South African Wetland Society
CSIR, Building 33, Room S157, Pretoria, 0184

Enquiries: Lulu Van Rooyen
☎ +27 (0)79 506-6702 ✉ Pretorius.lulu@gmail.com

The competence required of a wetland assessment practitioner

Compiled by the South African Wetland Society, 08 October 2020

The aim of the South African Wetland Society (SAWS) is, among others, to develop and maintain professional standards and best management practices of wetland practitioners in South Africa through mentorship, training, and capacity building. SAWS also acts as a crucial intermediary in the interactions between our members, the broader community of practice, relevant decision-makers and the regulating authority (SACNASP).

The development of wetland practitioners is challenging in the wetland field of practice since a formal qualification in wetland science and/or management does not exist in South Africa. Rather, the wetland community of practice is built on specialists in various fields of practices that intersect within the wetland realm (ecology, botany, geology, hydrology, soil science, geomorphology, environmental science, etc). Becoming a wetland specialist currently relies heavily on short courses, conferences, capacity development within organisations and professional mentorship. A result of this ad-hoc 'in-practice-training' is that there is currently no standard or guide as to what constitutes a competent wetland practitioner. This leaves a significant space for unregulated, poor practice, or even malpractice. With this in mind, SAWS is now in the process of establishing - through a multi-stakeholder approach – what the competencies and skills are that a wetland scientist would require to conduct scientifically sound wetland work in South Africa. The aim of this process would be to achieve a certain agreed-upon standard of what is deemed a competent professional accepted with decision-makers and regulating authorities in order to improve the quality of wetland work in the country.

Competence is taken as: (1) the foundational understanding and (2) practical skills that enable the performance of a task. A wetland practitioner simply refers to someone who works in the wetland field, which may be for a wide variety of different purposes, e.g. for research or consultants doing specialist work to inform environmental authorizations or someone focusing on advocacy in the not-for-profit sphere. Wetland practitioners range from those with a narrow focus on one particular aspect of wetlands (e.g. wetland soils) to those with a broad focus on a wetland as an overall ecosystem. Amongst those with a broad ecosystem focus are what is described as a wetland assessment practitioner, defined as a practitioner who conducts appraisals of wetland ecosystems on a regular basis as part of his/her profession. In the context of applications for environmental authorization, such a practitioner is often referred to as a "wetland specialist" who provides specialist wetland inputs into these processes.

A wetland assessment practitioner is expected to have a good foundational understanding in **all** of the following seven **core practices**.

1. Identification and delineation of wetlands using appropriate guidelines[1]

2. Classification of wetland type and characterization of key wetland attributes in accordance with an appropriate framework[2]

3. Rapid assessment of the Present Ecological State (PES)/ecological health of wetlands (which incorporates the assessment of impacts/stressors affecting the condition of a wetland) using an appropriate method[3]

4. Identification and rapid assessment of the ecosystem services associated with wetlands using an appropriate method[4]

5. Assessment of the Ecological Importance and Sensitivity (EIS) of wetlands using an appropriate method[5]

6. Determining the buffer requirements for the protection of wetlands from potential impacts using an appropriate method[6]

7. Development of management recommendations for wetlands, drawing on all other core practices and accumulated experience[7]

The wetland field is strongly interdisciplinary, and for all seven practices it is important to understand that wetlands are an expression of the interaction of several abiotic (including hydrology and geomorphology) and biotic processes. Appendix A highlights how the seven core practices draw to varying degrees from several different primary fields of practice, in particular from Ecological Science, which is central, but also Earth Science and Environmental Science. It is also important to recognize that the seven practices are highly inter-dependent. The extent to which each individual practice requires sound competence in the other practices varies, with dependence increasing from Core practice 1 through to 7 (Appendix B).

Specialist inputs into applications for environmental (Basic Assessment or EIA) or water use authorizations General Authorization (GA) and Water Use Licenses (WUL)) will often require practical competence in all seven core practices, which is therefore a useful goal for a wetland assessment practitioner. However, this is not given as a prescriptive requirement for all wetland assessment practitioners, as some may choose to work in a team with clearly defined complementary roles to cover all seven practices. However, it is prescribed that a wetland assessment practitioner should have practical competency in at least two of the first three core practices.

