Government Gazette
Staatskoerant

REPUBLIC OF SOUTH AFRICA
REPUBLIEK VAN SUID AFRIKA

Vol. 686 26 August Augustus 2022 No. 46798

PART 1 OF 4

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ISSN 1682-5845

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government printing
Department:
Government Printing Works
REPUBLIC OF SOUTH AFRICA

HIGH ALERT: SCAM WARNING!!!

TO ALL SUPPLIERS AND SERVICE PROVIDERS OF THE GOVERNMENT PRINTING WORKS

It has come to the attention of the *GOVERNMENT PRINTING WORKS* that there are certain unscrupulous companies and individuals who are defrauding unsuspecting businesses disguised as representatives of the *Government Printing Works* (*GPW*).

The scam involves the fraudsters using the letterhead of *GPW* to send out fake tender bids to companies and requests to supply equipment and goods.

Although the contact person's name on the letter may be of an existing official, the contact details on the letter are not the same as the *Government Printing Works*'. When searching on the Internet for the address of the company that has sent the fake tender document, the address does not exist.

The banking details are in a private name and not company name. Government will never ask you to deposit any funds for any business transaction. *GPW* has alerted the relevant law enforcement authorities to investigate this scam to protect legitimate businesses as well as the name of the organisation.

Example of e-mails these fraudsters are using:

PROCUREMENT@GPW-GOV.ORG

Should you suspect that you are a victim of a scam, you must urgently contact the police and inform the *GPW*.

GPW has an official email with the domain as **@gpw.gov.za**

Government e-mails DO NOT have org in their e-mail addresses. All of these fraudsters also use the same or very similar telephone numbers. Although such number with an area code 012 looks like a landline, it is not fixed to any property.

GPW will never send you an e-mail asking you to supply equipment and goods without a purchase/order number. *GPW* does not procure goods for another level of Government. The organisation will not be liable for actions that result in companies or individuals being resultant victims of such a scam.

Government Printing Works gives businesses the opportunity to supply goods and services through RFQ / Tendering process. In order to be eligible to bid to provide goods and services, suppliers must be registered on the National Treasury's Central Supplier Database (CSD). To be registered, they must meet all current legislative requirements (e.g. have a valid tax clearance certificate and be in good standing with the South African Revenue Services - SARS).

The tender process is managed through the Supply Chain Management (SCM) system of the department. SCM is highly regulated to minimise the risk of fraud, and to meet objectives which include value for money, open and effective competition, equitability, accountability, fair dealing, transparency and an ethical approach. Relevant legislation, regulations, policies, guidelines and instructions can be found on the tender's website.

Fake Tenders

National Treasury's CSD has launched the Government Order Scam campaign to combat fraudulent requests for quotes (RFQs). Such fraudulent requests have resulted in innocent companies losing money. We work hard at preventing and fighting fraud, but criminal activity is always a risk.

How tender scams work

There are many types of tender scams. Here are some of the more frequent scenarios:

Fraudsters use what appears to be government department stationery with fictitious logos and contact details to send a fake RFQ to a company to invite it to urgently supply goods. Shortly after the company has submitted its quote, it receives notification that it has won the tender. The company delivers the goods to someone who poses as an official or at a fake site. The Department has no idea of this transaction made in its name. The company is then never paid and suffers a loss.

OR

Fraudsters use what appears to be government department stationery with fictitious logos and contact details to send a fake RFQ to Company A to invite it to urgently supply goods. Typically, the tender specification is so unique that only Company B (a fictitious company created by the fraudster) can supply the goods in question.

Shortly after Company A has submitted its quote it receives notification that it has won the tender. Company A orders the goods and pays a deposit to the fictitious Company B. Once Company B receives the money, it disappears. Company A's money is stolen in the process.

Protect yourself from being scammed

- If you are registered on the supplier databases and you receive a request to tender or quote that seems to be from a government department, contact the department to confirm that the request is legitimate. Do not use the contact details on the tender document as these might be fraudulent.
- Compare tender details with those that appear in the Tender Bulletin, available online at **www.gpwonline.co.za**
- Make sure you familiarise yourself with how government procures goods and services. Visit the tender website for more information on how to tender.
- If you are uncomfortable about the request received, consider visiting the government department and/or the place of delivery and/or the service provider from whom you will be sourcing the goods.
- In the unlikely event that you are asked for a deposit to make a bid, contact the SCM unit of the department in question to ask whether this is in fact correct.

Any incidents of corruption, fraud, theft and misuse of government property in the *Government Printing Works* can be reported to:

Supply Chain Management: Ms. Anna Marie Du Toit, Tel. (012) 748 6292.
Email: **Annamarie.DuToit@gpw.gov.za**

Marketing and Stakeholder Relations: Ms Bonakele Mbhele, at Tel. (012) 748 6193.
Email: **Bonakele.Mbhele@gpw.gov.za**

Security Services: Mr Daniel Legoabe, at tel. (012) 748 6176.
Email: **Daniel.Legoabe@gpw.gov.za**

Closing times for **ORDINARY WEEKLY** *REGULATION GAZETTE* 2022

*The closing time is **15:00** sharp on the following days:*

- **31 December 2021,** Friday for the issue of Friday **07 January 2022**
- **07 January,** Friday for the issue of Friday **14 January 2022**
- **14 January,** Friday for the issue of Friday **21 January 2022**
- **21 January,** Friday for the issue of Friday **28 January 2022**
- **28 January,** Friday for the issue of Friday **04 February 2022**
- **04 February,** Friday for the issue of Friday **11 February 2022**
- **11 February,** Friday for the issue of Friday **18 February 2022**
- **18 February,** Friday for the issue of Friday **25 February 2022**
- **25 February,** Friday for the issue of Friday **04 March 2022**
- **04 March,** Friday for the issue of Friday **11 March 2022**
- **11 March,** Friday for the issue of Friday **18 March 2022**
- **17 March,** Thursday for the issue of Friday **25 March 2022**
- **25 March,** Friday for the issue of Friday **01 April 2022**
- **01 April,** Friday for the issue of Friday **08 April 2022**
- **07 April,** Thursday for the issue of Thursday **14 April 2022**
- **13 April,** Wednesday for the issue of Friday **22 April 2022**
- **21 April,** Thursday for the issue of Friday **29 April 2022**
- **28 April,** Thursday for the issue of Friday **06 May 2022**
- **06 May,** Friday for the issue of Friday **13 May 2022**
- **13 May,** Friday for the issue of Friday **20 May 2022**
- **20 May,** Friday for the issue of Friday **27 May 2022**
- **27 May,** Friday for the issue of Friday **03 June 2022**
- **03 June,** Friday for the issue of Friday **10 June 2022**
- **09 June,** Thursday for the issue of Friday **17 June 2022**
- **17 June,** Friday for the issue of Friday **24 June 2022**
- **24 June,** Friday for the issue of Friday **01 July 2022**
- **01 July,** Friday for the issue of Friday **08 July 2022**
- **08 July,** Friday for the issue of Friday **15 July 2022**
- **15 July,** Friday for the issue of Friday **22 July 2022**
- **22 July,** Friday for the issue of Friday **29 July 2022**
- **29 July,** Friday for the issue of Friday **05 August 2022**
- **04 August,** Thursday for the issue of Friday **12 August 2022**
- **12 August,** Friday for the issue of Friday **19 August 2022**
- **19 August,** Friday for the issue of Friday **26 August 2022**
- **26 August,** Friday for the issue of Friday **02 September 2022**
- **02 September,** Friday for the issue of Friday **09 September 2022**
- **09 September,** Friday for the issue of Friday **16 September 2022**
- **16 September,** Friday for the issue of Friday **23 September 2022**
- **23 September,** Friday for the issue of Friday **30 September 2022**
- **30 September,** Friday for the issue of Friday **07 October 2022**
- **07 October,** Friday for the issue of Friday **14 October 2022**
- **14 October,** Friday for the issue of Friday **21 October 2022**
- **21 October,** Friday for the issue of Friday **28 October 2022**
- **28 October,** Friday for the issue of Friday **04 November 2022**
- **04 November,** Friday for the issue of Friday **11 November 2022**
- **11 November,** Friday for the issue of Friday **18 November 2022**
- **18 November,** Friday for the issue of Friday **25 November 2022**
- **25 November,** Friday for the issue of Friday **02 December 2022**
- **02 December,** Friday for the issue of Friday **09 December 2022**
- **08 December,** Thursday for the issue of Thursday **15 December 2022**
- **15 December,** Thursday for the issue of Friday **23 December 2022**
- **22 December,** Thursday for the issue of Friday **30 December 2022**

LIST OF TARIFF RATES

FOR PUBLICATION OF NOTICES

COMMENCEMENT: 1 APRIL 2018

NATIONAL AND PROVINCIAL

Notice sizes for National, Provincial & Tender gazettes 1/4, 2/4, 3/4, 4/4 per page. Notices submitted will be charged at R1008.80 per full page, pro-rated based on the above categories.

Pricing for National, Provincial - Variable Priced Notices		
Notice Type	**Page Space**	**New Price (R)**
Ordinary National, Provincial	1/4 - Quarter Page	252.20
Ordinary National, Provincial	2/4 - Half Page	504.40
Ordinary National, Provincial	3/4 - Three Quarter Page	756.60
Ordinary National, Provincial	4/4 - Full Page	1008.80

EXTRA-ORDINARY

All Extra-ordinary National and Provincial gazette notices are non-standard notices and attract a variable price based on the number of pages submitted.

The pricing structure for National and Provincial notices which are submitted as **Extra ordinary submissions** will be charged at R**3026.32** per page.

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GOVERNMENT PRINTING WORKS - BUSINESS RULES

The **Government Printing Works** (**GPW**) has established rules for submitting notices in line with its electronic notice processing system, which requires the use of electronic *Adobe* Forms. Please ensure that you adhere to these guidelines when completing and submitting your notice submission.

Closing Times for Acceptance of Notices

1. The *Government Gazette* and *Government Tender Bulletin* are weekly publications that are published on Fridays and the closing time for the acceptance of notices is strictly applied according to the scheduled time for each gazette.

2. Please refer to the Submission Notice Deadline schedule in the table below. This schedule is also published online on the Government Printing works website www.gpwonline.co.za

   All re-submissions will be subject to the standard cut-off times.
   All notices received after the closing time will be rejected.

Government Gazette Type	Publication Frequency	Publication Date	Submission Deadline	Cancellations Deadline
National Gazette	Weekly	Friday	Friday 15h00 for next Friday	Tuesday, 15h00 - 3 working days prior to publication
Regulation Gazette	Weekly	Friday	Friday 15h00 for next Friday	Tuesday, 15h00 - 3 working days prior to publication
Petrol Price Gazette	Monthly	Tuesday before 1st Wednesday of the month	One day before publication	1 working day prior to publication
Road Carrier Permits	Weekly	Friday	Thursday 15h00 for next Friday	3 working days prior to publication
Unclaimed Monies (Justice, Labour or Lawyers)	January / September 2 per year	Last Friday	One week before publication	3 working days prior to publication
Parliament (Acts, White Paper, Green Paper)	As required	Any day of the week	None	3 working days prior to publication
Manuals	Bi- Monthly	2nd and last Thursday of the month	One week before publication	3 working days prior to publication
State of Budget (National Treasury)	Monthly	30th or last Friday of the month	One week before publication	3 working days prior to publication
Extraordinary Gazettes	As required	Any day of the week	*Before 10h00 on publication date*	*Before 10h00 on publication date*
Legal Gazettes A, B and C	Weekly	Friday	One week before publication	Tuesday, 15h00 - 3 working days prior to publication
Tender Bulletin	Weekly	Friday	Friday 15h00 for next Friday	Tuesday, 15h00 - 3 working days prior to publication
Gauteng	Weekly	Wednesday	Two weeks before publication	3 days **after** submission deadline
Eastern Cape	Weekly	Monday	One week before publication	3 working days prior to publication
Northern Cape	Weekly	Monday	One week before publication	3 working days prior to publication
North West	Weekly	Tuesday	One week before publication	3 working days prior to publication
KwaZulu-Natal	Weekly	Thursday	One week before publication	3 working days prior to publication
Limpopo	Weekly	Friday	One week before publication	3 working days prior to publication
Mpumalanga	Weekly	Friday	One week before publication	3 working days prior to publication

GOVERNMENT PRINTING WORKS - BUSINESS RULES

Government Gazette Type	Publication Frequency	Publication Date	Submission Deadline	Cancellations Deadline
Gauteng Liquor License Gazette	Monthly	Wednesday before the First Friday of the month	Two weeks before publication	3 working days **after** submission deadline
Northern Cape Liquor License Gazette	Monthly	First Friday of the month	Two weeks before publication	3 working days **after** submission deadline
National Liquor License Gazette	Monthly	First Friday of the month	Two weeks before publication	3 working days **after** submission deadline
Mpumalanga Liquor License Gazette	Bi-Monthly	Second & Fourth Friday	One week before publication	3 working days prior to publication

Extraordinary Gazettes

3. *Extraordinary Gazettes* can have only one publication date. If multiple publications of an *Extraordinary Gazette* are required, a separate Z95/Z95Prov *Adobe* Forms for each publication date must be submitted.

Notice Submission Process

4. Download the latest *Adobe* form, for the relevant notice to be placed, from the **Government Printing Works** website www.gpwonline.co.za.

5. The *Adobe* form needs to be completed electronically using *Adobe Acrobat* / *Acrobat Reader*. Only electronically completed *Adobe* forms will be accepted. No printed, handwritten and/or scanned *Adobe* forms will be accepted.

6. The completed electronic *Adobe* form has to be submitted via email to submit.egazette@gpw.gov.za. The form needs to be submitted in its original electronic *Adobe* format to enable the system to extract the completed information from the form for placement in the publication.

7. Every notice submitted **must** be accompanied by an official **GPW** quotation. This must be obtained from the *eGazette* Contact Centre.

8. Each notice submission should be sent as a single email. The email **must** contain **all documentation relating to a particular notice submission**.

   8.1. Each of the following documents must be attached to the email as a separate attachment:

      8.1.1. An electronically completed *Adobe* form, specific to the type of notice that is to be placed.

         8.1.1.1. For National *Government Gazette* or *Provincial Gazette* notices, the notices must be accompanied by an electronic Z95 or Z95Prov *Adobe* form

         8.1.1.2. The notice content (body copy) **MUST** be a separate attachment.

      8.1.2. A copy of the official **Government Printing Works** quotation you received for your notice. *(Please see Quotation section below for further details)*

      8.1.3. A valid and legible Proof of Payment / Purchase Order: **Government Printing Works** account customer must include a copy of their Purchase Order**. Non-Government Printing Works** account customer needs to submit the proof of payment for the notice

      8.1.4. Where separate notice content is applicable (Z95, Z95 Prov and TForm 3, it should **also** be attached as a separate attachment. *(Please see the Copy Section below, for the specifications)*.

      8.1.5. Any additional notice information if applicable.

GOVERNMENT PRINTING WORKS - BUSINESS RULES

9. The electronic *Adobe* form will be taken as the primary source for the notice information to be published. Instructions that are on the email body or covering letter that contradicts the notice form content will not be considered. The information submitted on the electronic *Adobe* form will be published as-is.

10. To avoid duplicated publication of the same notice and double billing, Please submit your notice **ONLY ONCE.**

11. Notices brought to **GPW** by "walk-in" customers on electronic media can only be submitted in *Adobe* electronic form format. All "walk-in" customers with notices that are not on electronic *Adobe* forms will be routed to the Contact Centre where they will be assisted to complete the forms in the required format.

12. Should a customer submit a bulk submission of hard copy notices delivered by a messenger on behalf of any organisation e.g. newspaper publisher, the messenger will be referred back to the sender as the submission does not adhere to the submission rules.

QUOTATIONS

13. Quotations are valid until the next tariff change.

    13.1. ***Take note:*** **GPW**'s annual tariff increase takes place on ***1 April*** therefore any quotations issued, accepted and submitted for publication up to ***31 March*** will keep the old tariff. For notices to be published from 1 April, a quotation must be obtained from **GPW** with the new tariffs. Where a tariff increase is implemented during the year, **GPW** endeavours to provide customers with 30 days' notice of such changes.

14. Each quotation has a unique number.

15. Form Content notices must be emailed to the *eGazette* Contact Centre for a quotation.

    15.1. The *Adobe* form supplied is uploaded by the Contact Centre Agent and the system automatically calculates the cost of your notice based on the layout/format of the content supplied.

    15.2. It is critical that these *Adobe* Forms are completed correctly and adhere to the guidelines as stipulated by **GPW**.

16. **APPLICABLE ONLY TO GPW ACCOUNT HOLDERS**:

    16.1. **GPW** Account Customers must provide a valid **GPW** account number to obtain a quotation.

    16.2. Accounts for **GPW** account customers **must** be active with sufficient credit to transact with **GPW** to submit notices.

        16.2.1. If you are unsure about or need to resolve the status of your account, please contact the **GPW** Finance Department prior to submitting your notices. (If the account status is not resolved prior to submission of your notice, the notice will be failed during the process).

17. **APPLICABLE ONLY TO CASH CUSTOMERS:**

    17.1. Cash customers doing **bulk payments** must use a **single email address** in order to use the **same proof of payment** for submitting multiple notices.

18. The responsibility lies with you, the customer, to ensure that the payment made for your notice(s) to be published is sufficient to cover the cost of the notice(s).

19. Each quotation will be associated with one proof of payment / purchase order / cash receipt.

    19.1. This means that **the quotation number can only be used once to make a payment.**

GOVERNMENT PRINTING WORKS - BUSINESS RULES

COPY (SEPARATE NOTICE CONTENT DOCUMENT)

20. Where the copy is part of a separate attachment document for Z95, Z95Prov and TForm03

20.1. Copy of notices must be supplied in a separate document and may not constitute part of any covering letter, purchase order, proof of payment or other attached documents.

The content document should contain only one notice. (You may include the different translations of the same notice in the same document).

20.2. The notice should be set on an A4 page, with margins and fonts set as follows:

Page size = A4 Portrait with page margins: Top = 40mm, LH/RH = 16mm, Bottom = 40mm; Use font size: Arial or Helvetica 10pt with 11pt line spacing;

Page size = A4 Landscape with page margins: Top = 16mm, LH/RH = 40mm, Bottom = 16mm; Use font size: Arial or Helvetica 10pt with 11pt line spacing;

CANCELLATIONS

21. Cancellation of notice submissions are accepted by **GPW** according to the deadlines stated in the table above in point 2. Non-compliance to these deadlines will result in your request being failed. Please pay special attention to the different deadlines for each gazette. Please note that any notices cancelled after the cancellation deadline will be published and charged at full cost.

22. Requests for cancellation must be sent by the original sender of the notice and must accompanied by the relevant notice reference number (N-) in the email body.

AMENDMENTS TO NOTICES

23. With effect from 01 October 2015, **GPW** will not longer accept amendments to notices. The cancellation process will need to be followed according to the deadline and a new notice submitted thereafter for the next available publication date.

REJECTIONS

24. All notices not meeting the submission rules will be rejected to the customer to be corrected and resubmitted. Assistance will be available through the Contact Centre should help be required when completing the forms. (012-748 6200 or email info.egazette@gpw.gov.za). Reasons for rejections include the following:

24.1. Incorrectly completed forms and notices submitted in the wrong format, will be rejected.

24.2. Any notice submissions not on the correct *Adobe* electronic form, will be rejected.

24.3. Any notice submissions not accompanied by the proof of payment / purchase order will be rejected and the notice will not be processed.

24.4. Any submissions or re-submissions that miss the submission cut-off times will be rejected to the customer. The Notice needs to be re-submitted with a new publication date.

GOVERNMENT PRINTING WORKS - BUSINESS RULES

APPROVAL OF NOTICES

25. Any notices other than legal notices are subject to the approval of the Government Printer, who may refuse acceptance or further publication of any notice.

