

Prof. Maitland Seaman

Centre for Environmental Management

Overview

The Centre for Environmental Management in the Faculty of Natural and Agricultural Sciences, incorporating the BloemWater Chair in Water Environmental Management, has established an envied niche for itself in South Africa. The niche is based on three intertwined components, namely the master's and doctoral programmes, short courses, and a research and contract component.

The centre is now an established centre of expertise in aquatic ecology, which carries out a number of applied projects and provides appropriate services to communities in the central part of South Africa. BloemWater, the regional water services agency, plays a central role in the development of this part of the centre's work. The BloemWater Chair in Water Environmental Management came into being on 1 July 2003.

The master's programme developed gradually and strongly around Project Management, Environmental Assessment, Environmental Management Systems, Integrated Environmental Management and Sustainable Development, into which a number of special skills and disciplines are woven.

From approximately 100 applicants, the master's programme took in about 50 students in 2007. The intake increases in diversity every year. In 2007 about 30% of the students were from the Southern African Development Community (SADC), and a few were from the rest of Africa, making this a truly continental programme. The programme is based on 37 full days of contact time at the Main Campus in Bloemfontein, split into one session per semester.

The programme is an integrated one. As the environment presents a very wide field, there is a perceived need to produce graduates with a healthy overview of the South African environment. Graduates are in demand by large companies, government and nature conservation bodies.

Approximately 50 lecturers are involved in the programme, half of whom are contracted in from government and the private sector, for their specific competence.

In 2007 seven students were registered for their Ph.D. degrees. During the April 2007 graduation ceremony, Ms Simoné Schroeder received the BloemWater Prize for the Best Master's Student in Environmental Management.

The centre has a co-operation agreement with the Katholieke Universiteit Leuven, Belgium, to conduct research on temporary water ecology. Under this agreement, a Ph.D. and two M.Sc. students from Leuven spent time working at the centre in 2007, on studies initiated by the centre.

Through the motivation of the centre, the National Research Foundation (NRF) awarded a Research Niche Area in Integrated Water Resources Management to the UFS. This niche area forms part of the UFS's Strategic Cluster Initiative and the research focuses on "Water management in water-scarce areas". Prof. Seaman is the interim co-ordinator of the cluster. Bursaries for postgraduate students form part of this grant from the NRF.

Staff of the centre attended a range of conferences in 2007. Prof. Seaman attended the World Water Week in Stockholm, Sweden, while Dr Jan Roos presented a paper entitled: *Nitrogen assimilation capacity of the Vaal River, South Africa* at the 2nd conference of the International Association of Science and Technology for Development (IASTED) on Water Resources Management, Honolulu, Hawaii, United States of America (USA). The paper was included in the conference proceedings.

The World Limnology Congress (SIL, 30th Congress of the International Association of Theoretical and Applied Limnology) was held in Montreal, Canada, and was attended by Dr Roos. The congress was attended by almost 1 500 delegates from all over the world. The 31st SIL Congress will be presented in 2010 in Cape Town, South Africa.

Mss Marilie Carstens, Eloise Lamprecht and Mr Jurie du Plessis attended the National Arid Zone Ecology Forum in Sutherland. The theme of the forum was: "Drought as a driver: physical, ecological and socio-economic effects, interactions and responses".

Ms Marie Watson attended and presented two posters at the 10th International River Symposium and Environmental Flows Conference in Brisbane, Australia. The conference covered aspects from environmental flows implementation, methods, models and monitoring to urban river management. Environmental economics and the involvement of social issues in E-flows received much attention in plenary and other sessions.

The 8th WaterNet/WARFSA/GWP-SA Symposium, held in Lusaka, Zambia, was attended by Mss Marinda Avenant, Tascha

Vos and Limpho Letsela. The theme of this year's conference was: "From Concept to Practice". Ms Avenant presented a paper in the session on Water and Environment entitled: *Investigations into the methodology for setting environmental water requirements in non-perennial rivers*.

Several projects and fieldwork were carried out by the centre. Biomonitoring reports are provided by the centre to BloemWater for the Modder River and associated rivers. Two sites are monitored on the Caledon, thirteen sites on the Modder River and its important tributaries and two sites on the Riet River.