For each of the listed seven core practices, the method currently deemed to be most appropriate is given as an end-note. Despite the strong need for standardization (as reflected in discussions with relevant authorities responsible for assessing applications for environmental authorization/licensing), in some cases there may be justification for using an alternative method to the one that is listed. In addition, it is recognized that many of the recommended methods will occasionally be revised to produce an updated version, and it will be incumbent on the practitioner to become familiar with the latest applicable version. Practitioners should be allowed two years after the release of the new version to make the transition, as training courses are undertaken and experience is gained in the application of the revised methods. It also should be recognized that some provinces

and municipalities have specific guidelines and/or policies with additional/contrasting requirements and/or recommendations to those contained in the recommended methods listed here, e.g. eThekwini Metropolitan Municipality has a specific requirement for wetland buffers not contained in the recommended buffer guidelines.

For each of the seven core practices, the following are required of the wetland assessment practitioner:

- **A basic understanding of key concepts that are foundational to the practice and *why* the practice is needed**

- **A practical understanding of *how* to carry out the assessments encompassed within the practice using the appropriate method/s**

- **A clear understanding of the key assumptions and limitations associated with the method/s used for the assessment in order to prevent the method being applied for an inappropriate purpose**

- **An ability to critically reflect on the results of the assessments undertaken and to motivate for any modifications in assessment outputs based on user interpretation.**

All of the above should be underpinned by a sound scientific reasoning that includes the thinking skills involved in scientific inquiry, experimentation, evidence evaluation and inference.

For a young practitioner entering the wetland field, it is recommended that the practitioner attend training courses covering each of the seven core practices (and their recommended methods) and attain the required competency to pass each course. In addition, in order to attain practical competency in a practice, a practitioner should receive/secure mentorship and peer review from experienced practitioners in the practical application of the recommended methods. As a general rule of thumb this should cover at least the first five independent assessments undertaken by a practitioner for a particular core practice. Furthermore, peer review and knowledge exchange should continue even for an experienced practitioner as part of his/her Continuing Professional Development (CPD) (Appendix C).

It is also important to recognize that while a practitioner (even one who is experienced) may be competent in carrying out a core practice (e.g. delineation) in one particular bioregion, if he/she now needs to carry out this same practice in a bioregion which is unfamiliar to them then they are likely to need to seek assistance from a practitioner with local knowledge of the bioregion or spend time becoming familiar with the local vegetation, soils and wetland types characteristic of the bioregion. Of the seven core practices, delineation and PES assessment have the greatest need for familiarity with the local vegetation and soils. This also highlights two key interlinked general principles applicable to all practices and all practitioners: (1) know what you do not know and (2) be mindful of when you need to seek advice/assistance.

In addition to the seven core practices for a wetland assessment practitioner, it is recognized that practitioners could be competent in at least one of several **additional practices**. These include, amongst others:

- Assessment of environmental risks and impacts and provision of mitigation measures[8] to address identified impacts for the purposes of Strategic Environmental Assessments, Basic and full Environmental Impact Assessment studies and Water Use applications (GAs and WULAs)
- Working knowledge of the national and international legislation, and its relevance to wetland protection and management, and the legislated protocols and policy guidelines that must be followed
- Wetland monitoring, for which the National Wetland Monitoring Programme (NWMP) provides specific guidance[9]
- Mapping wetland spatial extents and detecting wetland change using earth observation techniques (a key requirement is to be proficient in using Geographical Information Systems or GIS)[10]
- Incorporating wetlands into catchment planning and management strategies
- Incorporating wetlands into broad-scale/systematic biodiversity conservation planning[10]
- Planning and evaluating wetland rehabilitation interventions, often in association with engineers, geomorphologists and hydrologists
- Determining wetland offset requirements and development of wetland offset strategies, plans and programmes
- Determining the Ecological Reserve for wetlands[11], usually as part of a multidisciplinary team of specialists
- Developing research methodologies to assess components within a wetland environment
- Wetland geomorphology, origins and dynamics
- Hydropedological baseline and risk/impact assessment of wetlands
- Physico-chemical/ water quality assessment of wetlands
- Assessment of wetlands as social-ecological systems

As for the 7 core practices, these additional practices draw extensively from several different primary fields of practice, but with environmental science and water resources science featuring most prominently (Appendix D).

Competency in one or more of the additional practices listed above would likely increase the scope of the work which could be undertaken by a wetland assessment practitioner, but is <u>not</u> a requirement for recognition as a wetland assessment practitioner. Nevertheless, a wetland assessment practitioner is encouraged to develop a general understanding of what is encompassed within each of the listed additional practices (e.g. a general understanding of ecological concepts, wetland plant species, soil morphology and hydrodynamics). This general understanding will be especially valuable when a wetland assessment practitioner carries out core practices within a broader assessment/project that includes one or more of the additional practices conducted by other practitioner/s.

Recommended methods (current, but subject to changes/revisions over time):

[1] DWAF 2005. A Practical Field Procedure for Identification and Delineation of Wetlands and Riparian Areas. Department of Water Affairs and Forestry, Pretoria.