26. No amendments will be accepted in respect to separate notice content that was sent with a Z95 or Z95Prov notice submissions. The copy of notice in layout format (previously known as proof-out) is only provided where requested, for Advertiser to see the notice in final Gazette layout. Should they find that the information submitted was incorrect, they should request for a notice cancellation and resubmit the corrected notice, subject to standard submission deadlines. The cancellation is also subject to the stages in the publishing process, i.e. If cancellation is received when production (printing process) has commenced, then the notice cannot be cancelled.

GOVERNMENT PRINTER INDEMNIFIED AGAINST LIABILITY

27. The Government Printer will assume no liability in respect of—

27.1. any delay in the publication of a notice or publication of such notice on any date other than that stipulated by the advertiser;

27.2. erroneous classification of a notice, or the placement of such notice in any section or under any heading other than the section or heading stipulated by the advertiser;

27.3. any editing, revision, omission, typographical errors or errors resulting from faint or indistinct copy.

LIABILITY OF ADVERTISER

28. Advertisers will be held liable for any compensation and costs arising from any action which may be instituted against the Government Printer in consequence of the publication of any notice.

CUSTOMER INQUIRIES

Many of our customers request immediate feedback/confirmation of notice placement in the gazette from our Contact Centre once they have submitted their notice – While **GPW** deems it one of their highest priorities and responsibilities to provide customers with this requested feedback and the best service at all times, we are only able to do so once we have started processing your notice submission.
GPW has a 2-working day turnaround time for processing notices received according to the business rules and deadline submissions.
Please keep this in mind when making inquiries about your notice submission at the Contact Centre.

29. Requests for information, quotations and inquiries must be sent to the Contact Centre ONLY.

30. Requests for Quotations (RFQs) should be received by the Contact Centre at least **2 working days** before the submission deadline for that specific publication.

GOVERNMENT PRINTING WORKS - BUSINESS RULES

Payment of cost

31. The Request for Quotation for placement of the notice should be sent to the Gazette Contact Centre as indicated above, prior to submission of notice for advertising.

32. Payment should then be made, or Purchase Order prepared based on the received quotation, prior to the submission of the notice for advertising as these documents i.e. proof of payment or Purchase order will be required as part of the notice submission, as indicated earlier.

33. Every proof of payment must have a valid **GPW** quotation number as a reference on the proof of payment document.

34. Where there is any doubt about the cost of publication of a notice, and in the case of copy, an enquiry, accompanied by the relevant copy, should be addressed to the Gazette Contact Centre, **Government Printing Works**, Private Bag X85, Pretoria, 0001 email: info.egazette@gpw.gov.za before publication.

35. Overpayment resulting from miscalculation on the part of the advertiser of the cost of publication of a notice will not be refunded, unless the advertiser furnishes adequate reasons why such miscalculation occurred. In the event of underpayments, the difference will be recovered from the advertiser, and future notice(s) will not be published until such time as the full cost of such publication has been duly paid in cash or electronic funds transfer into the **Government Printing Works** banking account.

36. In the event of a notice being cancelled, a refund will be made only if no cost regarding the placing of the notice has been incurred by the **Government Printing Works**.

37. The **Government Printing Works** reserves the right to levy an additional charge in cases where notices, the cost of which has been calculated in accordance with the List of Fixed Tariff Rates, are subsequently found to be excessively lengthy or to contain overmuch or complicated tabulation.

Proof of publication

38. Copies of any of the *Government Gazette* or *Provincial Gazette* can be downloaded from the **Government Printing Works** website www.gpwonline.co.za free of charge, should a proof of publication be required.

39. Printed copies may be ordered from the Publications department at the ruling price. The **Government Printing Works** will assume no liability for any failure to post or for any delay in despatching of such *Government Gazette*(s)

GOVERNMENT PRINTING WORKS CONTACT INFORMATION

Physical Address:	**Postal Address:**	**GPW Banking Details:**
Government Printing Works	Private Bag X85	**Bank:** ABSA Bosman Street
149 Bosman Street	Pretoria	**Account No.:** 405 7114 016
Pretoria	0001	**Branch Code:** 632-005

For Gazette and Notice submissions: Gazette Submissions:	**E-mail:** submit.egazette@gpw.gov.za
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GOVERNMENT NOTICES • GOEWERMENTSKENNISGEWINGS

DEPARTMENT OF AGRICULTURE, LAND REFORM AND RURAL DEVELOPMENT

NO. 2421 **26 August 2022**

GENERAL NOTICE IN TERMS OF THE RESTITUTION OF LAND RIGHTS ACT, 1994 (ACT NO. 22 OF 1994) AS AMENDED

Notice is hereby given in terms of section 11(1) (c) of the Restitution of Land Rights Act, 1994 as amended) that a claim has been lodged for restitution of land rights on:

Ref No.	CLAIMANT	PROPERTY DESCRIPTION	EXTENT (M²)	CURRENT LANDOWNER	TITLE DEED	BOND	INTERESTED PARTIES
Z0121	Mr. Stephen Mahlangu	Remaining Extent of Portion 0 of Erf 425 Riamarpark Township JR	237007	Kungwini Local Municipality	T44162/1980 T28602/2002	N/A	Land Claimant, the current landowners and the City of Tshwane Metropolitan Municipality
		Portion 1 of Erf 425 Riamarpark Township JR	177559	Bronkhorspruit Golf Club	T28606/2002	N/A	
		Portion 0 of Erf 1 Riamarpark Township JR	1283	Josfar Abram Moropa & Kgati Maria Moropa	T8297/2015	N/A	
		Portion 0 of Erf 2 Riamarpark Township JR	1200	Jacky Evans Silawu & Sibongile Elsie Silawu	T32251/2013	N/A	
		Portion 0 of Erf 3 Riamarpark Township JR	1200	Tumelo Ophrins Madisha & Semakaleng Miriam Madisha	T23705/2016	N/A	
		Portion 0 of Erf 4 Riamarpark Township JR	1200	Nunko Ernest Baker	T9042/1996	ABSA Home Loans Guarantee CO PTY LTD B158511/2007	
		Portion 0 of Erf 5 Riamarpark Township JR	1200	Mane Elizabeth Morena	T104881/2016	N/A	

	Portion 0 of Erf 6 Riamarpark Township JR	1200	Love Rirhandzu Gazide	T145010/2003 T 3537/2006	Greenhouse Funding 4 (RF) LTD B58517/2008	
	Portion 0 of Erf 7 Riamarpark Township JR	1200	Lesibana Phineas Motau	T47120/2016	N/A	
	Portion 0 of Erf 8 Riamarpark Township JR	1200	Mabel Thembeni Mabena & Khethiwe Precious Mabena	T34106/1994 T84856/2016	N/A	
	Portion 0 of Erf 9 Riamarpark Township JR	1200	Bongani Mishack Maluleka	T112610/2004	N/A	
	Portion 0 of Erf 10 Riamarpark Township JR	1200	Nonhlanhla Cathrine Nhlapho Sydwell & Zwelithini Nhlapho	T4243/2020	SB Guarantee CO (RF) PTY LTD B3204/2020	
	Portion 0 of Erf 11 Riamarpark Township JR	1200	Maweza July Nkutha & Cynthia Mathabathe Nkutha	T92182/2016	SB Guarantee Company (RF) Pty Ltd B46930/2016	
	Portion 0 of Erf 12 Riamarpark Township JR	1200	Mapatlare Elias Madime & Freda Mphohu Madime	T42522/2019	N/A	
	Portion 0 of Erf 13 Riamarpark Township JR	1200	Thimothy Mafa & Tshidi Doreen Mafa	T130794/1997	N/A	
	Portion 0 of Erf 14 Riamarpark Township JR	1200	Mafindo Family Trust	T28759/2017	N/A	
	Portion 0 of Erf 15 Riamarpark Township JR	1200	Mzamo Simon Mtshweni & Lekobe Brunny Mtshweni	T18696/2019	Firstrand Bank LTD B11842/2019	
	Portion 0 of Erf 16 Riamarpark Township JR	1200	Abraham Mabena	T143487/2004	N/A	
	Portion 0 of Erf 17 Riamarpark Township JR	1200	Uveer Ashwankumar Lalla & Kerusha Lalla	T45911/2014	Nqaba Guarantee S P V PTY LTD	

	Portion 0 of Erf 18 Riamarpark Township JR	1200	Zebulon Magemfana Nkosi & Emely Bongi Nkosi	T79455/2011	F N B Mortgage Loans (RF) LTD B50947/2011	
	Portion 0 of Erf 136 Riamarpark Township JR	1065	Sarah Nantuli Ingwane	T883/2013	N/A	
	Portion 0 of Erf 137 Riamarpark Township JR	1122	Molefe Trymond Matlole & Sibongile Mavis Matlole	T66530/2001	N/A	
	Portion 0 of Erf 138 Riamarpark Township JR	1195	Sophie Khuwa Nkabinde	T137943/2001	Standard Bank of South Africa LTD B20177/2010 B90149/2001 B97980/2006	
	Portion 0 of Erf 139 Riamarpark Township JR	1114	Popisi Alfred Mdhluli	T106290/2005	ABSA Bank LTD B118718/2005	
	Portion 0 Erf 140 Riamarpark Township JR	1083	Nosipho Sedibe	T36808/2022	Nedbank LTD B21766/2022	
	Portion 0 of Erf 141 Riamarpark Township JR	1051	David Benjamin Snijman & Gertruida Maria Magrietha Snijman	T9923/1989	N/A	
	Portion 0 of Erf 147 Riamarpark Township JR	1211	Ponny Kenneth Mahlangu	T45173/2007	ABSA Bank LTD B56561/2007	

	Portion 0 of Erf 148 Riamarpark Township JR	1000	Azariah Kheliboy Mahlangu & Nhlahla Mahlangu	T97494/2013	N/A	
	Portion 0 of Erf 149 Riamarpark Township JR	1000	Lucas Bhefika Cele	T161575/2005	ABSA Bank LTD B185462/2005	
	Portion 0 of Erf 150 Riamarpark Township JR	1000	Jubida Mahomed, Haroon Carrim Mohamed & Abdul Carrim Haroon Mohamed	T31931/1995 T49952/2013	N/A	
	Portion 0 of Erf 151 Riamarpark Township JR	1000	Bokgathu Christian Seshabela & Kgopotso Enette Seshabela	T52144/2012	ABSA Home Loans 101 (RF) LTD B31696/2012	
	Portion 0 of Erf 152 Riamarpark Township JR	1000	November Mbonani & Rill Muriel Mbonani	T79978/1993	N/A	
	Portion 0 of Erf 153 Riamarpark Township JR	1000	Berry Vusimuzi Chauke & Mirriam Gogo Chauke	T18541/2009	N/A	
	Portion 0 of Erf 154 Riamarpark Township JR	1000	Moses Khandlela Mahlangu & Molorane Sannah Phetla	T47285/2020	South African Home Loans Guarantee Trust B31875/2020	
	Portion 0 of Erf 155 Riamarpark Township JR	1000	Lea Anne Coetzee, Michelle Pamela Roets & Frederick Johannes Coetzee	T48124/2021	N/A	
	Portion 0 of Erf 156 Riamarpark Township JR	987	Moses Sibusiso Mmguni & Morula Stephina Galane	T72240/2003	Nedbank LTD B134304/2005 B204550/2006 B49942/2003	

	Portion 0 of Erf 157 Riamarpark Township JR	987	Patrick Simon Mahole	T3210/2013	South African Home Loans Guarantee Trust B1756/2013		
	Portion 0 of 158 Riamarpark Township JR	1000	Teunis Vorster	T114813/2005	Standard Bank Van Suid-Afrika LTD B128626/2005 B80903/2007		
	Portion 0 of Erf 159 Riamarpark Township JR	1000	Mncedisi Headman Klaas & Nomakhwezi Gladys	T43057/2014	ABSA Home Loans Guarantee CO (RF) PTY LTD B28333/2017		
	Portion 0 of Erf 160 Riamarpark Township JR	1000	Storm INV 330 PTY LTD Autumn	T119449/2006	Nedbank LTD B150653/2006		
	Portion 0 of Erf 161 Riamarpark Township JR	1000	Charl Lourens & Tertia Lourens	T13561/1997	N/A		
	Portion 0 of Erf 162 Riamarpark Township JR	1000	Gerhardus Johannes Jacobus Booysen	T145786/2004	Greenhouse 4 Funding LTD (RF) B108967/2008 B6794/2012		
	Portion 0 of Erf 163 Riamarpark Township JR	1000	Nozuko Busisiwe Phillee & Motswiane Nozuko Busisiwe Phillee Motswiane	T49388/2012 T85697/2005	Standard Bank of South Africa LTD B29888/2012		
	Portion 0 of Erf 164 Riamarpark Township JR	1000	Elizabeth Magarietha Bezuidenhout	T5490/1970 T18478/2014	N/A		

	Portion 0 of Erf 165 Riamarpark Township JR	1000	Sipho Desember Zembe & Fikile Sweetness Mqoma	TZ701/2003	Nedcor Bank LTD B6377/2003		
	Portion 0 of Erf 166 Riamarpark Township JR	1138	Jane Motlatsi Aphane, Neo Nkululeko Aphane & Nompumelelo Thengi Tshoba	T15958/2021	N/A		
	Portion 0 of Erf 167 Riamarpark Township JR	1260	Thembinkosi Aubrey Nkonyane	T33899/2018	N/A		
	Portion 0 of Erf 169 Riamarpark Township JR	1133	Joseph Kabini & Gugulethu Phillipine Kabini	T35147/2019	ABSA Home Loans Guarantee CO (RF) PTY LTD B21897/2019		
	Portion 0 of Erf 170 Riamarpark Township JR	1000	Lisiti Abram Molete & Tsoliso Mercia Molete	T109100/2007	Standard Bank of South Africa LTD B133446/2007		
	Portion 0 of Erf 171 Riamarpark Township JR	1000	Johannes Thoka Makakaba & Tebogo Pertunia Makakaba	T78415/2018	N/A		
	Portion 0 of Erf 172 Riamarpark Township JR	1000	Ditshego Susan Siko	T86870/2005	ABSA Bank LTD B95684/2005		
	Portion 0 of Erf 173 Riamarpark Township JR	1000	Thulisile Mary Kobue	T93422/2017	SB Guarantee Company (RF) Pty Ltd B52939/2017		
	Portion 0 of Erf 174 Riamarpark Township JR	1000	Louis Botha & Celeste Elaine Botha	T25264/1985	N/A		

	Portion 0 of Erf 175 Riamarpark Township JR	1000	Joseph Milton Mudhari	T21958/2009	Nedbank LTD B17152/2009	
	Portion 0 of Erf 176 Riamarpark Township JR	1000	Makaya Tolwana & Penelope Nompumelelo Tolwana	T59142/2009	Nqaba Guarantee S P V PTY LTD B37595/2009	
	Portion 0 of Erf 177 Riamarpark Township JR	1000	Motselisi Frangeni Chere	T81749/2012	South Africa Home Loans Guarantee Trust B49023/2012	
	Portion 0 of Erf 178 Riamarpark Township JR	1000	Coenraad Frederick De Kock & Elizabeth Sussanna De Kock	T14213/2014	South African Home Loans Guarantee Trust B8445/2014	
	Portion 0 of Erf 179 Riamarpark Township JR	1000	Godfrey Diaheng Phokoane & Precious Phokoane	T26702/2019	SB Guarantee CO (RF) PTY LTD B17012/2019	
	Portion 0 of Erf 180 Riamarpark Township JR	1000	Chenene David Makulwane & Nomfusi Vanessa Makulwane	T20728/2017	South Africa Home Loans Guarantee Trust B11040/2017	
	Portion 0 of Erf 181 Riamarpark Township JR	987	Matshidiso Mathildah Ngomane	T38278/2011	Standard Bank of South Africa LTD B25092/2011	
	Portion 0 of Erf 182 Riamarpark township JR	987	Eric Clody Gerber	T72884/1989 T60127/2011	ABSA Bank LTD B38466/2011 B76984/1989	
	Portion 0 of Erf 183 Riamarpark Township JR	1000	Jabulani Peter Sibiya & Priscilla Pheladi Sibiya	T84499/2005	ABSA Bank LTD B92724/2005	

		Portion 0 of 184 Riamarpark Township JR	1000	Nomakhosi Emily Skosana	T105084/1998	N/A	
		Portion 0 of Erf 185 Riamarpark Township JR	1000	Speelman Venselwa Mabona	T128441/2000	N/A	
		Portion 0 of Erf 186 Riamarpark township JR	1000	Mphoho Edward Sathekge & Mosima Mirriam Sathekge	T90095/1998	N/A	
		Portion 0 of Erf 187 Riamarpark Township JR	1000	Daisy Mmatemo Mngomezulu	T96274/2004 T25029/2010	N/A	
		Portion 0 of Erf 188 Riamarpark Township JR	1000	Dibaneng Daniel Tlou & Setshelekile Nonhlanhla Mirriam Tlou	T116496/2006	N/A	
		Portion 0 of Erf 189 Riamarpark township JR	1000	Aaron Mnguni & Martha Miemie Mnguni	T77144/2007	N/A	
		Portion 0 of Erf 190 Riamarpark Township JR	1000	Nkoane Emmanuel Mmatshia & Khomotso Innosacia Motsatsi Mmatshia	T39381/2019	S B Guarantee CO (RF) PTY LTD B24516/2019	
		Portion 0 of Erf 191 Riamarpark Township JR	1000	Ephraim Bhekie Masina	T32818/2002	ABSA Bank LTD B51801/2010	
		Portion 0 of Erf 192 Riamarpark Township JR	1000	Hendrick Tsokotla Mphela	T232/2021	S B Guarantee CO (RF) PTY LTD B209/2021	
		Portion 0 of Erf 193 Riamarpark Township JR	1000	Piet Loyiwe Mashegwane	T27986/2004 T71602/2021	N/A	

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	Portion 0 of Erf 194 Riamarpark Township JR	1000	Mxolisi Collen Skosana	T89494/2012	South African Home Loans Guarantee Trust B53873/2012	
	Portion 0 of Erf 195 Riamarpark Township JR	1179	Jabulani Fortitude Shabangu & Zelda Refilwe Shabangu	T153874/2000	ABSA Bank B48109/2005 B87405/2000	
	Portion 0 of Erf 220 Riamarpark Township JR	1000	Elsie Nomasonto Mampono Maholwana	T14906/2007	Nedbank Ltd B18973/2007 B33614/2010 B4828/2008	
	Portion 0 of Erf 221 Riamarpark Township JR	1000	Malupa Trust	T65678/2015	N/A	
	Portion 0 of Erf 241 Riamarpark Township JR	1028	Clifford Maseko & Beryl Bongiwe Maseko	T8611/2011	South African Home Loans Guarantee Trust B6368/2011	
	Portion 0 of Erf 242 Riamarpark Township JR	1000	Pumlani Kube & Gcobisa Caroline Kube	T40397/2011	Nqaba Guarantee SPV Pty LTd B26408/2011	
	Portion 0 of Erf 243 Riamarpark Township JR	1000	Thokozile Maria Machika	T58370/2012	N/A	
	Portion 0 of Erf 244 Riamarpark Township JR	1000	Emmah Thembi Mtsweni	T29918/2018	ABSA Home Loans Guarantee CO (RF) PTY LTD B15635/2018 B43249/2021	
	Portion 0 of Erf 245 Riamarpark Township JR	1000	Edward Wisane Mathebula & Millicent Nommie Mathebula	T163896/2007	N/A	

		Portion 0 of Erf 246 Riamarpark Township JR	1000	Lethabo Mokwena	T58754/2010	N/A	
		Portion 0 of Erf 247 Riamarpark Township JR	1000	Fana Desmond Phala & Johanna Nkgowa Phala	T9747/2021	N/A	
		Portion 0 of Erf 248 Riamarpark Township JR	1000	Motshaodi Thomas Shai & Khethiwe Nhlapo	T8847/2022	S B Guarantee CO (RF) PTY LTD B5503/2022	
		Portion 0 of erf 249 Riamarpark Township JR	1000	Ngibo Nelly Maseko	T56789/2014	N/A	
		Portion 0 of Erf 250 Riamarpark Township JR	1000	Bells CC Five	T30023/1993	N/A	
		Portion 0 of Erf 251 Riamarpark Township JR	1000	Keith Adrian Ramsay	T21653/1981	N/A	
		Portion 0 of Erf 252 Riamarpark Township JR	1000	Johan Diederik Du Toit	T11489/1981	NBS Bank B118688/1992 B11873/1981	
		Portion 0 of Erf 253 Riamarpark Township JR	1000	Mmesa Pebetsi Moyane & Takalani Netshipise	T54456/2018	Firstrand Bank LTD B28507/2018	
		Portion 0 of Erf 254 Riamarpark Township JR	1000	Tshepo Elvis Mogola	T44256/2016	SB Guarantee Company (RF) (PTY) LTD B24760/2016	