The centre has a project with the Water Research Commission (WRC) to establish the "Environmental water requirements for non-perennial rivers". The South African National Water Act requires that the environmental reserve be determined for each significant water body before licenses may be issued. Methods currently available for the determination of environmental water requirements in South Africa are based on perennial rivers. Initially, the suitability of existing methods was determined through a series of desktop case studies. These case studies enable the researchers to identify gaps in knowledge, and hence the research needs to be identified.

Once this has been done, the next step is to modify or develop methods to meet these needs. At all stages this research has been interdisciplinary, with experts from the field making a major input into each stage of the process. Important contributions in this regard have come from team members at Rhodes University, University of Cape Town, the Council for Scientific and Industrial Research (CSIR) and the UFS.

Communication of all phases of the work throughout the region is seen as crucial to its success. To this end, a communication strategy has been developed that will ensure that all interested parties know what is being done and are able to make appropriate input into the process as it proceeds.

The centre has also been contracted to assist in developing an intervention plan for the National Grassland Biodiversity Programme, under the auspices of the South African National Biodiversity Institute (SANBI). This intervention plan, known as the *Free State River Ecosystem Project - the Koranna and Sepane Spruit in the Modder River Catchment Area* was developed as a demonstration project to address biodiversity and river ecosystems services.



The Mayoral Reception in the Blue Room of the City of Stockholm, Sweden, during the World Water Week. Here are, from the left: Mss Helga Seaman and Tumi Makgetla, Rhodes Scholar from South Africa and daughter of Mr Makgetla, Prof. Maitland Seaman, Director of the centre, Mr Zeph Makgetla, South African Ambassador to Sweden, Mr Jaco Schoeman, Technical Director, Western Utilities Corporation, and Ms Marina Schoeman.



Mss Tascha Vos and Marinda Avenant with a taxi driver in Lusaka, Zambia during the 8th WaterNet/WARFSA/GWP-SA Symposium.

Staff

Director and BloemWater

Chair: Prof. Maitland Seaman

Senior Lecturer: Dr Jan Roos

Lecturer: Ms Marinda Avenant

Associated Researchers: Drs
Ziets Zietsman, James Brink, Nico
Avenant

Course Co-ordinator: Ms
Marthie Kemp

Senior Professional Officer: Ms
Marie Watson (Macro-
Invertebrates)

Professional Officers: Mss Marilie
Carstens (GIS), Eloise Lambrecht
(Macro-Invertebrates), Limpho
Letsela (Sociology), Ms Bettie
Phillips (Finance), Tascha Vos
(Water Quality and Algae), Louise
Zietsman (Macro-Invertebrates),
Messrs Jurie du Plessis (Fish), Juan
Potgieter (Fish)