[2]Ollis DJ, Snaddon CD, Job NM, Mbona N 2013. Classification System for Wetlands and other Aquatic Ecosystems in South Africa. User Manual: Inland Systems No. 22, SANBI Biodiversity Series. South African National Biodiversity Institute, Pretoria.

[3]Macfarlane D, Ollis D, Kotze D, Grenfell M, Malan H, Edwards R, Ellery W, Walters D, Ngobela T and Ewart-Smith J, 2020. WET-Health Version 2.0: A technique for rapidly assessing wetland health. WRC Report TT 820/20. Water Research Commission, Pretoria, South Africa.

[4]Kotze D C, MacFarlane D, Edwards R, Mander M, Collins N B, Texeira-Leite A, Lagesse J, Pringle C, Marneweck G C, Batchelor A L, and Lindley D S, in press. WET-EcoServices Version 2: A technique for rapidly assessing ecosystem services supplied by wetlands. WRC Report, Water Research Commission, Pretoria.

[5]WET-EcoServices Version 2 (Kotze et al. in press) above include a subcomponent for determining ecological importance (based on the WET-EcoServices results) but no specific method currently exists for assessing ecological sensitivity

[6]Macfarlane DM and Bredin IP, 2016a. Buffer zone guidelines for rivers, wetlands and estuaries. Part 1: Technical Manual. WRC Report No. TT 715/1/17, Water Research Commission, Pretoria.
[6]Macfarlane DM and Bredin IP, 2016b. Buffer zone guidelines for rivers, wetlands and estuaries. Part 2: Practical guide. WRC Report No. TT 715/2/17, Water Research Commission, Pretoria.

[7]No specific method currently exists for guiding the development of management recommendations for wetlands

[8]A Mitigation Measures Tool for wetlands has been developed by MacFarlane and Bredin (2016a) for their Buffer Zone Guidelines project[6].

[9]Sustento Development Services. 2016a. The Design of a National Wetland Monitoring Programme (NWMP). Consolidated Technical Report. Volume 1. WRC Report no. 2269/1/16. Pretoria: Water Research Commission.
[9]Sustento Development Services. 2016b. The Design of a National Wetland Monitoring Programme (NWMP). Implementation manual. Volume 2. WRC Report no. 2269/2/16. Pretoria: Water Research Commission.

[10]Job, N., Mbona, N., Dayaram, A. and Kotze, D. 2018. Guidelines for mapping wetlands in South Africa. SANBI Biodiversity Series 28. South African National Biodiversity Institute, Pretoria.

[11]Rountree, M.W., Malan, H.L. and Weston, B.C. (Editors) 2013. Manual for the Rapid Ecological Reserve Determination of Inland Wetlands (Version 2.0). WRC Report No. 1788/1/12, Water Research Commission, Pretoria.

Acknowledgements

This report was drafted by Donovan Kotze, Kate Snaddon, Adam Teixeira-Leite and Lulu Van Rooyen of the SAWS Board. Comments received on an earlier draft of the report are gratefully acknowledged from the following: Nancy Job of SANBI, Piet-Louis Grundling and Stanley Tshitwamulomoni of DEFF, Jackie Jay, Shaddai Daniel-Harris, Lumka Kuse, Stanford Macevele, Elijah Mogakabe and Wietsche Roets of DWS, Craig Cowden of GroundTruth, Dean Ollis of Inland Waters and Damian Walters of Ikhwane Wetland Science. Jackie Jay is also thanked for organizing a virtual meeting to introduce the report to DWS officials.

Appendix A: Links between the core practices of a wetland practitioner and the related fields of practice recognized by SACNASP

The core practices required of a wetland practitioner	Field of practice into which the specific competencies best "fit"							
	Aquatic science	Botanical science[1]	Conservation science	Earth science	Ecological science	Environmental science	Soil science	Water resources science
Identification and delineation of wetlands in accordance with the National Practical Field Procedure	*	***	*	**	***	*	***	*
Classification and characterization of wetlands in accordance with the National Classification System for Wetlands	*	*	*	***	**	*	*	*
Rapid assessment of the Present Ecological State (PES)/ecological health of wetlands using the most appropriate method	*	**	*	**	***	***	**	**
Identification and rapid assessment of the ecosystem services associated with wetlands using the most appropriate method	*	*	*	**	***	***	*	*
Assessment of the ecological importance and sensitivity of wetlands using the most appropriate method	*	**	**	**	***	**	*	*
Determining the buffer requirements for wetlands using the most appropriate method	*	*	**	**	***	***	*	**
Development of management recommendations for wetlands	*	**	**	**	***	***	*	*