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	Portion 0 of Erf 255 Riamarpark Township JR	1000	Andre Gerhardus Grobler	T10742/1981	N/A	
	Portion 0 of Erf 256 Riamarpark Township JR	1000	Shadrack Sesibana Dlamama Julia & Sekwaila	T55718/2011	Nqaba Guarantee S P V PTY LTD B36077/2011	
	Portion 0 of Erf 257 Riamarpark township JR	1000	Petrus Johannes Le Roux & Anilie Le Roux	T138056/2001	ABSA Bank LTD B90168/2001	
	Portion 0 of Erf 258 Riamarpark Township JR	1000	Modise Paulus Mohlala	T171321/2003	Greenhouse 4 Funding LTD (RF) B118011/2003 B12357/2013 B15044/2011 B53291/2011	
	Portion 0 of Erf 259 Riamarpark Township JR	1028	Queen Naddie Ngoepe	T9142/2002	N/A	
	Portion 0 of Erf 260 Riamarpark Township JR	1028	Phokwane Crecious Mmotong	T26725/2021	SB Guarantee CO (RF) PTY LTD B17935/2021	
	Portion 0 oF Erf 261 Riamarpark Township JR	1000	Annellie Vorster	T8053/2006	Standard Bank Van Suid-Afrika LTD B10205/2006 B201309/2007	
	Portion 0 of Erf 262 Riamarpark Township JR	1000	Checky John Sindane & Betty Namsiza Sindane	T152375/2000	N/A	

	Portion 0 of Erf 263 Riamarpark Township JR	1000	Makhamisa Brandon Quentin Maseko	T33305/2005	N/A	
	Portion 0 of Erf 264 Riamarpark Township JR	1000	Moninyane Patrick Magopa & Masesi Busisiwe Mabuza Magopa	T54844/2016	Mpumalanga Economic Growth Agency B30042/2014	
	Portion 0 of Erf 265 Riamarpark Township JR	1000	Gary William Mann & Annette Mann	T4897/1988	N/A	
	Portion 0 of Erf 266 Riamarpark Township JR	1000	Mapogo John Mtshweni & Dorah Intombiezi Mtshweni	T15565/2001	N/A	
	Portion 0 of Erf 267 Riamarpark Township JR	1000	Absalom Tshelwani Matshika	T66575/2001	Nedbank LTD B186579/2006	
	Portion 0 of Erf 268 Riamarpark township JR	1000	Mashilo Alpheus Makola & Makobo Lydia Makola	T32293/2002	N/A	
	Portion 0 of Erf 269 Riamarpark Township JR	1000	Rakgwadi Johannes & Mogashoa Magdeline Fredah Mogashoa	T66155/2007	Standard Bank of South Africa LTD B81950/2007	
	Portion 0 of Erf 270 Riamarpark Township JR	1000	Petros Khulumani Ntuli & Cathrine Naniwe Ntuli	T107354/1999	N/A	

		Portion 0 of Erf 271 Riamarpark Township JR	1000	Dawid Johannes De Villiers Swanepoel	T48385/1983	ABSA Bank LTD B12204/2003 B126763/2005 B59310/1983 United B60858/1990 B65318/1987	
		Portion 0 of Erf 272 Riamarpark Township JR	1000	Modisana Justice Moshiga & Keamogetse Julia Moshiga	T71546/2021	SB Guarantee CO (RF) PTY LTD B49033/2021	
		Portion 0 of Erf 273 Riamarpark Township JR	1000	Jabulani Johannes Mahlangu	T48758/2018	N/A	
		Portion 0 of Erf 274 Riamarpark Township JR	1000	Linah Ngophelana Linkie Msiza & Jabulane Kleinbooi Msiza	T95442/1999	N/A	
		Portion 0 of Erf 275 Riamarpark Township JR	1000	Patrick Simon Mbonani	T12165/2019	N/A	
		Portion 0 of Erf 276 Riamarpark Township JR	1000	Mrashiya William Mokwena & Chinah Sarah Masango	T98283/2013	Standard bank of South Africa LTD B56647/2013	
		Portion 0 of Erf 277 Riamarpark Township JR	1000	Douglas Marais & Ria Madikwane Marais	T46803/2011	SB Guarantee CO (RF) PTY LTD B6737/2022	
		Portion 0 of Erf 278 Riamarpark Township JR	1028	Jabulani Michael Dzimbili & Selloane Franciska Dzimbili	T152805/2004	N/A	
		Portion 0 of Erf 279 Riamarpark	1028	Jacobus Speek & Maria Geertruida Speek	T121653/1997	N/A	

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	Township JR					
	Portion 0 of Erf 280 Riamarpark Township JR	1000	David Ngakane Mawela & Johanna Mawela	T170963/2006	ABSA Bank LTD B213137/2006	
	Portion 0 of Erf 281 Riamarpark Township JR	1000	Thokozile Jacob Masilela & Mini Catherine Masemola	T77704/2003	ABSA Bank LTD B92471/2007 B96636/2006	
	Portion 0 of Erf 282 Riamarpark Township JR	1000	Helene Janse Van Rensburg	T27715/2000	N/A	
	Portion 0 of Erf 283 Riamarpark Township JR	1000	Kgaogelo Louisa Mahlaba	T3479/2006	N/A	
	Portion 0 of Erf 284 Riamarpark Township JR	1000	Adolphina Dolores Sbongile Moabelo	T73444/1998	Firstrand Bank LTD B195944	
	Portion 0 of Erf 285 Riamarpark Township JR	1000	Loenard Marius Oosthuizen	T28863/1991	Nedperm B33205/1991 Nedcor Bank B56551/1993 Nedbank LTD B61264/2003 B87302/2005	
	Portion 0 of Erf 286 Riamarpark Township JR	1000	Elias Ntapi Matshika & Fuduka Betty Matshika	T66319/2010	N/A	
	Portion 0 of Erf 287 Riamarpark Township JR	1000	Johannes George Herbst	T45100/2017	N/A	

	Portion 0 of Erf 288 Riamarpark Township JR	1000	Clifford Leon Filander & Suzan Evelyn Filander	T53096/2006	ABSA Bank LTD B155472/2006 B67643/2006		
	Portion 0 of Erf 289 Riamarpark Township JR	1000	Thuna Victor Mariba & Grace Nomsa Mariba	T41624/2012	Standard bank of South Africa LTD B24642/2012		
	Portion 0 of Erf 290 Riamarpark Township JR	1000	Sipho Jerry Makitla & Linah Pukane Sebothoma	T28381/2010	N/A		
	Portion 0 of Erf 291 Riamarpark Township JR	1000	Busani Jamson Sindane	T93437/2002	Firstrand Bank LTD B66701/2002		
	Portion 0 of Erf 292 Riamarpark Township JR	1000	Nomvula Silvia Masoka	T51701/2010	N/A		
	Portion 0 of Erf 293 Riamarpark Township JR	1000	Letebele Cynthia Boya	T3223/2016	N/A		
	Portion 0 of Erf 294 Riamarpark Township JR	1000	Developments CC Bosnia	T45371/2014	N/A		
	Portion 0 of Erf 295 Riamarpark Township JR	1000	Mathys Jacobus Visser & Hester Erna Visser	T40946/2002	N/A		
	Portion 0 of Erf 296 Riamarpark Township JR	1000	Mpitso Benjamin Mxakwe	T21070/2022	N/A		
	Portion 0 of Erf 297 Riamarpark	1028	Bongani Jeffrey Mahlangu	T59005/2018	N/A		

		Township JR					
		Portion 0 of Erf 298 Riamarpark Township JR	1028	Eric Van Der Merwe	T47268/2020	N/A	
		Portion 0 of Erf 299 Riamarpark Town JR	1000	Busani Sipho Mthombeni & Hlalaphi Dorah Mthombeni	T9574/2014	N/A	
		Portion 0 of Erf 300 Riamarpark Township JR	1000	Monde Simon Masilela & Lebogang Accacia Bodiba	T53412/2021	ABSA Home Loans Guarantee CO (RF) PTY LTD B36915/2021	
		Portion 0 of Erf 301 Riamarpark Township JR	1000	Petrus Michael Mahlangu	T50545/2019	SB Guarantee CO (RF) PTY LTD B32141/2019	
		Remaining Extent of Erf 302 Riamarpark Township JR	500	Testamentary Trust Pool & Helen Catherine Pool	T88898/2018	N/A	
		Portion 0 of Erf 303 Riamarpark Township JR	1000	Moswatse Lucas Seoka & Mapula Margaret Seoka	T16969/2006	Standard bank of South Africa LTD B22307/2006 B71467/2007	
		Portion 0 of Erf 304 Riamarpark Township JR	1000	Mauritz Herman Otto Janse Van Rensburg	T46595/2016	South Africa Home Loans Guarantee Trust B25988/2016	
		Portion 0 of Erf 305 Riamarpark Township JR	1000	David Musa Madlala & Priscilla Dumisile Madlala	T10908/2007	Nedbank LTD B13581/2007	

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	Portion 0 of Erf 306 Riamarpark Township JR	1000	Dorcas Matsoku Mphela	T18160/2001	N/A	
	Portion 0 of Erf 307 Riamarpark Township JR	1000	Frederik Johannes Broodryk	T99965/1993	ABSA Bank B110064/1993	
	Portion 0 of Erf 308 Riamarpark Township JR	1000	Johannes Willem Engelbrecht & Madeleine Engelbrecht	T53750/1991	Guarantee Trust B62438/2004 South African Home Loans Guarantee Trust B88146/2006	
	Portion 0 of Erf 309 Riamarpark Township JR	1000	Maahlomakgoloa PTY LTD	T41053/2020	SB Guarantee CO (RF) PTY LTD B27925/2020 B32459/2021	
	Portion 0 of Erf 310 Riamarpark Township JR	1000	Jacob Simon Tshili & Martha Badanus Tshili	T6608/1999	ABSA Bank LTD B10056/2006	
	Portion 0 of Erf 311 Riamarpark Township JR	1000	Baphelile Eva Ndala	T122315/1998	N/A	
	Portion 0 of Erf 312 Riamarpark Township JR	1000	Sidisho Jerry Mahlangu	T93543/2012	Standard Bank South Africa LTD B56286/2012	
	Portion 0 of Erf 313 Riamarpark Township JR	1000	Richard Mishack Lusenga & Evely Hluphekile Lusenga	T75320/1998	N/A	

	Portion 0 of Erf 314 Riamarpark Township JR	1000	Morris Hennie Nzolo	T9332/2000	ABSA Bank LTD B51751/2000	
	Portion 0 of Erf 315 Riamarpark Township JR	1000	Sunny Grey Magane	T58888/2002	N/A	
	Portion 0 of Erf 316 Riamarpark Township JR	1028	Phillemon Somatseulan Mashiane	T5101/1998	Firstrand Bank LTD B215280/2006	
	Portion 0 of Erf 317 Riamarpark Township JR	1028	George Bayengeni Masanabo	T6287/2005	N/A	
	Portion 0 of Erf 318 Riamarpark Township JR	1000	Alden Columbos Louw	T99500/2000	ABSA Bank LTD B52589/2000	
	Portion 0 of Erf 319 Riamarpark Township JR	1000	John Bokile Masanabo	T13485/1999	N/A	
	Portion 0 of Erf 320 Riamarpark Township JR	1000	Thulani Sikhosana	T60491/2015	Standard Bank of South Africa LTD B32062/2015	
	Portion 0 of Erf 321 Riamarpark Township JR	1000	Sphenge Sophy Ntuli	T75674/2001	N/A	
	Portion 0 of Erf 322 Riamarpark Township JR	1000	Benjamin Mabena & Magdeline Mabena	T21173/2002	N/A	
	Portion 0 of Erf 323 Riamarpark	1000	Benjamin Henning	T14187/1981	N/A	

		Township JR					
		Portion 0 of Erf 324 Riamarpark Township JR	1000	Mongezi Ashley Mahlangu & Tebogo Mahlangu	T23303/2020		
		Portion 0 of Erf 325 Riamarpark Township JR	1000	Frans Koning Motau & Emily Thethiwe Motau	T53470/2003	N/A	
		Portion 0 of Erf 326 Riamarpark Township JR	1000	Omotayo Abiola Odeh	T24279/2018	Nedbank LTD B12619/2018	
		Portion 0 of Erf 327 Riamarpark township JR	1000	Letlibe Jacob Phahlamohlaka & Julia Thokozile Phahlamohlaka	T12029/1993	Standard Bank South Africa LTD B106531/2003 Standard B12105/1993 Standard Bank South Africa LTD B132347/2005 B169534/2006	
		Portion 0 of Erf 328 Riamarpark Township JR	1000	Elizabeth Dinao Modiroadi Phala & Lehlogonolo Makopi Phala	T73096/2019	SB Guarantee CO (RF) PTY LTD B46389/2019	
		Portion 0 of Erf 329 Riamarpark Township JR	1000	Annie Patricia Mphahlele & Mokgamisheng Nehemia Mphahlele	T68367/2001	N/A	
		Portion 0 of Erf 330 Riamarpark Township JR	1000	Ras Michael Venter & Harmke Venter	T124543/1996	Absa Home Loans Guarantee CO (RF) PTY LTD B1022/2019	

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	Portion 0 of Erf 331 Riamarpark Township JR	1000	Velaphi January Motswene & Maria Rose Motswene	T73479/2007		
	Portion 0 of Erf 332 Riamarpark Township JR	1000	Dumisani John Mlangeni	T108930/2001	N/A	
	Portion 0 of Erf 333 Riamarpark Township JR	1000	Mornay Oelofse	T125946/2002	ABSA Bank LTD B87734/2002	
	Portion 0 of Erf 334 Riamarpark Township JR	1000	Catharina Johanna Magrietha Liandi Breet, Pieterse & Willem Sternberg Breet	T62115/2012	N/A	
	Portion 0 Erf 335 Riamarpark Township JR	1028	Irhalane Prop PTY LTD	T39229/2018	N/A	
	Portion 0 of Erf 336 Riamarpark Township JR	1028	Lebobole Boquin Rantitha	T39187/2010	N/A	
	Portion 0 of Erf 337 Riamarpark Township JR	1000	France Ndlozi Mtsweni & Makhosazana Cynthia Mthimunye	T71239/2014	Standard Bank South Africa LTD B42312/2014	
	Portion 0 of Erf 338 Riamarpark Township JR	1000	Marcus Malome Tlou & Koloti Wilhelmina Tlou	T10849/2019	N/A	
	Portion 0 of Erf 339 Riamarpark township JR	1000	Emmarentia Frederika Hanekom	T20509/1998 T11370/2006	ABSA Bank LTD B14437/2006	

		Remaining Extent of Erf 340 Riamarpark Township JR	500	Gisela Ingeborg Brigitte Van Reenen	T120966/2005	Nedbank LTD B136280/2005	
		Portion 1 of Erf 340 Riamarpark Township JR	500	Folashade Okundaye Salihu	T59093/2015	Firstrand Bank Ltd B31301/2015	
		Portion 0 of Erf 341 Riamarpark Township JR	1000	Jozua Joachim Francois Britz & Thelma Hilton Britz	T20986/1984 T25768/1998	Eerste Nasionale Bank LTD B30539/1998	
		Porion 0 of Erf 342 Riamarpark Township JR	1000	Anna Elizabeth Marais	T100707/2004	ABSA Home Loans Guarantee CO (RF) PTY LTD B10886/2020	
		Portion 0 of Erf 343 Riamarpark Township JR	1000	Motuku Zebedius Rakgahla	T85633/1998	ABSA Bank LTD B70895/1998	
		Portion 0 of Erf 344 Riamarpark Township JR	1000	Motsimanyana Isaac Moloi & Nomali Annah Sibanyoni	T20570/2022	Nedbank LTD B12907/2022	
		Portion 0 of Erf 345 Riamarpark Township JR	1000	Ntombi Johanna Shoba	T107644/1995 T161089/2002	N/A	
		Portion 0 of Erf 346 Riamarpark Township JR	1000	Louis Harmse & Charmain Harmse	T41043/2004	N/A	
		Portion 0 of Erf 347 Riamarpark Township JR	1000	Andries Thulani Mthethwa & Pracuias Mahlangu	T5638/2022	ABSA Home Loans Guarantee CO (RF) PTY LTD B3568/2022	

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	Portion 0 of Erf 348 Riamarpark Township JR	1000	Digokwe Noah Mokone	T30699/1995	ABSA Bank B62489/1995 B62122/2005	
	Portion 0 of Erf 349 Riamarpark ownship	1000	Dithomo Smuts Mahlaela & Baby Mfaneseiwa Mabena	T43354/2008	Standard Bank of South Africa LTD B45626/2008	
	Portion 0 of Erf 350 Riamarpark Township JR	1000	Elizabeth Duduzile Modipi	T74152/2005	ABSA Bank LTD B81738/2005	
	Portion 0 of Erf 351 Riamarpark Township JR	1000	Andre Oberholzer & Linda Aletta Oberholzer	T159375/2005	ABSA Band LTD B82845/2005 B94738/2007	
	Portion 0 of Erf 352 Riamarpark Township JR	1000	Zoli Willy Godi	T36707/2003	N/A	
	Portion 0 of Erf 353 Riamarpark Township JR	1000	Tigratrim PTY LTD	T108492/2016	N/A	
	Portion 0 of Erf 354 Riamarpark Township JR	1028	Willem Stemberg Smit & Dina Susanna Maria Smit	T119029/2007	ABSA Bank LTD B28418/2008	
	Portion 0 of Erf 354 Riamarpark Township JR	1028	Willem Stemberg Smit & Dina Susanna Maria Smit	T119029/2007	ABSA Bank LTD B28418/2008	
	Portion 0 of Erf 426 Riamarpark Townshhip JR	1833	City of Tshwane Metropolitan Municipality Administrative Unit Centurion	T36846/1973 T76730/2012	N/A	
	Portion 1 of Erf 685 Riamarpark	1000	Bheki Simphiwe Thukwane	T87366/2016	SB Guarantee Company (RF) (PTY)	

		Township JR				LTD B44658/2016	
		Portion 2 of Erf 685 Riamarpark Township JR	1000	Thomas Frederik Van Den Berg	T44445/1993	Eerste Nasionale Bank B45064/1993	
		Portion 3 of Erf 685 Riamarpark Township JR	1001	Daniel Sipho Mahlangu & Adelaide Mahlangu	T92775/2006	ABSA Bank LTD B117499/2006	
		Portion 4 of Erf 685 Riamarpark township JR	1002	Bomeleni Nelly Masuku & Petrus Masuku	T142892/2003	Standard Bank South Africa LTD B203292/2007 B96726/2003	
		Portion 5 of Erf 685 Riamarpark Township JR	1001	Ntipe Maesela Jack Malapela & Rakgadi Grace Malapela	T18865/2003	Nqaba Guarantee S P V PTY LTD B42/2011	
		Portion 6 of Erf 685 Riamarpark Township JR	1001	Maisela Johannes Shela & Maria Nomakhuwa Shabangu	T306/2011	Standard Bank of South Africa LTD B200/2011	
		Portion 17 of Erf 685 Riamarpark Township JR	1000	Johannes Hendrik Jasper Du Plooy & Zelda Du Plooy	T107668/2002	N/A	
		Portion 34 (Remaining Extent) of Erf 685 Riamarpark Township JR	510	Kanka Raymond Legodi	T117925/2005	ABSA Bank LTD B132664/2005	
		Portion 35 of Erf 685 Riamarpark Township JR	1030	Rendani Abraham Shiwalula	T24941/2022	South African Home Loans Guarantee Trust	