Messenger: Ms Evodia Khalata

Contact details

Prof. Maitland Seaman

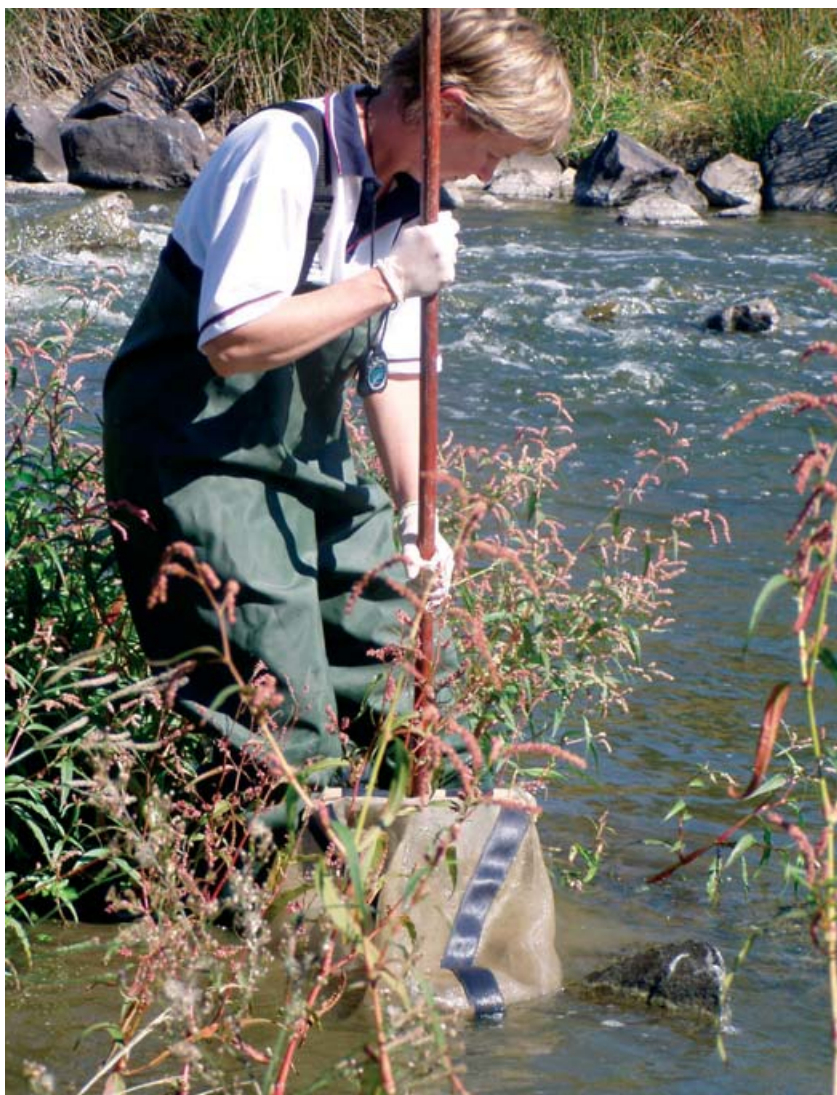
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Ms Louise Zietsman sampling gravel for the South African Scoring System (SASS) at Bishop's Weir on the Renoster Spruit.

Research outputs

Research articles

Avenant, N.L. & Cavallini, P. 2007. Correlating rodent community structure with ecological integrity: Tussen-die-Riviere Nature Reserve, Free State Province, South Africa. *Integrative Zoology* 2: 212-219.

Vanschoenwinkel, B., De Vries, C., Seaman, M.T. & Brendonck, L. 2007. The role of metacommunity processes in shaping invertebrate rock pool communities along a dispersal gradient. *Oikos* 116: 1255-1266.

Du Plessis, J.J., Avenant, M.F. & Potgieter, J. 2007. Freshwater fish specialist study (Appendix B). In *Environmental Impact Assessment: Mining Right Application. Alluvial Diamond Mining at Rooipoort Private Nature Reserve (Sol Plaatje Municipality: Frances Baard District Municipality)*. Report compiled by B. Benade on behalf of De Beers Consolidated Mines for the Institute of Natural Resources, Scottsville, South Africa. Appendix B: p.1-26.

Seaman, M.T., Roos, J.C., Watson, M. & Vos, A.T. 2007. *State of the Modder River, first term 2007 – A biomonitoring report*. Report to BloemWater, Bloemfontein, South Africa.

Seaman, M.T., Roos, J.C., Watson, M. & Vos, A.T. 2007. *State of the Modder River, second term*

Reports

Avenant, N.L. 2007. *Mammals and the Senqu Sources Biosphere Reserve*. Report for Strategic Environmental Focus, Pretoria, South Africa.

2007 – A biomonitoring report. Report to BloemWater, Bloemfontein, South Africa.

Seaman, M.T., Roos, J.C., Watson, M., Avenant, M.F., Vos, A.T. & Du Plessis, J.J. 2007. *State of the Modder River, third term 2007 – A biomonitoring report.* Report to BloemWater, Bloemfontein, South Africa.

Seaman, M.T., Roos, J.C., Watson, M., Avenant, M.F., Vos, A.T. & Du Plessis, J.J. 2007. *State of the Modder River, fourth term 2007 – A biomonitoring report.* Report to BloemWater, Bloemfontein, South Africa.