*** =A large "portion" of the practice falls within this field of practice

** =A moderate portion" of the practice falls within this field of practice

* =A small "portion" of the practice falls within this field of practice

[1] This field may also potentially be covered by the Biological science field, which includes both the botanical and zoological science fields

Appendix B: Extent to which each of the specific core practices of a wetland practitioner (given in Column 1) depend on the other core practices (given in Row 1) for their sound execution

	Identification and delineation of wetlands	Classification and characterization of wetlands	Rapid assessment of the Present Ecological State (PES)/ecological health of wetlands	Identification and rapid assessment of the ecosystem services associated with wetlands	Assessment of the ecological importance and sensitivity of wetlands	Determining the buffer requirements for wetlands	Development of management recommendations for wetlands
Identification and delineation of wetlands		1	1	0	0	0	0
Classification and characterization of wetlands	1		1	1	1	0	0
Rapid assessment of the Present Ecological State (PES)/ecological health of wetlands	2	2		0	1	1	0
Identification and rapid assessment of the ecosystem services associated with wetlands	2	2	2		1	1	0
Assessment of the ecological importance and sensitivity of wetlands	2	2	2	2		1	0
Determining the buffer requirements for wetlands	2	2	2	2	2		1
Development of management recommendations for wetlands	2	2	2	2	2	2	

0=little dependence; 1=moderate dependence; 2=high dependence

Appendix C: Continuing Professional Development (CPD)

(adapted from: https://www.sacnasp.org.za/overview-cpd)

All natural scientists (including wetland scientists) should strive to maintain and enhance their competence, as well as to contribute to the advancement of the body of knowledge within which they practice, and to their profession.

Continuing Professional Development (CPD) is vital to professionals in order to keep up with the latest developments in the knowledge base and practice in their fields of science, and is relevant to professionals at all stages of their careers. CPD refers to activities which:

- have a clear set of objectives and formal structure
- require your active participation
- extend your professional knowledge and skills

Benefits of CPD:

- Maintain or increase your level of technical competence
- Extend your range of scientific skills
- Develop new areas of expertise
- Promote confidence and pride in your work
- Establish links with fellow professionals
- Increase your career options

In addition, as you develop your knowledge and skills, you add to the body of knowledge and expertise and help maintain the profession's standards, dynamism and public image.

There are a variety of ways through which you can contribute to your CPD (e.g. attendance of relevant conferences and training courses, etc.) and these are outlined in detail by SACNASP (South African Council for Natural Scientific Professions) and are central to maintaining your status as a natural scientist registered through SACNASP.

Appendix C: Links between the additional practices of a wetland practitioner and the related fields of practice recognized by SACNASP

The additional practices within the wetland field (this excludes research, for which the most important field/s of practice will vary considerably depending on the particular research topic)	**Field of practice into which the specific competencies best "fit"**							
	Aquatic science	Botanical science[1]	Conservation science	Earth science	Ecological science	Environmental science	Soil science	Water resources science
Assessment of environmental risks and impacts and provision of mitigation measures to address identified impacts for the purposes of environmental and water use authorisations	*	*	**	**	**	***	*	**
Working knowledge of the national and international legislation, and its relevance to wetland protection and management, and the legislated protocols and policy guidelines to be followed	*		*		*	***		**
Wetland monitoring, for which the National Wetland Monitoring Programme (NWMP) provides specific guidance	**	**	*	*	***	**	*	**
Mapping wetland spatial extents and detecting wetland change using earth observation techniques	*	*	*	*	**	***	*	*
Incorporating wetlands into catchment planning and management strategies	*	*	**	*	*	**	*	***
Incorporating wetlands into broad-scale/systematic biodiversity conservation planning	*	*	***	*	**	*		*
Planning and evaluating wetland rehabilitation interventions, often in association with engineers	*	**	**	**	**	**	*	**
Determining wetland offset requirements and development of wetland offset strategies	*	**	*	*	**	***	*	**
Determining the Ecological Reserve for wetlands	***	*	*	*	**	**	*	***
Wetland geomorphology, origins and dynamics	*	*	*	***	*	*	*	**
Hydropedological impact assessment of wetlands	*			***	*	*	***	***
Physico-chemical/ water quality assessment of wetlands	***				*	**		***
Assessment of wetlands as social-ecological systems	*	**	*	*	**	***	*	**

*** =A large "portion" of the practice falls within this field of practice

** =A moderate portion" of the practice falls within this field of practice

* =A small "portion" of the practice falls within this field of practice