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						B15253/2022	
		Potion 36 of Erf 685 Riamarpark Township JR	1036	Mokhine Clement Diale & Malehu Martha Diale	T20595/1994		
		Portion 37 of Erf 685 Riamarpark Township JR	1000	Themba Steven Nene	T143793/2003	Firstrand Bank LTD B18582/2005 B66800/2006	
		Portion 38 of Erf 685 Riamarpark Township JR	0	No deeds information	N/A	N/A	
		Portion 40 of Erf 685 Riamarpark Township JR	423	Ezekiel Majola	T29060/2012	South African Home Loans Guarantee Trust B17360/2012	
		Portion 41 of Erf 685 Riamarpark Township JR	581	Ruth Nanankele Nkoe	T117340/2001	N/A	
		Portion 42 of Erf 685 Riamarpark Township JR	581	Evah Khuzo Mabena	T32352/2003	N/A	
		Portion 43 of portion 39 of Erf 685 Riamarpark Township JR	425	Mapholoane Stephina Malapane & Offering Sebolai Modise	T40425/2006	Nedbank LTD B51471/2006	
		Portion 44 of Erf 685 Riamarpark Township JR	444	Irvin Peter Mkhonto & Sarah Kabini	T16977/2007	Standard Bank of South Africa LTD B21579/2007	

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	Portion 45 of portion 39 of Erf 685 Riamarpark Township JR	548	Leonie Scholtz	T82230/2013	N/A	
	Portion 46 of Erf 685 Riamarpark township JR	622	Bulani Ronnie Selomane & Khuwa Florence Selomane	T77574/2014	Firstrand Bank LTD B46075/2014	
	Portion 47 of portion 39 of Erf 685 Riamarpark Township JR	409	Lethabo Rejoice Boya & Ramokone Dinah Boya	T34617/2010	ABSA Home Loans 101 (RF) LTD B21948/2010	
	Portion 48 of Erf 685 Riamarpark Township JR	414	Madikana Hosia Nkoane & Martha Nkoane	T13228/2007	N/A	
	Portion 49 of Erf 685 Riamarpark Township JR	411	Monyai Phillemon Mashashane	T23024/2010	ABSA Home Loans 101 (RF) LTD B15270/2010	
	Portion 50 of Erf 685 Riamarpark Township JR	403	Mapula Albertinah Mpatolia	T133311/1998	ABSA Bank LTD B88818/2003	
	Portion 51 of Erf 685 Riamarpark Township JR	718	Luck Abednego Makolota & Gilry Suzan Msiza	T79775/2015	SB Guarantee Compant (RF) PTY LTD B43785/2015	
	Portion 52 of Erf 685 Riamarpark Township JR	538	Fuduka Betty Matshila	T6276/1996	N/A	
	Portion 53 of Erf 685 Riamarpark Township JR	458	Petrus Lukas Koekemoer	T55246/2002	N/A	

		Portion 54 of portion 39 of Erf 685 Riamarpark Township JR	468	Surprise Tebatso Monaiwa	T46301/2016	Firstrand Bank LTD B25864/2016	
		Portion 55 of Erf 685 Riamarpark Township JR	483	Motlanalo Olgah Masupa	T161587/2005	ABSA Bank LTD B185523/2005	
		Portion 56 of Erf 685 Riamarpark Township JR	442	Siphiwe Boy Mashiane	T43210/2003	N/A	
		Portion 57 of Erf 685 Riamarpark Township JR	777	Anna Mtimunye	T74848/2002	N/A	
		Portion 58 of portion 39 of Erf 685 Riamarpark Township JR	538	Sizwe Tevin Skhosana & Cate Naledi Rakoto	T29159/2011	Standard Bank of South Africa LTD B19687/2011	
		Portion 59 of Erf 685 Riamarpark Township JR	438	Motoko Frans Sebothoma	T35454/1995	N/A	
		Portion 60 of Erf 685 Riamarpark Township JR	482	Marriam Ntombizodwa Mabena	T8070/2020	ABSA Home Loans Guarantee CO (RF) PTY LTD B5451/2020	
		Portion 61 of Erf 685 Riamarpark Township JR	442	Nomvula Anna Maphangela	T85655/2011	N/A	
		Portion 62 of Erf 685 Riamarpark Township JR	547	Hellen Ntombi Mahlangu	T111751/2003	N/A	

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		Portion 63 of Erf 685 Riamarpark Township JR	572	Edward Malesela Lekoto	T102577/1999	Credit & Savings Help Bank B48272/1999	
		Portion 64 of Erf 685 Riamarpark Township JR	440	Mahlatse Oupa Nkosi	T45023/2011	Firstrand Mortgage CO (RF) PTY LTD B15073/2022	
		Portion 65 of portion 39 of Erf 685 Riamarpark Township JR	497	Stevens Tsimisi Dilebo	T100282/2013	South African Home Loans Guarantee Trust B57897/2013	
		Portion 66 of Erf 685 Riamarpark Township JR	477	Ngwanapedi Annah Chidi	T35457/1995	Firstrand Bank LTD B129904/2006	
		Portion 67 of Erf 685 Riamarpark Township JR	464	Luckyboy Thomas Mathebula	T17304/2012	N/A	
		Portion 68 of Erf 685 Riamarpark Township JR	432	Nkosi Phuthuma Wilfred	T8551/2011	N/A	
		Portion 69 of Erf 685 Riamarpark Township JR	430	Linah Simangele Mahlangu	T18431/2010	N/A	
		Portion 70 of Erf 685 Riamarpark Township JR	791	Madimetja Samuel Mapoga & Roselina Lindiwe Mapoga	T120431/2003	N/A	
		Portion 71 of Erf 685 Riamarpark Township JR	557	Shikoane David Ramahuta	T58562/2003	N/A	

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	Portion 72 of Erf 685 Riamarpark Township JR	506	Thabisile Sarah Carybell Mdaka	T45171/2012	N/A		
	Portion 73 of Erf 685 Riamarpark Township JR	566	Selina Meidjie Mahlangu	T35455/1995	N/A		
	Portion 74 of portion 39 of Erf 685 Riamarpark Township JR	536	Thomas Lucas Mahlangu & Florence Lindiwe Mahlangu	T1154651/1998	N/A		
	Portion 75 of Erf 685 Riamarpark Township JR	495	Henothina Fikisile Masuku	T27791/2002	Nedbank LTD B167288/2006		
	Potion 76 of Erf 685 Riamarpark Township JR	782	Claribel Mahlogonono Legodi	T54991/2019	N/A		
	Portion 77 of Erf 685 Riamarpark Township JR	557	Bellinah Mampa Ndlovu	T36820/2004	Standard Bank of South Africa LTD B18155/2007 B31498/2004		
	Portion 78 of Erf 685 Riamarpark Township JR	494	Lenah Mabena & Zwelibanzi David Matshaba Mabena	T92541/2003	N/A		
	Portion 79 of Erf 687 Riamarpark Township JR	490	Vivian Mapula Masekwameng	T132626/2002	N/A		
	Portion 80 of portion 39 of Erf 685 Riamarpark Township JR	437	Isaack Sipho Mahlangu & Nomaswazi Mary Mahlangu	T92118/2006	N/A		

	Portion 81 of Erf 685 Riamarpark Township JR	460	Princess Thabisile Leshaba	T19811/2003	Nedbank LTD B18942/2007	
	Portion 82 of Erf 685 Riamarpark Township JR	738	Mampeane Virginia Mokoena	T156592/2002	Nedbank LTD B198343/2006	
	Potion 83 of Erf 685 Riamarpark Township JR	603	Xolile Nozinhlanhla Mavundla	T17404/2012	Firstrand Bank LTD B11088/2012	
	Portion 84 of Erf 685 Riamarpark Township	572	Percival Pontsho Makole	T64189/2012	N/A	
	Portion 85 of portion 39 of Erf 685 Riamarpark Township JR	524	Zacharia Ngomane	T89485/1995	N/A	
	Portion 86 of Erf 685 Riamarpark Township JR	671	Modiketse Jim Tshehla & Zanele Virginia Tshehla	T156482/2005	ABSA Bank LTD B136717/2007 Home Obligors Mortgage Enhanced Securities PT B202712/2006	
	Portion 87 Erf 685 Riamarpark Township JR	613	John Sinky Shabangu	T20387/2007	ABSA Bank LTD B26142/2007	
	Portion 88 of Erf 685 Riamarpark Township JR	488	Nichollas Ramono Kgasi & Welhemina Khabo Kgasi	T15083/1999	Company Unique Finance Pty Ltd B480/1999	

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		Portion 89 of Erf 685 Riamarpark Township JR	456	Fulufhelo David Mabuduga	T73424/2010	Nedbank LTD B47529/2010	
		Portion 90 of Erf 685 Riamarpark Township Jr	593	Percy Magadlela Rooiter & Anna Baby Mnyakeni	T90757/2003	N/A	
		Portion 91 of Erf 685 Riamarpark Township JR	593	Karel Christopher Mashego	T110027/2005	N/A	
		Portion 92 of Erf 685 Riamarpark Township JR	451	Thembisile Emily Chili	T51726/2019	Firstrand Bank LTD B33025/2019	
		Portion 94 of portion 34 of Erf 685 Riamarpark Township JR	527	Lebohang Harriet Nchupetsang	T79906/2014	South African Home Loans Guarnatee Trust B47466/2014	
		Portion 2 of Erf 682 Riamarpark Township JR	1003	Msebenzi Elias Mahlangu & Annah Thembekile Mahlangu	T142032/2000	N/A	
		Portion 3 of Erf 682 Riamarpark Township JR	1000	William Joubert Malereka & Madithokane Aletta Molopo	T48442/2021	N/A	
		Portion 4 of Erf 682 Riamarpark Township JR	1371	Thulani Sikhosana	T61416/2011	Standard Bank of South Africa Ltd B39326/2011	

have been submitted to the Regional Land Claim Commission and that the Commission on Restitution of Land Rights will investigate the claim in terms of the provisions of the Act in due course. Any interested person who has an interest in the above-mentioned land claim is hereby invited to submit, within ninety (90) working days from the publication any comments/information to:

Chief Directorate: Land Restitution Support Gauteng Province
Private Bag X03

ARCADIA
0007
Tel: (012) 310-6500
Fax: (012) 324-5812

MR. L.H MAPHUTHA
REGIONAL LAND CLAIMS COMMISSIONER
DATE: 2022/08/13

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DEPARTMENT OF EMPLOYMENT AND LABOUR

NO. 2422 **26 August 2022**

LABOUR RELATIONS ACT, 1995

NOTICE OF CANCELLATION OF REGISTRATION OF TRADE UNION

I , Lehlohonolo Daniel Molefe, Registrar of Labour Relations, hereby, in terms of section 109(2) read with section 106(2A) cancel the registration of **South African Liberated Public Sector Workers Union (SALIPSWU) (LR2/6/2/2391**).

The name of the Organisation has been removed from the Register of Trade Unions.

REGISTRAR OF LABOUR RELATIONS

DEPARTMENT OF FORESTRY, FISHERIES AND THE ENVIRONMENT

NO. 2423 **26 August 2022**

NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT, 2004 (ACT NO. 10 OF 2004)

PUBLICATION OF THE REVISED NATIONAL BIODIVERSITY FRAMEWORK 2019 – 2024 FOR IMPLEMENTATION

I, Barbara Dallas Creecy, Minister of Forestry, Fisheries and the Environment, hereby publish the revised National Biodiversity Framework in terms of section 38 of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004), as set out in the Schedule hereto, for implementation.





forestry, fisheries & the environment
Department:
Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

2030 NDP



South Africa's National Biodiversity Framework

2019 - 2024

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Section 1: Introduction to the National Biodiversity Framework

The National Biodiversity Framework (NBF) is a requirement in terms of section 38 of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004), hereafter referred to as the 'Biodiversity Act').

1.1 Purpose of the NBF

The overall purpose of the NBF is to **coordinate and align** the efforts of the many organizations and individuals involved in conserving and managing South Africa's biodiversity in support of sustainable development**.**

Section 39 of the Biodiversity Act specifies that the NBF must:

(a) provide for an integrated, co-ordinated and uniform approach to biodiversity management by organs of state in all spheres of government, non-governmental organisations, the private sector, local communities, other stakeholders and the public;
(b) be consistent with- this Act; the national environmental management principles; and any relevant international agreements binding on the Republic and;
(c) identify priority areas for conservation action and the establishment of protected areas; and
(d) reflect regional co-operation on issues concerning biodiversity management in Southern Africa.

The NBF is a short to medium-term coordination tool that shows the **alignment** between the strategic objectives and outcomes identified in the National Biodiversity Strategy and Action Plan (NBSAP v.2, 2015) and other key national strategies, frameworks and systems that currently guide the work of the biodiversity sector and identifies mechanisms through which this work is **coordinated**. It also identifies a set of interventions or "acceleration measures" that can unlock or fast-track implementation of the NBSAP and indicates the **relative roles** of the many agencies involved in implementing these activities.

The purpose of the NBF is not to provide a comprehensive review of all work currently being undertaken in the biodiversity sector, nor to list all the actions required to conserve and manage South Africa's biodiversity in support of sustainable development.

1.2 Informants of the National Biodiversity Framework

The primary informants of the NBF are the latest versions of the **National Biodiversity Strategy and Action Plan** (NBSAP), which is South Africa's long-term strategy for ensuring sustainable use and conservation of biodiversity; the **National Biodiversity Assessment** (NBA), which provides the status of South Africa's ecosystems and biodiversity through headline indicators and a spatial assessment of ecosystems and species; and, the **National Protected Areas Expansion Strategy** (NPAES), which is a long-term strategy for guiding cost-effective expansion of the country's protected area estate. The NBF is also informed by numerous other national and provincial strategies, frameworks and systems that guide the work being carried out in the biodiversity sector – an overview of these is presented in section 3 of this Framework.

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1.2.1. Overview of the National Biodiversity Strategy and Action Plan (version 2, 2015)

An NBSAP is a requirement that all contracting parties to the Convention on Biological Diversity (CBD, 1992) are obliged to fulfil. South Africa's NBSAP 2015 sets out an integrated and coherent national strategy for the conservation, management and sustainable use of the country's biodiversity to ensure equitable benefits to the people of the country. It outlines how South Africa will fulfil the objectives of the CBD and contribute to the global sustainable development agenda. It also provides a framework for the integration of biodiversity considerations into national development plans and a wide range of other sectoral strategies, placing wise management and protection of biodiversity at the heart of the sustainable development agenda.

The NBSAP 2015 – 2025 (GoS, 2015a) identifies **6 strategic objectives**, under each of which key **outcomes**, **activities** (designated as high, medium and low priority), and medium to long-term **targets** are described in detail – see ***Figure 1*** for a summary of the strategic objectives, and ***Table 1*** for a more detailed listing of the outcomes.

The Department of Forestry Fisheries and the Environment (DFFE) is responsible for coordinating and monitoring the implementation of the NBSAP, with the support of the environmental Minister and Members of the Executive Council (MinMEC) Committee, the Ministerial Technical Committee (MinTech) and their various Working Groups (WGs), in particular WG 1 (Biodiversity and Conservation) – these are described in more detail in section 4 of this document.

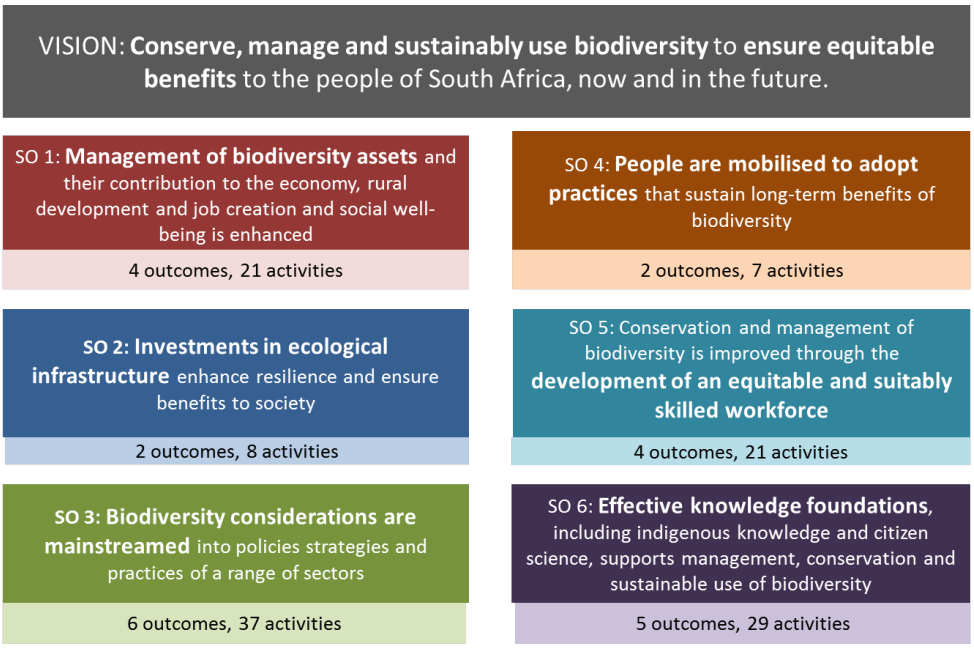


Figure 1: Summary of the six strategic objectives described in the NBSAP 2015 - 2025

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Table 1: Core strategy of the NBSAP 2015 to 2025

Strategic objectives	Outcomes
1. **Management of biodiversity assets** and their contribution to the economy, rural development, job ceation and social well-being is enhanced	1.1. The network of **protected areas and conservation areas** includes a representative sample of ecosystems and species, and is coherent and effectively managed. 1.2. **Species of special concern** are sustainably managed. 1.3. The **biodiversity economy** is expanded, strengthened and transformed to be more inclusive of the rural poor. 1.4. Biodiversity conservation supports the **land reform agenda and socio-economic opportunities** for communal landowners.
2. Investment in ecological infrastructure enhances resilience and ensures benefits to society	2.1. Restore, maintain and secure important **ecological infrastructure** in a way that contributes to rural development, long-term job creation and livelihoods. 2.2. **Ecosystem-based adaptation** (EbA) is shown to achieve multiple benefits in the contxt of sustainable development.
3. Biodiversity considerations are mainstreamed into policies, strategies and practices of a range of sectors	**3.1.** Effective **science-based tools inform planning and decision-making.** 3.2. Embed biodiversity considerations into **national, provincial and municipal development-planning and monitoring.** 3.3. Strengthen and streamline development **authorisations and decision-making.** 3.4. **Compliance** with authorisations and permits is monitored and enforced. 3.5. Appropriate allocation of resources in key sectors and spheres of government facilitates **effective management** of biodiversity, especially in biodiversity priority areas. 3.6. **Biodiversity considerations are integrated** into the development and implementation of policy, legislative and other tools.
4. People are mobilised to adopt practices that sustain the long-term benefits of biodiversity	4.1 People's **awareness of the value of biodiversity** is enhanced through more effective coordination and messaging. 4.2 **People are mobilised** to conserve and sustainably use biodiversity.
5: Conservation and management of biodiversity is improved through the **development of an equitable and suitably skilled workforce**	5.1. Macro-level **conditions enabled for skills planning, development and evaluation** of the sector as a whole. 5.2. An **improved skills development system** incorporates the needs of the biodiversity sector. 5.3. **Partnerships are developed and institutions are capacitated** to deliver on their mandates towards improved service delivery.
6: Effective knowledge foundations, including indigenous knowledge and citizen science, support the management, conservation and sustainable use of biodiversity	6.1. Relevant **foundational data sets** on species and ecosystems are in place and well-monitored and available to the public in a useful format. 6.2 The **status of species and ecosystems** is regularly monitored and assessed and communicated. 6.3 **Geographic priority areas** for the managament, conservation and restoration of biodiversity assets and ecological infrastructure are identified based on best available science. 6.4 Management-relevant and policy-relevant **research and analysis is undertaken** through collaboration between scientists and practitioners. 6.5 **Knowledge base is accessible** and presented in a way that **informs decision-making.**

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1.2.2. Overview of the National Biodiversity Assessment

The purpose of the National Biodiversity Assessment (NBA) is to assess the state of South Africa's biodiversity based on best available science, with a view to understanding trends over time, and informing policy and decision-making across a range of sectors. The NBA is a product of high scientific importance, developed through a five-year process of research and consultation that is led by the South African National Biodiversity Institute (SANBI), working in collaboration with DFFE and several other partner organizations. The NBA deals with all three components of biodiversity (genes, species and ecosystems), and assesses biodiversity and ecosystems across terrestrial, freshwater, estuarine and marine realms. The NBA is a primary informant of the NBSAP, the National Protected Areas Expansion Strategy (NPAES), and its provincial counterparts), provincial and metropolitan systematic biodiversity plans, bioregional plans, and other biodiversity and spatial planning tools. It also links closely with the developing National Biodiversity Monitoring Framework (see ***Table 4***, Section 3.1), which establishes a consistent set of headline biodiversity indicators for the country, including ecosystem threat status and ecosystem protection level. The NBA provides spatial focus and impetus for taking forward a programme of work to measure these indicators and synthesises them periodically at the national scale.