Watson, M. 2007. Aquatic macro-invertebrate specialist study (Appendix A). In *Environmental Impact Assessment: Mining Right Application. Alluvial Diamond Mining at Rooipoort Private Nature Reserve (Sol Plaatje Municipality: Frances Baard District Municipality).* Report compiled by B. Benade on behalf of De Beers Consolidated Mines for the Institute of Natural Resources, Scottsville, South Africa. Appendix A: p.1-32.

Watson, M., Avenant, M.F., Du Plessis, J.J. & Vos, A.T. 2007. Ecological character of the Sepane and Koranna Spruit. In *The Free State River Ecosystem Project – the Koranna and Sepane Spruit in the Modder River Catchment Area*, edited by G.J. Hoon, M. Watson, J. Armour & L. Letsela for the National Grasslands Biodiversity Programme – Free State Rivers Ecosystem Project. A report by H2ON Environmental Specialists, the Centre for Environmental Management, Laughing Waters & Netgroup for SANBI, Pretoria, South Africa. Appendix C: p.1-47.

Conference contributions

Avenant, M.F., Seaman, M.T., Armour, J., Barker, C.H., Dollar, E.J., Du Preez, P.J., Hughes, D., King, J.M., Rossouw, L., Van Tonder, G.J. & Watson, M. 2007. *Investigations into the methodology for setting environmental water requirements in non-perennial rivers.* Paper presented at the 8th WaterNet / WARFSA / GWP-SA Symposium: Integrated Water Resource Management, Livingston, Zambia. 30 October – 3 November.

Avenant, N.L. 2007. *Incorporating caracal feeding and ranging behaviour in the management of this damage-causing carnivore.* Poster presented at the Felid Biology and Conservation Conference, Oxford, UK. 17-21 September.



Ms Marie Watson, Louise Zietsman, and Eloise Lamprecht identifying macro-invertebrates for the South African Scoring System (SASS) version 5 at Bishop's Weir on the Renosterspruit.

Avenant, N.L. 2007. *Sustainable small stock farming and ecosystem conservation in southern Africa: A role for small mammals.* Poster presented at the 10th African Small Mammal Symposium, Cotonou, Benin. 20-25 August.

Avenant, N.L., Watson, J.P. & Schulze, E. 2007. *Correlating small mammal community characteristics with habitat integrity in the Caledon Nature Reserve, South Africa.* Paper presented at the 10th African Small Mammal Symposium, Cotonou, Benin. 20-25 August.

Roos, J.C. 2007. *Nitrogen assimilation capacity of the Vaal River, South Africa.* Paper presented at the Second IASTED (International Association of Science and Technology for Development) International Conference on Water Resources Management, Honolulu, Hawaii, USA. 20-22 August.

Seaman, M.T. 2007. *The registration of Environmental Assessment Practitioners - Assuring the future, with some benefits for geohydrologists.* Paper presented at the Biennial South African Groundwater Conference, University of the Free State, Bloemfontein, South Africa. 8-10 October.

Seaman, M.T., Avenant, M.F., Armour, R. J., Barker, C.H., Dollar, E., Du Plessis, J.J., Du Preez, P.J., Hughes, D., King, J., Rossouw, L., Van Tonder, G., Vos, A.T. & Watson, M. 2007. *Environmental water requirements (EWRs) of a non-perennial river: The Seekoei River example.* Poster presented at the 10th International River Symposium and International Conference on Environmental Flows, Brisbane, Australia. 3-6 September.

Vanschoenwinkel, B., Seaman, M.T. & Brendonck, L. 2007. *Local vs regional factors in a rock pool metacommunity: The role of dispersal limitation and priority effects in explaining small-scale spatial patterns.* Paper presented at the ASLO 2007 Aquatic Sciences Meeting, American Society of Limnology and Oceanography, Santa Fe, New Mexico, USA. 4-9 February.

Watson, M. 2007. *Invertebrates in a non-perennial river: The Seekoei River example.* Poster presented at the 10th International River Symposium and International Conference on Environmental Flows, Brisbane, Australia. 3-6 September.