabrowski, J.M.**, Peall, S.K.C., van Niekerk, A., Reinecke, A.J., Day, J. and Schulz, R. (2002) Predicting runoff-induced pesticide input in agricultural sub-catchment surface waters: linking catchment variables and contamination. *Water Research* 36 4975-4984.
- Dabrowski, J.M.**, Peall, S.K.C., Reinecke, A.J., Liess, M. and Schulz, R. (2002) Runoff-related pesticide input into the Lourens River, South Africa: Basic data for exposure assessment and risk mitigation at the catchment scale. *Water, Air and Soil Pollution*. 135: 265-283.
- Schulz, R., Thiere, G., and **Dabrowski, J.M.** (2002) A combined microcosm and field approach to evaluate the aquatic toxicity of azinphos-methyl to stream communities. *Environmental Toxicology and Chemistry*. 21 (10): 2172-2178
- Schulz, R. and **Dabrowski, J.M.** (2001) Combined effects of predatory fish and sublethal pesticide contamination on the behaviour and mortality of mayfly nymphs (*Baetis* sp.). *Environmental Toxicology and Chemistry*. 20 (11): 2537-2543
- Schulz, R., Peall, S.K.C., **Dabrowski, J.M.** and Reinecke, A.J. (2001) Spray deposition of two insecticides into surface waters in a South African orchard area. *Journal of Environmental Quality*. 30 (3): 814-822.
- Schulz, R., Peall, S.K.C., **Dabrowski, J.M.** and Reinecke, A.J. (2001) Current-use insecticides, phosphates and suspended solids in the Lourens River, Western Cape, during the first rainfall event of the wet season. *Water SA*. 27: 65-70.