The NBA 2018 (published in 2019) follows from the National Biodiversity Assessment 2011 (which informed the NBSAP 2015). Both of these were preceded by the National Spatial Biodiversity Assessment (NSBA, 2004), which informed the NBSAP 2005. The NBA process culminates in the publication of a Synthesis Report, a popular report (which makes the results available to non-specialists), a number of technical reports, peer-reviewed papers in journals, data and metadata – all of which are made publicly available.

The findings of the NBA 2018 confirm a wide range of interventions that are priorities for managing and conserving biodiversity as highlighted in the NBSAP and NBF. The key priorities for improving the effectiveness of interventions emerging from this NBA include the need to improve compliance with existing laws, strengthen cross-sectoral planning, strengthen adaptive management, improve implementation of conservation projects, and build and maintain capacity.

The NBA 2018 technical reports per realm elaborate some of these interventions in more detail and articulate additional priority actions resulting from the NBA findings. The following are, however, several general priority actions identified in the NBA (2018) that support the successful implementation of many of these interventions, and ultimately affect South Africa's ability to meet the NBSAP and NBF goals.

The following priority actions were identified by the NBA (2018) for managing and conserving South Africa's biodiversity:

(a) Spatial biodiversity priorities
(b) Priority interventions, clustered into the following themes:
    (i) Strengthening compliance and enforcement;
    (ii) Strengthening cross-sectoral and cross-realm planning;
    (iii) Strengthening evaluation for adaptive management;
    (iv) Conservation project implementation; and
    (v) Maintaining and further strengthening capacity

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(a) Knowledge gaps:
    (i) Research priorities;
    (ii) Monitoring needs; and
    (iii) Data management and sharing imperatives.

The NBA, furthermore, directly supports the implementation of Strategic Objectives 1, 2 and 3 of the NBSAP and NBF; and further has direct links with Strategic Objective 6, while most of the other objectives are also informed or supported by the NBA[1]. Strategic Objective 1 focuses on managing biodiversity assets, and includes outcomes related to expanding the protected area network and management of species of special concern. Strategic Objective 2 focuses on maintaining and restoring ecological infrastructure, including key ecological infrastructure features highlighted in the NBA. Strategic Objective 3 includes the science-based planning and decision-making tools that the NBA is major contributor to, including maps of threatened ecosystems which are a key input into land-use planning and environmental authorisations. The NBA headline indicators of threat status and protection level are key indicators as to whether interventions are making progress towards achieving the outcomes for these strategic objectives. Several of the outcomes and activities in Strategic Objective 6 directly strengthen the NBA, i.e. if relevant foundational datasets are continually being updated through research and monitoring programmes and such data are available, then the indicators in the NBA can be calculated more regularly and with a higher confidence of accuracy.

The above mentioned NBA (2018) priorities will be addressed through a set of **key interventions,** called '**accelerators'** as contained in ***Table 5*** of the NBF. These **'accelerators',** can make a significant contribution to fast-tracking implementation of the NBSAP, NBF and related strategies and are presented as *recommendations* to guide priority-setting by institutions and organise collective action within the biodiversity sector.

1.2.3 Overview of the National Protected Areas Expansion Strategy

The goal of South Africa's NPAES is to achieve cost-effective protected area expansion for improved ecosystem representation, ecological sustainability, and resilience to climate change. The NPAES highlights how we can become more efficient and effective in allocating the scarce human and financial resources available for protected area expansion. It sets protected area targets, maps priority areas for protected area expansion, and makes recommendations on mechanisms for achieving the targets. This is particularly important in the context of South Africa's globally exceptional biodiversity richness on the one hand, and significant financial and human resource constraints on the other. The common set of targets and spatial priorities provided by the NPAES enable co-ordination between the many role-players involved in protected area expansion. Detailed spatial planning and roll-out to achieve the protected area targets is carried out at provincial level, guided by provincial systematic biodiversity plans and protected area expansion strategies, where these exist (DEA, 2018[2]).

The NPAES is a 20-year strategy with 5-year implementation targets aligned with a 5-year revision cycle whereby each new revision of the NPAES refers to a rolling 20-year period. In short, provision is

[1] Refer to Table 16 of the National Biodiversity Assessment 2018: The status of South Africa's ecosystems and biodiversity. Synthesis Report (NBA 2018)
[2] Gazette Notice 4210 (Notice Number 667 of 2018)

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made for the review and updating of the NPAES every 5 years The first NPAES, which was published in 2008, has recently been updated to include the following:

(a) New biodiversity data and newly declared protected areas as well as updated Provincial Conservation Plans (PCPs) and Provincial Protected Area Expansion Strategies (PAES). This was updated with the aim to improve the setting of targets and the identification of priority areas for meeting theses targets.
(b) A review of the performance of protected area institutions in protected area expansion for the first implementation phase of the NPAES (2008 – 2014).
(c) A description of the priority activities, with explicit performance targets, for the second implementation phase (2018 – 2022) of the NPAES (DEA, 2018).

The NPAES is intended to be used by all those who play, or could play, a role in protected area expansion, including protected area institutions, agencies and managers, conservation Non-Governmental Organisations (NGOs) and funding agencies, policymakers in relevant national departments, municipalities and the private sector.

1.3 Overview of the National Biodiversity Framework

South Africa's first National Biodiversity Framework (**Government Gazette No 530, Notice No. 32474, 3 August 2009**) was based on the first NBSAP (DEA, 2005), and the National Spatial Biodiversity Assessment (NSBA, 2004). It identified a set of 33 high priority activities to guide the work of the biodiversity sector over the period 2008 to 2013. The NBF, along with the updated National Biodiversity Assessment (NBA 2018), in turn, became an important informant in the process to update the first NBSAP, and has played an important role in guiding conservation action in the biodiversity sector.

Differences in the policy context prevailing now, compared to when the original NBF was developed, have made it necessary to take a different approach in the revised NBF. In particular, a range of national policies, strategies, frameworks and other systems is now in place – and others are being developed – to guide work in certain areas of the biodiversity sector, such as management of invasive species, protected area expansion, biodiversity stewardship, ecosystem-based adaptation, the biodiversity economy, and water resource management. Some of these strategies include detailed action plans (in which specific activities with targets, roles and responsibilities are identified), whilst others are more conceptual (outlining a broad approach or set of principles which should guide the development of more detailed implementation plans). The NBSAP makes reference to some of these strategies (those that were developed before 2015), and has identified priority actions that are well-aligned with them, but other strategies have been developed since, and there is a need to align these with priorities of the NBSAP, which is the 'umbrella strategy' for the sector.

For these reasons, and to achieve its primary purpose (which is to provide an integrated framework for coordinating the work of the biodiversity sector), the revised **National Biodiversity Framework** for the period 2019 to 2024 takes a two-pronged approach, which includes:

(a) providing an overview of key national strategies, frameworks and systems that guide the work of the biodiversity sector, and indicating their relevance to the strategic objectives,

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outcomes and priority activities of the NBSAP. This is complemented by an overview of key, national-level co-ordination mechanisms and communities of practice through which sector role-players can coordinate their work and exchange information and experiences.

(b) identifying a set of interventions (called 'accelerators') that can be used to **accelerate implementation** of high-level **priorities of the NBSAP** over the next five years.

In taking this approach, the NBF brings together key elements of the NBSAP and other relevant strategies. The NBF is underpinned by a strong scientific foundation (provided by the NBA, the NPAES and the research that underpins several of the other strategies included in the overview) and builds on the consultative processes through which all of these other products were developed.

The NBSAP and NBF highlight a wide range of interventions that are priorities for managing and conserving biodiversity. These are confirmed and reinforced by the findings of the NBA 2018.

Development of the revised NBF has been carried out through a thorough **analysis of the NBSAP** and **30 other strategies, frameworks and systems**, and a **targeted consultation process** involving key stakeholders in government and civil society (with emphasis on those institutions that carry a government mandate to manage and protect biodiversity and other natural resources and ensure their sustainable use). The relationship between the NBF, NBSAP, NPAES and other key strategies is illustrated in ***Figure 2.***

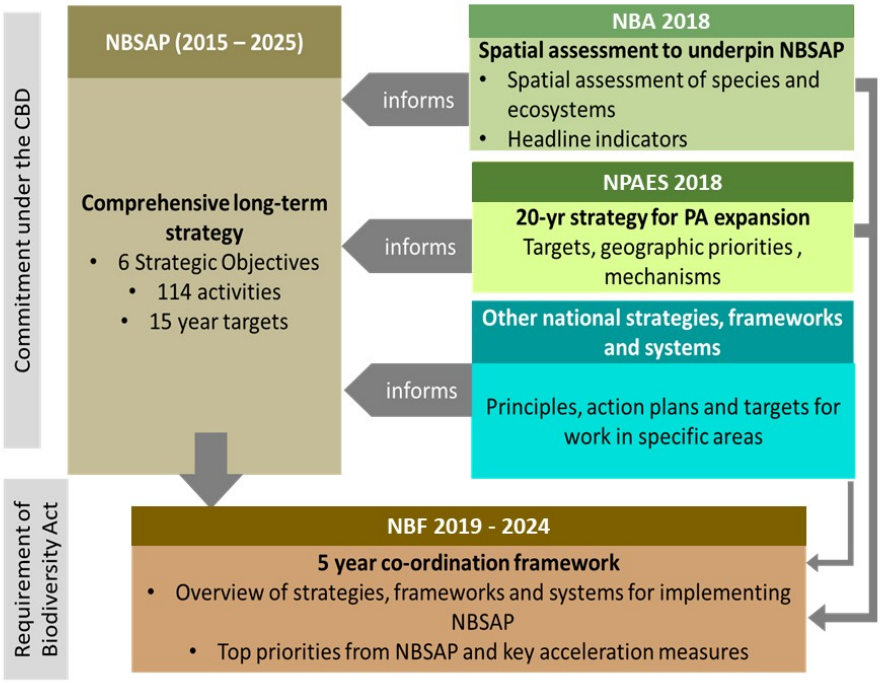


Figure 2: Informants of the revised National Biodiversity Framework

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1.4. Users of the NBF

The primary users of the NBF are institutions whose **core business is biodiversity conservation and environmental management**. Broadly, the users may include organs of state in national, provincial and local spheres; government-led programmes, such as those to restore and rehabilitate ecosystems; NGOs and CBOs; and, multi-stakeholder conservation and development programmes and projects, such as multi-partner landscape-level initiatives and other flagship projects (see ***Table 2***, for a summary of the key role-players).

The NBF may also have some relevance for stakeholders whose core work is not biodiversity conservation, but whose business either impacts on the status of biodiversity and ecosystems, or depends on biodiversity assets, ecosystem services and ecological infrastructure – for example, sectors such as agriculture, fisheries, water and sanitation, mining, energy, rural development and land reform, urban development, local economic development, and education.

It also has relevance for government departments which are not responsible for direct or indirect management of natural resources, but play an important role in establishing policies and practices that impact on biodiversity management and conservation, and the implementation of the NBSAP (such as the Presidency; National Treasury; Department of Co-operative Governance and Traditional Affairs (CoGTA); Department of Higher Education Science and Technology (DHEST); Department of Trade Industry and Competition (DTIC); the Department of Basic Education (DBE); and, the Department of Sports, Arts and Culture (DSAC).

Table 2: Key institutions directly involved in biodiversity management and conservation

Government Entities	
National departments and public entities	**Provincial conservation agencies, parks boards or other conservation authorities**
• Department of Forestry, Fisheries and the Environment, (DFFE) • South African National Biodiversity Institute (SANBI) • South African National Parks (SANParks) • iSimangaliso Wetland Park Authority • World Heritage Site Authorities • Department of Human Settlements, Water and Sanitation (DHSWS) *Research entities* • The Council for Scientific and Industrial Research (CSIR) • The Water Research Commission (WRC) • The Agricultural Research Council (ARC) • The South African Environmental Observation Network (SAEON)	• **Western Cape**: CapeNature • **Kwazulu-Natal**: Ezemvelo KZN Wildlife (EKZNW) • **North West**: North West Parks and Tourism Board (NWPB) • **Eastern Cape**: Eastern Cape Parks and Tourism Agency (ECPTA) • **Limpopo**: Limpopo Tourism and Parks Board (LTPB) • **Mpumalanga**: Mpumalanga Tourism and Parks Agency (MTPA)
Provincial environment and/or conservation departments	**Key government-led national environmental programmes**

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<table>
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<td>

Western Cape: Department of Environmental Affairs and Development Planning (DEA&DP)
Northern Cape: The Department of Environment Affairs and Nature Conservation (DENC)
Free State: Department of Economic Development, Small Business Development, Tourism and Environmental Affairs
Eastern Cape: The Department of Economic Development, Environmental Affairs and Tourism (DEDEAT)
KwaZulu-Natal: Department of Economic Development, Tourism and Environmental Affairs (DEDTEA)
Gauteng: Gauteng Department of Agriculture and Rural Development (GDARD)
Mpumalanga: Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA)
North West: Department of Rural, Environmental and Agricultural Development (NW READ)
Limpopo: Limpopo Department of Economic Development, Environment and Tourism (LEDET)

</td>
<td>

Working for Water (WfW)
Working on Fire (WoF)
Working for Wetlands (WfWet)
Working on Ecosystems (WonEco)
LandCare
Working for the Coast (WftC)
Community-based Natural Resource Management (CBNRM)
People and Parks Programme
Man and Biosphere Reserve Programme (MAB)

Local governments
All local governments in South Africa (including Metropolitan, District and Local Municipalities) play an increasingly important role in spatial planning and land-use management (including biodiversity management and integrated environmental management). They also provide a strategic opportunity to mainstream biodiversity into sustainable development through the integration of nature-based opportunities (aligned with the NBSAP) into integrated development plans
</td>
</tr>
<tr>
<td colspan="2">NGOs, the private sector, civil society</td>
</tr>
<tr>
<td colspan="2">African Conservation Trust (ACT); BirdLife South Africa, The Botanical Society of Southern Africa (BotSoc); Conservation-South Africa; Endangered Wildlife Trust (EWT); IUCN in SA; Peace Parks Foundation (PPF), Wildlife and Environment Society of South Africa (WESSA); World Wide Fund for Nature South Africa (WWF-SA); Wildlands Conservation Trust; Wilderness Foundation; ICLEI; Biosphere Reserve management agencies; community-based organizations; businesses and other private sector role-players; landowners</td>
</tr>
</table>

1.5. Structure of the NBF

The NBF is presented in five sections, as follows:

Section 1 provides an introduction to the NBF, including its purpose, its relationship to the NBSAP, NBA and other national strategies, its intended users, and its overall structure.

Section 2 describes the context for implementation of the NBF, including a brief description of key pressures on South Africa's biodiversity and opportunities for addressing these; the institutional context; alignment with national policies and international commitments under multilateral agreements; and guiding principles.

Section 3, which is the core of the NBF, has two components: (i) an **overview of key national strategies, frameworks and system**s that guide the work of the biodiversity sector, and provide effective vehicles for implementing the provisions of the NBSAP; and, (ii) a brief description of **key acceleration measures** that can be used to remove bottlenecks or barriers or provide opportunities for fast-tracking implementation of high priority activities identified in the NBSAP. These measures include a combination of enabling and other types of activities, some of which are specific to particular strategic objectives of the NBSAP, key priorities of the NBA2018, and others of which are cross-cutting, and hold the potential to achieve multiple NBSAP objectives simultaneously.

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The information in this section is presented in a combination of summary tables (organised under the Strategic Objectives and Outcomes of the NBSAP), accompanied by brief narrative description.

Section 4 deals with mechanisms for co-ordination and co-operation (including national and regional priorities), communities of practice for promoting collaboration and knowledge sharing, and implementation arrangements.

Section 5 is a set of annexures providing additional or supplementary information including references, a list of Sustainable Development Goals (SDGs) and Aichi Biodiversity Targets (ABTs), and a list of acronyms and abbreviations used in the document.

Section 2: Context for implementation of the NBF

2.1. Status of South Africa's biodiversity

South Africa is one of the world's most diverse countries in terms of ecosystems and species, with nine different terrestrial biomes (Fynbos, Grassland, Savanna, Nama Karoo, Succulent Karoo, Forest, Subtropical Thicket, Indian Ocean Coastal Belt, and Desert), a wealth of freshwater ecosystems, diverse marine ecosystems and a rich store of marine resources, and over 95 000 known species of living organisms. In addition to their own intrinsic value, these ecosystems and species are critical natural assets that provide a range of goods and services to people, such as producing food and clean water, regulating climate and disease, supporting crop pollination and nutrient cycles, and delivering cultural benefits and recreational opportunities. Maintaining the biodiversity assets and ecological infrastructure that provide these benefits in good ecological condition is fundamental to achieving South Africa's social and economic development objectives. A brief overview of the status of South Africa's biodiversity and ecosystems is provided in ***Table 3***. All the information in the table has been extracted from the NBA 2018, unless otherwise stated.

Table 3: Status of South Africa's ecosystems and species, at a glance

Ecosystem/element	Status, at a glance
Terrestrial Ecosystems:	
Ecosystem threat status (NBA 2018):	22% of ecosystem types are threatened, with highest proportion of threatened ecosystems in the Indian Ocean Coastal Belt, Grassland and Fynbos Biomes
Ecosystem protection level (NBA 2018):	26% of ecosystem types are well-protected, 25% not protected at all
Key ecosystem services:	Rangelands; fertile soil; pollination; ecotourism; medicinal plants; wild food sources; resources for the wildlife and natural products industries; cultural, recreational and spiritual resources
Main pressures:	Clearing natural vegetation for croplands, human settlements, mining and plantations; with overutilisation of rangelands, altered fire regimes, biological invasions and climate change as additional pressures.
River ecosystems	
Ecosystem threat status (NBA 2018):	64% of all river ecosystem types are threatened, two-thirds of these being Critically Endangered
Ecosystem protection level (NBA 2018):	13% of river ecosystem types are well-protected, 42% not protected at all; only 12% of Strategic Water Source (high water-yield) Areas are protected
Key ecosystem services:	Fresh water, South Africa's most scarce natural resource; food and other materials that support livelihoods

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Main pressures:	Changes to the hydrological regime, water pollution, loss and fragmentation of natural habitat, and invasive species. Climate change exacerbates existing pressures - increasing temperatures affect the hydrological cycle.
Wetland ecosystems	
Ecosystem threat status (NBA 2018):	79% of wetland ecosystem types are threatened, three-quarters of these being Critically Endangered
Ecosystem protection level (NBA 2018):	6% of wetland ecosystem types are well-protected, 61% not protected at all
Key ecosystem services:	Water purification; flood regulation; natural resources for food and livelihoods
Main pressures:	Changes to the hydrological regime, water pollution, loss and fragmentation of natural habitat, and invasive species. Climate change exacerbates existing pressures - increasing temperatures affect the hydrological cycle.
Estuarine ecosystems	
Ecosystem threat status (NBA 2018):	86% of estuary ecosystem types are threatened
Ecosystem protection level (NBA 2018):	18% of estuary ecosystem types are well-protected, 14% are not protected at all
Key ecosystem services:	Nurseries for fish, various raw materials for food and livelihoods, recreation
Main pressures:	Freshwater flow modification; pollution; overfishing and bait collection; inappropriate land use and development in the EFZ and catchment; overfishing and bait collection; and invasive species.
Marine and coastal ecosystems	
Ecosystem threat status (NBA 2018):	63% of inshore marine ecosystem types and 28% of offshore marine ecosystem types are threatened
Ecosystem protection level (NBA 2018):	Inshore ecosystem types: 34% well-protected, 5% not protected; offshore: 29% well-protected, 19% not protected
Key ecosystem services:	Fish and other marine resources, recreation, trade and transport, ecotourism, coastal protection
Main pressures:	Fishing, ports and harbours, coastal development, mining, mariculture, pollution and reduced fresh water flow. Climate change and invasive species exacerbate other pressures.
Species of Special Concern	
Current statistics have the number of South African animal species estimated at 67 000, while 20 401 plant species have been described. Red List assessments were conducted for 23 314 indigenous taxa from 11 taxonomic groups using the IUCN Red List of Species categories and criteria. Of the assessed taxa, 0.2% are extinct (48 taxa) and a further 3 156 taxa are threatened with extinction (14%). 11% of birds, 17% of mammals 6% of reptiles, 13% of amphibians, 10% of butterflies, 13% of dragonflies, 36% of freshwater fishes, 21% of seabreams (Sparids), 9% of corals and 14% of plants are threatened. Loss of natural habitat, invasive alien species, over-harvesting, over-abstraction of water, and climate change are the main pressures placing the survival of species at risk.	
Protected areas	
9.09% of South Africa's terrestrial surface currently falls within protected areas (information extracted from the South African Protected Areas Database). Of the 969 recognised ecosystem types representing all realms, for example freshwater and marine, 21% are well protected, 13% are moderately protected, 30% are poorly protected and 37% are not protected. 23% of the coastline and 0.4% of offshore marine habitat is protected (information extracted from NPAES 2018).	

Key pressures on South Africa's biodiversity

The most recent national assessment of South Africa's biodiversity and ecosystems (NBA 2018) has shown that, despite an impressive baseline of innovative policies, numerous conservation programmes, extensive efforts, and significant advances made in the biodiversity sector over the last

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decade in particular, South Africa's biodiversity remains under high pressure from a variety of human-induced factors and disturbances.

The major pressures on South Africa's biodiversity include:

(a) Loss and degradation of natural habitat in terrestrial, freshwater, estuarine and marine ecosystems due to unsustainable land-use and ocean-use practices, inappropriate or poorly-located land uses and ocean uses.
(b) Disruptions to hydrological regimes of rivers wetlands and estuaries, including over-abstraction of water and pollution of aquatic ecosystems
(c) invasive alien species (both plant and animal)
(d) destructive and over-harvesting of species, especially in the marine environment
(e) illegal wildlife trafficking and other illegal resource use
(f) disruption of natural drivers of ecosystem functioning (such as fire cycles)
(g) impact induced by climate change.

The social and economic costs of not managing ecosystems in a sustainable manner are high, as evidenced by accelerated land degradation and biodiversity loss, lowered land productivity, weakened ecological (and social) resilience, declining availability and quality of freshwater, increased infestation by invasive alien species, collapsing fish stocks, and increased air and water pollution. These impacts are all increased by an increasingly unpredictable climate and an increase in the frequency and severity of extreme weather events, which cause severe social and economic disruption, increased food insecurity due to crop and stock losses and lower yields, damage to infrastructure, and even loss of life.

These impacts compromise the nation's ability to fulfil its social and economic growth goals, and impacts on the quality of life of all South Africans especially the rural poor who rely daily on biodiversity resources to meet their subsistence needs. Responding to this requires a development path which minimises pressures on ecosystems and species, and strengthens resilience to climate change, whilst providing opportunities for addressing poverty, securing essential ecosystem services and addressing other social improvement needs (Cadman *et a*l., 2010).

Coordinated implementation of the strategies identified in this NBF will contribute meaningfully to achieving these goals.

2.2. Institutional context for biodiversity management and protection

South Africa has adopted a landscape approach to conserving biodiversity, which involves good alignment and co-operation between diverse role-players and effective mainstreaming of biodiversity considerations into planning, decision-making and daily practice in multiple sectors. The NBF sets out a framework for achieving this co-ordination at national level. The Department of Forestry, Fisheries and the Environment (DFFE) has been assigned to coordinate State's efforts to fulfil its obligations under section 24 of the Constitution of the Republic of South Africa 108 of 1996 (Constitution) to protect the environmental for the benefit of current and future generations through legislative and other reasonable measure that prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and the use of natural resources, while promoting justifiable economic and social development.

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However, responsibility for managing, conserving and ensuring sustainable use of South Africa's biodiversity assets is shared by a large number of entities in government, and, increasingly, civil society and the private sector. These organisations include those whose core business is biodiversity management and protection, and a growing number of entities whose core business is some kind of productive activity that either relies or impacts on natural resources and biodiversity. (See ***Table 1*** for a summary). Many decisions affecting biodiversity are taken outside of the biodiversity or environmental sector (for example, agriculture, mining, energy and urban development), which makes it all the more important to adopt a framework for integrated, policy-aligned decision-making.

A full description of the institutional context for biodiversity management, protection and sustainable use in South Africa is provided in the NBSAP 2015, pages 10 – 15.

2.3. Alignment with national policy and legislation

The NBF forms part of the robust policy and legislative framework that guides and governs the conservation, management and sustainable use of South Africa's biodiversity assets. For this reason, the NBSAP, the implementation of which the NBF sets out to support, has been designed to align with key national legislation and policy in the broader environmental sector.

The overall framework for environmental governance is provided by the South African Constitution and its associated Bill of Rights. Although the Constitution does not specifically refer to 'biodiversity', it enshrines certain environmental rights and specifies the powers and functions of national and provincial governments in terms of 'the environment,' 'nature conservation,' and 'natural resources,' such as soil, water, forests and marine resources.

Section 24 of the Constitution inter alia, requires the State to enact legislation and to take other reasonable measures aimed at the protection of the environment. A suite of environmental legislation has been enacted by Parliament to give effect to that obligation. A range of non-legislative measures have also been taken by Government as required by the Constitution.

In addition, there are several other Acts of Parliament relating to water, forests, marine resources and coastal management that are of relevance, especially to Strategic Objectives 1, 2 and 3 of the NBSAP. These are summarised here in Box 1, below.

Box 1: Key legislation of relevance to biodiversity conservation, management and sustainable use
Over-arching legislation and policies:
The Constitution of South Africa, 1996
White Paper on Environmental Management Policy for South Africa (1998)
Core legislation dealing with the conservation of biodiversity:
National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004), as amended
National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003), as amended
National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004), as amended
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
Key legislation governing natural resource management:
Marine Living Resources Act, 1998 (Act No. 18 of 1998)

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The Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)
National Forest Act, 1998 (Act No. 84 of 1998) as amended
National Water Act, 1998 (Act No. 36 of 1998), as amended
World Heritage Convention Act, 1999 (Act No. 49 of 1999)
Mountain Catchment Areas Act, 1970 (Act No. 63 of 1970)
Genetically Modified Organisms Act, 1997 (Act No. 15 of 1997)

Relevant spatial planning legislation:
Sub-division of Agricultural Land Act, 1970 (Act No. 70 of 1970)
The Spatial Planning and Land-Use Management Act,2013 (Act No. 16 of 2013)
National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008), as amended

To fulfil its vision of conserving, managing and using biodiversity sustainably to ensure equitable benefits to all the people of South Africa, the NBSAP has also been designed to ensure alignment with national policies and frameworks that guide the broader sustainable development agenda in the country. Key among these is:

(a) the **National Development Plan** (NDP) 2030 (in particular Chapter 5)
(b) the **Medium-Term Strategic Framework** (MTSF) outcomes of the Presidential Delivery Agreement, which is updated at regular intervals
(c) the **National Strategy for Sustainable Development** (NSSD), 2002.

The vision of the NDP is that South Africa's transition to an environmentally sustainable, climate-change resilient, low-carbon economy and just society will be well-progressed by 2030 (MTSF, 2014 – 2019). The NDP proposes a multi-dimensional framework, including ten critical actions, to address the principal challenges of poverty and inequality. As part of this process, it specifically identifies the need to use water and other natural resources more sustainably, emit less carbon, and protect oceans, soils and wildlife, in ways that buoy up the economy and create employment opportunities. This aligns closely with the vision and strategic objectives of the NBSAP.

The Medium-Term Strategic Framework (MTSF 2019-2024) developed by the Presidency translates the NDP vision and priorities into a set of sector-specific outcomes, outputs and targets. Those relevant to the environmental sector are reflected as seven electoral priorities adopted by government as:

(a) Building a capable, ethical and developmental state
(b) Economic transformation and job creation
(c) Education, skills and health
(d) Consolidating the social wage through reliable and quality basic service
(e) Spatial integration, human settlements and local government
(f) Social cohesion and safe communities
(g) A better Africa and world

Priority 5: Spatial integration, human settlements and local government, makes reference to South Africa's national policy and strategic context, which has provided a solid foundation for supporting environmental sustainability. However, despite this strong foundation, environmental management

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remains a weak area of core policy and implementation. Part of the challenge is capacity to manage intersecting environmental crises, mounting resource pressures, climate change and environmental degradation, and the transition to a growth path in a manner that lessens our environmental impact and resource use.

There are, however, several opportunities for transitioning South Africa to a development path that actively pursues environmental sustainability as a core value. In order to advance the NDP, which identified ecosystem protection as a guiding principle, South Africa has improved its capacity to monitor environmental management through participation in key platform such as the SDGs and various international conventions. We need to ensure that there are targeted actions to safeguard our unique natural resource base and mitigate risks related to climate change. To achieve this, the MTSF 2019-2024 focuses on four interrelated outcomes:

(a) GHG emission reduction.
(b) Municipal preparedness to deal with climate change.
(c) A just transition to a low carbon economy.
(d) Improved ecological infrastructure.

The close alignment of these four interrelated outcomes means that the framework and acceleration measures outlined in this document contribute directly to achieving the targets in Priority 5 of the MTSF. In addition, many of the accelerated measures of the NBF will also address a number of other Government Priorities set out in the MTSF 2019-2024 and ultimately contribute towards the objectives of the National Development Plan.

2.4. Alignment with international commitments

The priorities identified in the NBF are aligned with the priorities identified in the international conventions, treaties, protocols and many other agreements and programmes of work relating to biodiversity management and protection to which South Africa is a signatory.

Key among these is:

(a) The **UN Convention on Biological Diversity** (CBD, ratified by South Africa in 1995) including:
  (i) The CBD Strategic Plan for Biodiversity 2011 – 2020, and the Aichi Biodiversity Targets (ABTs) – see Annexure 6.4.
  (ii) The Cartegena Protocol on Biosafety (governing the movement of living modified organisms, resulting from biotechnological intervention, from one country to another).
(b) The Nagoya Protocol on access to genetic resources and the fair and equitable sharing of benefits arising from their use
(c) The **UN Convention to Combat Desertification** (UNCCD, ratified by South Africa in 1997).
(d) The **UN Framework Convention on Climate Change** (UNFCCC, ratified by South Africa in 1997).
(e) The **UN Convention on Trade in Endangered Species of Wild Flora and Fauna** (CITES, ratified by South Africa in 1975).
(f) The **International Plant Protection Convention** (IPPC, ratified by South Africa in 1952)
(g) The **RamSar Convention on Wetlands** (Ramsar, ratified by South Africa in 1971)
(h) The **World Heritage Convention** (WHC, ratified by South Africa in 1972)

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(i) The **International Treaty on Plant Genetic Resources for Food and Agriculture** (ITPGRFA, ratified by South Africa in 2004)

(j) Other international agreements and programmes:

(i) The UN Agenda 2030 for **Sustainable Development and the Sustainable Development Goals** (SGDs) – See Annexure 6.3

(ii) The UNESCO Man and Biosphere (MAB) Programme

(iii) The Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES).

Alignment of the NBF with these international commitments is indicated in ***Table 4*** in Section 3 of this document.

2.5. Principles of the NBF

This NBF is firmly seated on a number of core principles that are aligned with those articulated in the NBSAP, and that should guide the work of all role-players in the biodiversity sector. These include, though are not limited to:

(a) The national environmental management principles set out in section 2 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) NEMA, including the principles that the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied; and that a risk-averse and cautious approach is applied in environmental decision-making.

(b) *A landscape and seascape approach to biodiversity conservation and management*, which involves working both within and beyond the boundaries of protected areas to manage a mosaic of land and ocean uses including protection, restoration, production and subsistence use, in order to deliver ecological, economic and social benefits that are equitably shared by all citizens of South Africa.

(c) *A consistent and strategic approach guided by the principles of representation and persistence*, in which a representative sample of ecosystems and species is conserved along with the ecological processes that allow these biodiversity patterns to persist over time. This is achieved through identification of strategic spatial priorities, based on best available science, in national, provincial and municipal systematic biodiversity plans that guide the spatial focus of the sector's work. These spatial priorities take the form of, amongst others, Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs), Strategic Water Source Areas, Freshwater Ecosystem Priority Areas (FEPAs), and priorities for protected area expansion.

(d) *Biodiversity has intrinsic value and constitutes critical natural capital which is essential for sustainable and resilient economic and social development*. Management of biodiversity and ecological infrastructure should be directed to meet conservation objectives and should also be people-centred and strive to meet multiple transformational benefits, by placing strategic protection, wise management, and sustainable use of natural capital at the core of the country's sustainable development agenda.

(e) *Partnerships that enable cooperation and collaboration across institutional and administrative boundaries* are essential for managing ecosystems effectively at the landscape and seascape scale.

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Section 3: Integrated framework for coordinating work in the biodiversity sector

South Africa's NBSAP is the overarching or 'umbrella' strategy guiding the work of the biodiversity sector. It is complemented by a wide range of other **national strategies, frameworks and systems** that have been developed to guide work in particular parts of the sector (for example, management of biological invasions, biodiversity information management, or ecosystem-based adaptation) and that provide effective vehicles for implementing the NBSAP. Some of these strategies and frameworks are more conceptual in nature (providing principles, high-level strategic objectives or general approaches), whilst others also provide detailed sets of activities, with indicators, timelines and institutional responsibilities clearly spelt out. Because there is such a proliferation of strategies in the sector, this Framework provides an overview of those that align most closely with the NBSAP, indicating what the purpose of each strategy is, how it is aligned with the strategic objectives, outcomes and priority activities of the NBSAP, how they cross-link with each other, and how they align with international commitments under multilateral agreements to which South Africa is a signatory, and programmes in which South Africa participates. This information is presented in ***Table 4.***

Table 5 presents a set of **accelerators**, which are those measures that can most effectively remove bottlenecks and/or systemic or underlying barriers to implementation, or that provide the best opportunities for fast-tracking implementation, or achieving multiple goals simultaneously. These are presented as *recommendations* and should be used to guide priority-setting by institutions and organise collective action within the biodiversity sector.

It is also important to note the acceleration measures identified here do not represent new activities that institutions must implement in addition to their already-heavy workloads; rather, they represent a collation of priorities that have already been identified, but in numerous, separate documents and plans, or through consultation with stakeholders.

Table 6 presents an overview of national guidelines that support the implementation of the acceleration measures identified in Table 5.

3.1. National strategies, frameworks and systems in the biodiversity sector

Table 4 presents an overview of 30 strategies, frameworks and systems that exist in the biodiversity sector (see Annexure 2 for a full document references). Only those strategies that are of relevance at the national scale to the biodiversity sector at large, and that are readily available in the public space, have been included. Provincial, local or institution-specific strategies, whilst important, have generally been excluded from the overview, though cross-linkage to them is indicated where this is known and relevant.

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TABLE 4: Overview of strategies, frameworks and systems guiding work in the biodiversity sector

SO = Strategic Objective; ABTs = Aichi Biodiversity Targets; SDGs = Sustainable Development Goals; all other acronyms described in Section 6

1. The National Protected Areas Expansion Strategy (NPAES)	**Date**	**Lead developer**	**Partners (bold = lead)**	**Timeframe**	**Likely revision**
	2016	DFFE	**DFFE**, SANParks, provincial conservation authorities, land owners, CPAs, NGOs	2016 - 2025	Targets to be updated every 5 years
Description: The NPAES (first edition 2008, revised 2016) is a **20-year strategy** (updated every 5 years) to guide **cost-effective expansion of protected areas in South Africa** to increase **ecosystem representivity**, promote **ecological sustainability**, **strengthen resilience** to climate change, and support diversification of rural livelihoods and **local economic development**. It sets **national-level protected area expansion targets** (for ecosystems), provides **maps** of priority areas for expansion, **identifies gaps**, and **recommends mechanisms** for achieving the targets. Detailed spatial planning and roll-out to achieve the targets is carried out at provincial level, through provincial protected area expansion strategies and biodiversity plans. The NPAES **enables coordination** between the many role-players involved in protected area expansion by providing a common set of targets and spatial priorities.			***Relevance to NBSAP***	***Cross linkage to other strategies/frameworks***	***International alignment***
			NBSAP SO 1 Outcome 1.1 (activities 1.1.1 and 1.1.2)	• The Phakisa MPSG Strategy • Provincial Protected Area Expansion Strategies • SANParks Protected Area Expansion and Land Consolidation Strategy • National Buffer Zone Strategy for National Parks • The Business Case for Biodiversity Stewardship • The National Plant Conservation Strategy, • The National Biosphere Reserves Strategy	ABT: 11 SDGs: 14 and 15

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2. The Business Case for Biodiversity Stewardship	**Date**	**Lead developer**	**Partners**	**Timeframe**	**Likely revision**
	2015	SANBI/DFFE	**DFFE**, **SANBI**, SANParks, Provincial conservation authorities, NGOs and landowners	2015 - 2020	Not specified
Description: The Business Case is a Report that presents the economic rationale for increasing **investment in biodiversity stewardship** in South Africa. It outlines the role of biodiversity stewardship as a key tool for contributing to **cost-effective expansion of protected areas**, and placing priority biodiversity areas under **improved, long-term management** with **benefits for landowners**, **diversification of rural livelihoods**, and **enhanced local economic development.** The Business Case makes **six key recommendations** relating to: resourcing of provincial biodiversity programmes; incentives; partnerships for implementation (with a focus on NGOS), promoting the land reform agenda, technical support and strengthening the community of practice for implementation of biodiversity stewardship.			***Relevance to NBSAP*** NBSAP SO 1 Outcome 1.1 (activities 1.1.1, 1.1.2 and 1.1.3.) Outcomes 1.3 and 1.4 (cross-cutting)	***Cross-linkages*** • NPAES (and provincial counterparts) • National Buffer Zone Strategy for National Parks • National Biodiversity Economy Strategy (incorporating the Wildlife Economy Strategy) • National MAB Strategy • People and Parks Co-management Framework • BIOFIN Plan	***International alignment*** ABT: 11 SDGs: 1, 8, 14, 15
3. National Buffer Zone Strategy for National Parks (Government Notice 106 of 2012)	**date**	**Lead Developer**	**Partners**	**Time period**	**Likely revision**
	2012	DFFE	**DFFE**, **SANParks**, Provincial conservation authorities, biosphere reserves, landowners, communities	Open-ended	Not specified
Description: This document sets out the South African government's national strategy on the **establishment and management of buffer zones around national parks**. The purpose of the strategy is to: **inform the public** of the government's objectives in respect of buffer zones, and how it intends to			***Relevance to NBSAP*** NBSAP SO 1	***Cross-linkages*** • NPAES (and provincial counterparts) • National MAB Strategy	***International alignment*** ABTs: 11, 14, 16 SDGs: 1, 2, 8, 15

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meet these; and, to **guide government agencies and organs of state in developing plans** to achieve these objectives. The **vision** for buffer zones is to provide for **integration of national parks into local landscapes** for the benefit of those living adjacent to the protected areas. In support of this vision, the strategy describes **8 goals**, with recommendations for how they should be achieved. **The goals relate to** the kinds of areas that should be included in buffer zones, and mechanisms for their inclusion; suitable and unsuitable land uses in buffer zones, and ways of incentivizing and optimizing sustainable land-use practices; the development of community-based management initiatives and other partnerships that increase the flow of benefits to communities.			Outcome 1.1 (activities 1.1.1, 1.1.2 and 1.1.3) Outcome 1.3 (activities 1.3.2 and 1.3.5) Outcome 1.4 (activities 1.4.2 and 1.4.3)	• National Biodiversity Economy Strategy • People and Parks Framework for Co-Management	
4. People and Parks Co-Management Framework	**Date**	**Lead developer**	**Partners**	**Timeframe**	**Likely revision**
	2010	DFFE/SAN Parks	**DFFE, SANParks**, Provincial conservation authorities and other protected area management authorities	Not specified	Not specified
Description: The purpose of this framework is to ensure **effective redress of land rights** in a fair and equitable manner to persons or communities who own restituted land (in terms of the Land Restitution Act) within protected areas or other biodiversity priority areas. The Framework sets out **principles**, **models** and a **beneficiation framework** to guide the relationship between protected area management authorities and land claimants, drawing on the draft co-management strategy developed under the People and Parks Programme, and the Isimangaliso Co-Management Agreement.			***Relevance to NBSAP***	***Cross-linkages***	***International alignment***
			NBSAP SO 1, Outcome 1.4 (activity 1.4.2)	• NPAES (and provincial counterparts) • National MAB Strategy • Business Case for Biodiversity Stewardship	ABTs: 11 SDGs: 8, 15
5. The Operation Phakisa Marine Protection Services and Ocean Governance Focus Area (MPSG)	**Date**	**Lead developer**	**Partners**	**Timeframe**	**Likely revision**
	2014	DFFE	DHEST, DMRE, DoDMV, DFFE, DoT, DTIC, SANBI, SANParks, CSIR, Council for Geoscience, DIRCO, iSimangaliso, Provincial Departments and Conservation Agencies	2014 - 2033	Not specified

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Description: The MPSG informs the implementation an **overarching, integrated governance framework for sustainable growth of the ocean economy** that will maximise **socio-economic benefits**, whilst ensuring adequate **ocean protection** over the next five years. It identifies **10 key initiatives** to achieve this objective. Key amongst these are the establishment of 22 **offshore marine protected areas**, the development of **marine spatial planning tools** to enable a sustainable ocean economy; **implementation plans** and **enforcement measures** for regional and sub-regional marine spatial plans; a **fine-scale marine management plan** to enable a sustainable economy; and, a **review of ocean-related legislation** (Integrated Coastal and Ocean Management Act and the Oceans Act).			***Relevance to NBSAP***	***Cross-linkages***	***International alignment***
			NBSAP SO 1, Outcome 1.1 (activity 1.1.1) Outcome 1.3 (activity 1.3.3)	• NPAES (and counterparts in coastal provinces) • Operation Phakisa and Presidential 9-point Plan	ABTs: 6, 11 SDG: 14
6. South Africa's Strategy for Plant Conservation	**Date**	**Lead developer**	**Partners**	**Timeframe**	**Likely revision**
	2015	SANBI and BotSoc of Southern Africa	**SANBI,** BotSoc, other NGOs, SANParks, provincial conservation authorities, academic institutions, citizen scientists	2015 - 2020	tbc
Description: South Africa's Strategy for Plant Conservation is structured around **16 outcome-oriented targets**, clustered under **5 objectives** relating to: understanding and documenting South Africa's plant diversity (targets 1 to 3); conservation (targets 4 to 10); sustainable and equitable use (targets 11 to 13); education and awareness (target 14); and capacity development and public engagement (targets 15 and 16). The Strategy specifies **key outputs** under each target and provides a detailed analysis of the cross-linkages between these and the NBSAP Outcomes and Activities.			***Relevance to NBSAP***	***Cross linkages***	***International alignment***
			SO 1 Outcome 1.1 (activity 1.1.1) Outcome 1.2 (activities 1.2.2 and 1.2.4) Also has relevance under SO 3; SO 4; SO 5 and SO 6 (see table 1 in the Strategy for details)	• NPAES (and provincial counterparts)	Global Strategy for Plant Conservation (GSPC) CITES ABT: 12, 13 SDGs: 15
	Date	**Lead developer**	**Partners**	**Timeframe**	**Likely revision**

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7. The National Man and Biosphere Reserve Strategy and Implementation Plan (MAB Strategy)	2016	DFFE	**DFFE**, **NGOs appointed as management authorities of the biosphere reserves**, SANParks, Provincial conservation authorities, NGOs, private sector partners, communities	2016 - 2020	To be determined
Description: This is South Africa's first national strategy for the Biosphere Reserve Programme. It builds on lessons learnt over 20 years, complemented by a comprehensive situation analysis and extensive consultation process. Its main purpose is to **enable biosphere reserves to reach their full potential as model landscapes for implementing integrated approaches to environmental protection and sustainable socio-economic development**. The Strategy defines the overall strategic direction for the Biosphere Reserve Programme, under **three strategic objectives** relating to **conservation** of biodiversity, ecosystems and cultural heritage; building **sustainable communities**; and promoting **awareness and adaptive capacity**. It identifies cross-cutting issues and interventions through which the objectives can be achieved and describes their expected outputs. It also describes enabling conditions for successful implementation of the Strategy, including financing, communication and capacity-building needs, and includes a framework for nomination of new Biosphere Reserves. The Strategy is supported by a comprehensive *Implementation Plan, and Monitoring and Evaluation Framework,* which sets **priorities**, specifies practical **activities** and institutional **responsibilities** for implementation, **indicators** and **timelines** for implementation.			***Relevance to NBSAP***	***Cross-linkages***	***International alignment***
			SO 1 Outcome 1.1 (all activities, but especially 1.1.2 and 1.1.3) Outcome 1.3 (activity 1.3.5) Outcome 1.4 (activity 1.4.3)	• NPAES (and provincial counterparts) • National Buffer Zone Strategy • Business case for Biodiversity Stewardship • People and Parks Co-Management Framework • National Biodiversity Economy Strategy • BIOFIN Plan	UNESCO World Heritage Convention and Biosphere Reserve Strategy The AU Convention on Conservation of Nature and Natural Resources (2012) ABTs: 8, 19, 20 SDGs: 1, 3, 8, 14 and 15
8. The National Biodiversity Economy Strategy (NBES)	**Date**	**Lead developer**	**Partners**	**Timeframe**	**Likely revision**
	2017	DFFE	**DFFE**, Multiple partners in government, the private sector and civil society	2015 - 2030	Not specified

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Description: The NBES is a 14-year framework the purpose of which is to provide **structural coordination and direction** to guide the **sustainable growth and transformation of the wildlife and bioprospecting industries**. It provides for the creation of inclusive **biodiversity-based economic activities** that can **accelerate development of the rural economy,** improve social well-being and ensure **equitable access to and sharing of benefits from biological resource**s, while **maintaining the ecological resource base.** The NBES has set an overall industry growth goal of 10% per annum to be achieved through implementation of **20 enabling activities** (10 each for the wildlife and bioprospecting industries), that will: facilitate the formation of cooperative partnerships between government, the private sector and communities to open up opportunities in various market segments; address development and growth constraints; enable skills transfer; and manage the wildlife and bioprospecting sectors sustainably. Working through a **nodal approach**, the NBES identifies **priority activities**, outlines **stakeholder roles**, and sets out a **detailed, results-based monitoring framework.**			***Relevance to NBSAP***	***Cross linkages***	***International alignment***
			NBSAP SO1 Outcome 1.3 (activities 1.3.1, 1.3.2, and 1.3.5)	• Strategy for investing in Ecological Infrastructure • Framework for investment in Environment and Natural Resource Management for a Green Economy • The BIOFIN Plan • The National Plant Conservation Strategy • National MAB Strategy • People and Parks Co-Management Framework	Nagoya Protocol of the CBD AU Guidelines for Co-ordinated implementation of the Nagoya Protocol ABTs: 4, 6, 13,16 SDGs: 1, 2. 5, 8, 10, 11, 12
9. The National Botanical Garden Expansion Strategy	**Date**	**Lead developer**	**Partners**	**Timeframe**	**Likely revision**
	2020	DFFE & SANBI	**DFFE, SANBI**, SANParks, Isimangaliso Wetland Park Authority, Provincial conservation authorities and parastatal institutions	2019- 2030	Not specified
Description: A Strategy for the establishment, **expansion and maintenance of a representative network of botanical gardens** across South Africa, with the purpose of **raising awareness** of the importance of biodiversity and its status, **strengthening *ex situ* conservation** (especially of threatened species and habitats, and medicinally/economically useful species),			***Relevance to NBSAP***	***Cross linkages***	***Alignment international***
			NBSAP SO 1 Outcome 1.2 (activities 1.2.2 and 1.2.3)	• The National Plant Conservation Strategy	Global Pant Conservation Strategy

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enhancing **environmental education and recreational opportunities** for the public, and creating '**green lungs'** in urban areas to strengthen resilience to CC. The strategy identifies gaps in the current coverage of the NBG network, a broad set of priorities for addressing these, and the mechanisms through which the Strategy will be implemented. The **overall aims of the Strategy** are to: • Establish at least one NBG in each of the nine provinces of South Africa (with priority given to Limpopo and North West) • Establish botanical or demonstration gardens representative of each biome (with priority given to Desert and Indian Ocean Coastal Belt) • Expand existing gardens to incorporate additional species/habitats, conserve adjacent natural habitats and create natural corridors that serve as refugia for plants and animals in urban areas.			Also has broad relevance to SO4 (raising awareness)		ABTs: 12 and 13 SDGs: 8 and 15
10. Strategic Framework and Overarching Implementation Plan for Ecosystem-based Adaptation (EbA) in South Africa	**Date**	**Lead Developer**	**Partners**	**Timeframe**	**Likely revision**
	2016	DFFE & SANBI	**DFFE, SANBI**, DHEST, the 'Working For' programmes, CSIR, WRC, ARC, DAFF, CoGTA, SALGA, NIE, Provincial governments, local governments, NGOs and experts	2016 - 2021	Not specified
The overall aim of this Strategy is to place Ecosystem-based Adaptation at the core of South Africa's overall approach to climate change adaptation, to enable a **long-term, socially-inclusive transition to a climate-resilient society and economy**. As **context** for the Implementation Plan, the Strategy provides an overview of relevant literature and issues; alignment with policies (international, national, provincial and local) and programmes; and the institutional context for implementation of Ecosystem-based Adaptation.			***Relevance to NBSAP***	***Cross-linkages***	***International alignment***
			NBAP SO 2 Outcome 2.1 (activities 2.1.2 to 2.1.5) Outcome 2.2 (activities 2.2.1 and 2.2.2)	• Climate Change Adaptation Plans for Biomes in South Africa • The Biodiversity Sector Climate Change Response Strategy • Strategy for investment in Ecological Infrastructure	ABT: 15 SDGs: 8, 13, 15 UNFCC (Decision 1/CP.16)

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It sets out a **vision** and **four key outcome areas**, related to: co-ordination, communications and learning; research, monitoring and evaluation; mainstreaming into policy and practice; and demonstration projects. Under each of these outcome areas, the Framework sketches low, medium and high-road financing options for a set of priority activities, for which **institutional roles, timeframes and resource requirements** are clearly described. The Strategy also identifies a number of key **areas that should be strengthened** to promote more effective implementation of Ecosystem-based Adaptation, in particular: monitoring the effectiveness of Ecosystem-based Adaptation; vulnerability assessments; improved communications to encourage peer learning and capacity development; and better co-ordination of ground-level projects.			Also broadly relevant to NBSAP SO 3, Outcomes 3.5 and 3.6	• Framework for investment in ENRM for a Green Economy	Paris Agreement 2015 UNCCD (arts. 8 and 10) 10-YFP (Objectives 1,2 &3) UN Sendai Framework for Disaster Risk Reduction Nairobi Work Programme 2015
11. Framework for investing in Ecological Infrastructure (EI)	**Date**	**Lead Developer**	**Partners**	**Timeframe**	**Likely revision**
	2014	SANBI	**SANBI**, DFFE, CoGTA, DHSWS, Municipalities, irrigation boards, disaster management centres (national, provincial and municipal), National Treasury, the Presidency and the National Planning Commission, research institutions, provincial environmental affairs departments and conservation authorities, NGOs, and businesses	Not specified	Ongoing
The purpose of this framework is to **guide action and support collaboration** for investing in ecological infrastructure (EI). **Seven principles make up the core** of the Framework. These include that investment in EI should take place in ways that: build on existing			***Relevance to NBSAP***	***Other cross-linkages***	***International commitments***
			NBSAP SO 2, Outcome 2.1 (all activities)	• Ecosystem-based Adaptation Strategy	UNCCD UNFCCC

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programmes and experiences; optimise job creation and rural development; promote socially sensitive participation; achieve clearly defined outcomes and benefits; focus on systematically identified, strategic spatial priority areas; and, involve transdisciplinary collaboration. In addition, the framework provides a brief **background** to **what is meant by ecological infrastructure** and investment in ecological infrastructure and how this **contributes to national development goals**; it identifies **key role players** and describes some **key programmes and practices** into which investment in EI can be integrated; it outlines the scope for **resource mobilisation** for investing in ecological infrastructure, identifies **research needs** going forward, and briefly outlines **next steps** for advancing progress in this field. This Framework is not static and will be added to and expanded as experience in this field is gained.			Outcome 2.2 (activity 2.2.1) NBSAP SO 3 Outcome 3.2 (activities 3.2.1, 3.2.2, 3.2.4, 3.2.6, 3.2.7 Outcome 3.5 (activities 3.5.2, 3.5.3, 3.5.5) NBSAP SO 1 Outcome 1.1 (activity 1.1.3) Outcome 1.3 (activity 1.3.5) Outcome 1.4 (activity 1.4.3)	• Biodiversity Sector Climate Change Response Strategy • NPAES (and provincial counterparts) • Business Case for Biodiversity Stewardship • NBES • BIOFIN Plan • The national REDD+ programme led by DFFE/DAFF	ABTs: 5, 9, 14, 15 SDGs: 1, 8, 13, 15
12. A Framework for investment in Environmental and Natural Resource Management (ENRM) for a Green Economy	**Date**	**Lead developer (s)**	**Partners**	**Timeframe**	**Likely revision**
	2016	DHEST, DFFE, DBSA (developed by CSIR)	**DHEST, DFFE, DBSA**, Relevant role-players in the private sector, DAFF, DHSWS, the " Working For' programmes, donors, NGOs	Not limited	Not Specified
This Framework has been designed to **guide catalytic investment in Environmental and Natural Resource Management** (ENRM), particularly as it relates to the **green economy**. The specific aim is to support ENRM initiatives that protect and enhance biodiversity and the resilience of the country's ecosystems, in ways that promote – and capitalise on - the job creation potential of the natural resource management sector. The Framework is based on research and a consultation process. It provides a **comprehensive analysis of the current context** for enabling investment in ENRM, **lists examples** of key initiatives, and i**dentifies key**			***Relevance to NBSAP***	***Cross-linkages***	***International alignment***
			NBSAP SO 2 Outcome 2.1 (activities 2.1.3, 2.1.5) NBSAP SO 1 Outcome 1.3 (activity 1.3.1, 1.3.5) Outcome 1.2 (activity 1.2.3)	• Strategy for investing in Ecological Infrastructure • Ecosystem-based Adaptation Strategy • NBES • BIOFIN Plan	ABTs: 5, 9, 14, 15 SDGs: 8, 13, 15

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challenges and opportunities. The Framework identifies **four key themes**, under which **short, medium and long-term investment options** are specified. **The four themes are to: enhance government coordination** of South Africa's transition to a green economy; enable greater **private sector investment** in ENRM **support catchment-based studies** to integrate principles of a green economy into **restoration and conservation of ecological infrastructure**; and enhance technical and financial **support for small business development** in the biodiversity economy					
13. National Strategy for dealing with biological invasions in South Africa	**Date**	**Lead developer**	**Partners**	**Timeframe**	**Likely revision**
	2014	DFFE	**DFFE**, SANBI, DHSWS, DoH, DALRRD, CoGTA, Trade & Industry, SANParks, Provincial conservation authorities and departments, Customs, 'Working For' programmes, CMAs	10 years	Not specified
This Strategy identifies **11 objectives and 19 high-level interventions** (supported by **priority actions**) to achieve **integrated and cost-effective management of biological invasions** at the **national scale** in South Africa, over the medium to longer term (10 years). It provides a comprehensive **overview** of biological invasions and their **management**, the legislative and regulatory environment, and broad **principles** for effective management. It elaborates on the need for strengthened **management capacity** and **collaborative governance** amongst the different spheres of government responsible for management of invasive species, the need to increase understanding through **research and monitoring**, raise **awareness** of the problem, and equitably **distribute the costs** of management. It addresses all aspects, including the introduction, establishment and spread of invasive species in terrestrial, freshwater and marine ecosystems, and describes approaches that can be targeted at species, areas of invasion and pathways of movement. Its overall goal is to **protect the natural capital** of the country, in the interests of achieving and sustaining the goals of the National Development Plan.			***Relevance to NBSAP***	***Cross-linkages***	***International alignment***
			NBSAP SO 2 Outcome 2.1 (activity 2.1.3)	• National Strategy for Plant Conservation • Ecosystem-based Adaptation Strategy • Framework for Investing in Ecological Infrastructure • Framework for investment in ENRM for a Green Economy	ABT: 9, 14, 15 SDGs: 8, 14, 15

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14. The Biodiversity Sector Climate Change Response Strategy	**Date**	**Lead developer**	**Partners**	**Timeframe**	**Likely revision**
	2014	DFFE	**DFFE** and stakeholders sector-wide	Open-ended	Not specified
Description: This Strategy, which is aligned with the National Climate Change response Policy/Framework (2011), outlines principles and key elements of the biodiversity sector's strategic response to the risks posed by climate change. It serves as an over-arching national strategy to guide policy development and to inform the development of more specific implementation plans by sector departments. The Strategy identifies **three strategic dire**ctions, under each of which clusters of relevant activities are listed (without specification of indicators, timeframes or institutional roles). The directions and key kinds of activities are as follows: **Monitoring and Evaluation** (with emphasis placed on strengthening relevant research, including impact-monitoring) **Ecosystem-based Adaptation** (with emphasis placed on maintaining key ecological infrastructure in good ecological condition, restoring degraded EI, improved land-use planning (incorporating CC criteria), improved vulnerability assessment and climate-proofing communities) **Protection of natural capital** (with emphasis on measures to keep CBAs, ESAs and FEPAs intact – or to restore degraded ones and increasing the extent of the protected area estate). The strategy identifies **intersectoral coordination** through the development of regional and local partnerships as a key mechanism for ensuring delivery of the recommended actions.			***Relevance to NBSAP*** Cross-cutting relevance to NBSAP SOs 1, 2, 3 and 6 SO 1, Outcomes 1.1 and 1.2 SO 2, Outcomes 2.1 and 2.2 SO 3, Outcome 3.1, 3.2 and 3.6 SO 6, Outcome 6.1 and 6.4	***Cross-linkages*** • The Ecosystem-based Adaptation Strategy • The strategy for investing in ecological infrastructure • Framework for investment in ENRM for a Green Economy • The NPAES • The Climate Change Adaptation Plans for Biomes in South Africa • BIOFIN Plan	***International alignment*** UNFCCC UNCCD Paris Agreement UN Sendai Framework for Disaster Risk Reduction Nairobi Work Programme
15. National Climate Change Adaptation Strategy	**Date**	**Lead developer**	**Implementing partners**	**Timeframe**	**Likely revision**

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	2019	DFFE	DFFE, DWS, SANBI, Conservation Agencies, research institutions, NGOs and the private sector, DSI, provincial government departments, municipalities.	10-year plan	Every five years.
This document – South Africa's NCCAS – is intended to be the cornerstone for climate change adaptation in the country and to reflect a unified, coherent, cross-sectoral, economy-wide approach to climate change adaptation. It outlines priority areas for adaptation, both to guide adaptation efforts and to inform resource allocation. The strategic objectives of the NCCAS are as follows: ● Objective 1: Build climate resilience and adaptive capacity to respond to climate change risk and vulnerability. ● Objective 2: Promote the integration of climate change adaptation response into development objectives, policy, planning and implementation. ● Objective 3: Improve understanding of climate change impacts and capacity to respond to these impacts. ● Objective 4: Ensure resources and systems are in place to enable implementation of climate change responses.			***Relevance to NBSAP***	***Cross-linkages***	***International alignment***
			NBSAP SO 2; Outcome 2.2.; Activities 2.2.1 and 2.2.2	• National Climate Change Response Policy • The Ecosystem-based Adaptation Strategy • The Climate Change Adaptation Plans for Biomes in South Africa • Biodiversity Sector Climate Change Response Strategy	UNFCCC Paris Agreement UN Sendai Framework for Disaster Risk Reduction Nairobi Work Programme SDG 13
16. Climate Change Adaptation Plans for South African Biomes	**Date**	**Lead developer**	**Implementing partners**	**Timeframe**	**Likely revision**
	2015	DFFE	**DFFE** and stakeholders sector-wide	Not limited	No specified
This document summarizes the **current state of knowledge about climate change threats, drivers and vulnerabilities**, relevant to each of the nine biomes in South Africa and **identifies appropriate, biome-specific adaptive actions.**			***Relevance to NBSAP***	***Cross-linkages***	***International alignment***
			NBSAP SO 2,	• Ecosystem-based Adaptation Strategy	UNCCD

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The adaptive actions are grouped into **four categories**: (i) **spatial planning** approaches, which indicate where different land-uses should best be located; (ii) **management** approaches, which influence how the land uses are executed; (iii) **ecosystem-based** approaches, which reduce the stressors that compromise the capacity of ecosystems to buffer social and biological systems form the effects of climate change; and, (iv) **biodiversity stewardship** approaches, through which adaptive capacity outside of protected areas can be enhanced by more sustainable land management.			Outcomes 2.1 and 2.2 (cross-cutting) NBSAP SO 1 Outcomes 1.1, 1.3 and 1.4 (cross-cutting)	• Framework for investing in ecological infrastructure • Framework for investment in ENRM for a Green Economy • NPAES (and provincial counterparts) • NBES	UNFCCC ABTs: 14, 15 SDGs: 13, 15
17. The National Water Resource Strategy v 2 (NWRS)	**Date**	**Lead Developer**	**Implementing Partners**	**Timeframe**	**Likely revision**
	2013	DHSWS	**DHSWS**, DFFE, SANBI, SANParks, Working for Wetlands, Working for Water, WRC, provincial environmental departments, local governments, Catchment Management Agencies	Five to ten years	Not specified
The NWRS2 builds on the first NWRS which was published in 2004. The purpose of the NWRS2 is to **ensure that national water resources are protected, conserved, used, developed, managed and controlled in an efficient, equitable and sustainable manner**, to meet South Africa's development goals over the next five to 10 years. It identifies **three objectives**, **six key principles** and **seven strategic themes**, one of which focuses on environmental protection and conservation of water resources (which is covered in Chapter 5). Of particular relevance to the biodiversity sector are **strategic actions identified in Chapter 5 on Water Resource Protection,** including those to: invest in **Strategic Water Source Areas** (SWSAs); maintain and rehabilitate water ecosystems; maintain **Fresh Water Ecosystem Priority Areas** (FEPAS) in a good ecological state; protect **riparian and wetland buffers** and **groundwater recharge** areas; **rehabilitate** strategic water ecosystems to maintain water quality and quantity; and **monitor** ecological health to inform management.			***Relevance to NBSAP***	***Cross-linkages***	***International alignment***
			NBSAP SO 2 Outcome 2.1 (activity 2.1.1)	• NPAES (and provincial counterparts) • Framework for Investing in Ecological Infrastructure • Framework for investment in ENRM for a Green Economy • Biodiversity Sector Climate Change Response Strategy • Water RDI RoadMap • National Water Security Framework	Ramsar Convention on Wetlands ABTs: 9, 11, 14, 15 SDGs: 1, 6, 8,9, 13, 15

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18. Water Research, Development and Investment (RDI) Roadmap	**Date**	**Lead Developer (s)**	**Partners**	**Timeframe**	**Likely Revision**
	2015	WRC, DHSWS, DHEST	**DHSWS, DHEST, WRC**, DFFE, SANBI	2015 - 2025	Not specified
This Roadmap **provides strategic direction** (through a set of research, development and deployment focal areas), a set of **action plans** and an **implementation framework to guide, plan, manage and co-ordinate South Africa's portfolio investment for the next ten years**. It is a **high-level** planning tool that facilitates and guides re-focussing of research and funding and helps synergize existing initiatives and the resources of new ones that optimize the water innovation system. Through its focus on RDD activities that can improve water supply, it interfaces strongly with and provides an effective **vehicle for increasing investments in water-related ecological infrastructure.**			***Relevance to NBSAP***	***Cross-linkages***	***International alignment***
			NBSAP SO 2, Outcome 2.1 (all activities, and especially 2.1.6)	• NWRS v2 • Framework for investing in ecological infrastructure • Framework for investment in ENRM for a Green Economy • National Water Security Framework	ABTs: 9, 11, 14, 19, 20 SDGs: 6, 15, 17
19. The Biodiversity Finance Plan (BIOFIN)	**Date**	**Lead developer**	**Partners**	**Timeframe**	**Likely revision**
	2017	DFFE	**DFFE**, SANBI, National Treasury, national and provincial conservation authorities and other protected area management agencies, government, private sector and civil society groups sector-wide	Not specified	Not specified
Description: The overall aim of the Biodiversity Finance Plan is to **ensure adequate funding of conservation and management interventions** to protect and maintain South Africa's unique and valuable biodiversity. Based on a rigorous selection process and a systematic approach, South Africa has prioritised 15 finance solutions the Plan which are vehicles for attaining sustainable development and creating jobs through strengthened biodiversity conservation and management. The 15 solutions are clustered around three biodiversity outcomes, as follows:			***Relevance to NBSAP***	***Cross linkages***	***International alignment***
			Relevant to all NBSAP objectives, outcomes and activities, and especially SO 3, Outcome 3.5	Cross-cutting, but especially: • Framework for Investing in Ecological Infrastructure	BIOFIN global programme ABTs: 3, 20 SDGs: 8, 10, 15, 17

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Protected areas: PA revenues; property rates reforms; revolving land trusts; biodiversity tax incentives; biodiversity offsets; and, making the case for public funding of Pas **Ecosystem Restoration**: government grants for ecological infrastructure; water tariffs; NRM value-added industries; global climate funding; carbon tax offsets; NRM land-user incentives **Sustainable Use:** Tourism Conservation Funds; biodiversity-related fines and penalties; wildlife-ranching. The BIOFIN plan also provides concise technical proposals on how to operationalize the financial solutions and consolidated estimates of expected results.				• Framework for investment in ENRM for a Green Economy • NPAES (and provincial counterparts) • The Business Case for Biodiversity Stewardship • Water RDI Roadmap	
20. National Integrated Strategy to Combat Wildlife Trafficking (NISCWT)	**Date**	**Lead developer**	**Implementing partners**	**Timeframe**	**Likely revision**
	2017	DFFE	**DFFE, SAPS**, DIRCO, SARS, SANParks, Provincial conservation authorities (PCAs), Dept of Justice, SSA, private security companies, NGOs, NICC, SANDF	2017 - 2021	Not specified
This Strategy has been developed to **direct law enforcement structures across multiple departments/agencies and empower them to reduce and prevent wildlife trafficking.** The Strategy promotes an **integrated, multidisciplinary and consolidated law enforcement approach** to strengthen enforcement capacity across government and within society more broadly, to address the serious threat posed by wildlife trafficking to biodiversity and national security. The Strategy includes an **Implementation Plan** that identifies objectives, key performance areas (with short, medium and long-term options for activities), outcomes, institutional roles and responsibilities, indicators, and timeframes.			***Relevance to NBSAP***	***Cross linkages***	***International alignment***
			NBSAP SO 3 Outcome 3.4 (activity 3.4.4)	Monitoring and Enforcement Strategy for the EMI	CITES ABT: 5, 12 SDG: 14 ,15, 16
21. Environmental Sector Local Government Support Strategy (LGS)	**Date**	**Lead developer**	**Partners**	**Timeframe**	**Likely revision**
	2019	DFFE	**DFFE**, SANBI, CoGTA, SALGA, Treasury, Local Governments, provincial environment departments, SA Cities Network, ICLEI, NGOs	2019-2024	Not specified

Description:	*Relevance to NBSAP*	*Cross-linkages*	*International alignment*
This strategy **provides for a coordinated and structured approach to strengthening environmental governance, environmental sustainability and climate-resilience at local government level**. It clarifies **legal mandates** and policy imperatives, identifies **challenges**, and then details a **vision, goals** and **five-year implementation and monitoring plan**. The strategy includes common set of environmental sector **priorities** and identifies **opportunities** to enable maximum impact and collective action in which environmental sector support is integrated into the local government development agenda. The vision of the Local Government Support Strategy (LGSS) is to create climate change resilient and environmentally sustainable municipalities through **intervention focusing on three broad goals**: improved environmental governance; sustainable and efficient management and use of natural resources, and climate change response. To achieve this, nine sector-specific interventions will be implemented: a proposed municipal prototype structures and staffing process; a revised Legal Framework to include the latest developments in environmental legislation; establishment of a DFFE/SALGA and partners task team for lobbying for the allocation of funding for the municipal environmental management function by National Treasury; develop a capacity building and environmental education strategy; the sector to assist identified municipalities to develop legislated sector tools/plans to enable them to plan for environmental interventions using reliable scientific evidence; continue the sustained agenda interventions to improve local government's management and use of natural resources across all thematic areas; support municipalities to discharge their compliance and enforcement functions; craft a process for the introduction of favourable timeframes for the review and approval of municipal capital projects on EIA's; and continue its efforts to mainstreaming environmental management and climate change into municipal planning frameworks.	NBSAP SO 3 Outcome 3.1 (activity 3.1.3) Outcome 3.2 (activities 3.2.5 and 3.2.6) Outcome 3.3. (Activity 3.3.1) Outcome 3.4 (activity 3.4.2 and 3.4.3) Outcome 3.5 (activity 3.5.3) NBSAP SO 2, Outcome 2.1 (activity 2.1.3) Outcome 2.2 (activity 2.2.1)	• The Ecosystem-based Adaptation Strategy • Framework for investing in ecological infrastructure • Framework for investment in ENRM for a Green Economy • BIOFIN	Local Agenda 21 of the CBD ABT: 2, 3, 4, 8, 9, 14, 15 SDGs: 6, 11, 12, 13, 15, 16, 17

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22. Biodiversity Human Capital Development Strategy (BHCDS)	**Date**	**Lead Developer**	**Partners**	**Timeframe**	**Likely revision**
	2010	DFFE/SANBI/Lewis Foundation	**DFFE, SANBI**, NESPF, DHST, CATHSSETA, EWSETA, all universities, NGOs, training providers, NRF, GreenMatter, SANParks, provincial conservation authorities	2010 - 2030	Reviewed every five years
Description: This strategy contributes to the **growth of an equitable and skilled workforce of biodiversity professionals and technicians** who can optimally implement the sector's expanding and complex mandate. It was informed by a comprehensive sector analysis, research and stakeholder consultation process and is intended as a 'living strategy' that should be reviewed every five years. It provides for a **systemic approach to capacity development** that promotes co-ordination and synergy, builds on existing strengths and addresses gaps through sector-wide initiatives. It identifies **9 core principles**, **4 goals** and **7 strategic objectives**, under which particular **activities** are recommended. The implementation architecture for the Strategy includes mechanisms for **broad sectoral engagement** and **dedicated co-ordination**.			***Relevance to NBSAP***	***Cross linkages***	***International alignment***
			Cross-cutting, but with relevance to NBSAP SO5, Outcome 5.2 (activities 5.2.1 and 5.2.2)	• Environmental Sector Skills Development Plan • Environmental Sector Gender Mainstreaming Strategy • Biodiversity Sector Research and Evidence Strategy	ABT: cross-cutting SDGs: cross-cutting, but especially SDGs 4 and 17
23. The Environmental Sector Skills Development Plan for South Africa (Summary Document)	**Date**	**Lead developer**	**Partners**	**Timeframe**	**Likely revision**
	2010	DFFE	All sector institutions in government, the private sector and civil society	Not time-bound	Needs-driven
Description: The summary document brings together key information and recommendations drawn from numerous, underlying working documents, all of which are accessible via DFFE's Environmental Learning Forum webpage (www.envirolearningforum.co.za). It includes a description of skills needs and their drivers, factors influencing the supply of skills, and objectives and recommendations for environmental skills development-planning. This Plan provides the overarching context for human capital			***Relevance to the NBSAP***	***Cross-linkages***	***Alignment***
			SO 5, cross-cutting	• Biodiversity Human Capital Development Strategy	SDG 16 and 17

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development strategies for sub-sectors within the environmental filed, including the Biodiversity Human Capital Development Strategy.					
24. Strategy for gender mainstreaming in the environmental sector	**Date**	**Lead Developer**	**Partners**	**Timeframe**	**Likely revision**
	2016	DFFE	All sector institutions in government, the private sector and civil society	2016 - 20201	Not specified
Description: This strategy has been developed to **promote a gender-sensitive management approach** in the environmental sector, and to ensure that gender analysis and gender equity underpins the development of policies and the design of environmental programmes and projects. Though not developed specifically for the biodiversity sector, it has important implications for it (outlined in Section 6.5) and **should guide biodiversity-specific capacity building, policy-development and project cycle management**. The Strategy identifies **12 key strategies** for promoting gender empowerment and includes a **framework of interventions** (a gender mainstreaming 'toolkit') that can be used to put these into practice across all stages of the project cycle. It also includes an enumeration of **funding opportunities**, and a set of **indicators** to be used for monitoring and evaluation.			***Relevance to the NBSAP*** Cross-cutting, but with specific linkage to: NBSAP SO5 Outcomes 5.1 (activity 5.1.1) Outcome 5.2 (all activities) Outcome 5.3 (activity 5.3.4)	***Cross linkages*** Cross cutting, but with specific linkage to: • Biodiversity Human Capital Development Strategy • Environmental Sector Skills Development Plan • SA's national Policy Framework for Women's Empowerment and Gender Equality	***International alignment*** The Gender Plan of Action of the CBD (2008) The UN Women's Strategic Plan 2014 - 2017 The SADC Protocol on Gender Development SDGs: 5 and 10
25. Intergovernmental Platform for Biodiversity and Ecosystem Services Programme (IPBES)	**Date**	**Lead Agency**	**Partners**	**Timeframe**	**Likely revision**
	Established 2012	DFFE, CSIR	All sector role-players	Not time bound	N/A
Description: The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) is a global initiative of which South Africa is a founding and participating member. IPBES aims to s**trengthen capacity for the effective use of science in decision-making at all levels,** and to address the needs of Multilateral Environmental Agreements (MEAs) that are related to biodiversity. Working through a system of **expert groups,**			***Relevance to NBSAP*** Relevant under various NBSAP SOs, but particularly: SO 6, Outcomes 6.1, 6.2, 6.4 and 6.5	***Cross-linkages*** • Environmental Sector Research, Development and Evidence Strategy	***International alignment*** IPBES (global) ABT: 19 SDGs: 16, 17

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forums, task teams and technical support units, IPBES works to **produce, review, assess and critically evaluate relevant information and knowledge** on the contribution of biodiversity and ecosystem services to sustainability generated by government, academia, scientific organizations, NGOs and indigenous communities. The IPBES Work Programme includes **18 deliverables**, organized under **4 objectives.** DFFE serves as the national focal point for IPBES in South Africa, and the CSIR, with support from DFFE, hosts the IPBES Technical Support Unit for Africa.			SO 5, Outcomes 5.2 and 5.3 SO 3, Outcome 3.6 SO 2, Outcome 2.1	• Biodiversity Research Development and Evidence Strategy • BHCDS • National Biodiversity Information System • National Biodiversity Monitoring Framework	
26. National Biodiversity Research and Evidence Strategy	**Date**	**Lead developer**	**Partners**	**Timeframe**	**Likely revision**
	2015	DFFE	**DFFE**, SANBI, CSIR, Research Institutions, NRF, SAEON, DHEST, SANParks, provincial conservation authorities, NGOs, experts	2015 - 2025	Updated every 5 years
Description: The central goal of this strategy (which flows from the Environmental Sector Research, Development and Evidence Strategy – see Item 26) is to **ensure that research and evidence provides appropriate and sufficient support to decision-making and policy-development in the biodiversity sector**. The Strategy outlines **key principles** to guide the research agenda, including the need to **link research priorities to policy priorities**, adoption of an evidence-informed approach to planning, reporting and budgeting, the importance of following participatory approaches and long-term investment in institutional strengthening, capacity development and innovation. The strategy identifies **two clusters of strategic evidence objectives**, linked to short, medium and longer-term **outcomes,** and a set of **priorities**, which are to: address taxonomic gaps, develop the green economy, identify and address trade-offs between conservation and development, respond to global change, strengthen risk mitigation, and identify drivers of behaviour change.			***Relevance to NBSAP***	***Cross-linkages***	***International alignment***
			Of cross-cutting relevance, but with specific relevance to: NBSAP SO6 Outcome 6.1. (activity 6.1.8) Outcome 6.2. (all) Outcome 6.4 (activity 6.4.1)	• The Environmental Sector Skills Development Plan • IPBES • The National Biodiversity Information System • National Biodiversity Monitoring Framework • SANParks research data repository	ABT: 19 SDG: 14, 15, 17

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The Strategy is accompanied by an **annual implementation plan** which details evidence requirements for the short and medium term.					
27. The Environmental Sector Research, Development and Evidence Strategy	**Date**	**Lead Developer**	**Partners**	**Timeframe**	**Likely revision**
	2012	DFFE	**DFFE, SANBI, DHEST**, CSIR, SANParks, ARC, WRC, SAEON**,** research institutions	**Not determined**	**Not specified**
***Description*:** This framework addresses the need for a common approach to the collection of solid evidence that can be used in support of environment sector policy decisions and for the achievement of sector priorities. The framework seeks to develop a more rigorous approach that gathers, critically appraises and uses high quality research evidence to inform policy-making and professional practice. The context for this framework is to implement the national R&D goals through responding to the Environmental Sector Plan and Outcome 10 evidence needs, while ensuring a coordinated common approach for developing thematic strategies. The Framework sketches the strategic context for research development and evidence in the environmental sector, outlines a preferred approach, sets 6 objectives, identifies priorities informing evidence needs, knowledge sharing and human capacity development, and includes an implementation and monitoring plan. It sets the broader context for the Biodiversity Sector Research and Evidence Strategy. The Framework will be implemented in phases.			***Relevance to NBSAP***	***Cross-linkages***	***International alignment***
			NBSAP SO 6 Cross-cutting	• IPBES • Biodiversity Sector Research and Evidence Strategy	ABT: 19 SDGs: 14, 15, 17
28. National Biodiversity Information System (NBIS)	**Date**	**Lead Agency**	**Implementing partners**	**Timeframe**	**Likely revision**
	Since 2004	SANBI	**SANBI**, DFFE, DHEST and other sector departments in government, civil society, the private sector, research institutions, conservation authorities	Open-ended	Updated continuously

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Description: The National Biodiversity Information System is intended to **harness, organize, refine, synthesise and manage biodiversity information and knowledge**, to ensure that it is widely **accessible** and **supports research**, **policy-development** and **decision-making** in the biodiversity sector. As part of its core mandate determined by the Biodiversity Act, SANBI is leading the development of the System, working in partnership with a wide range of data providers and stakeholder institutions in government, private sector and civil society. As part of this process, SANBI is building on existing **tools that allow quick and easy access to biodiversity knowledge resources**, such as: **The Biodiversity Advisor**: a web-based platform that provides access to a wide range of reports, checklists, training materials, databases, virtual forums, webpages and other sources of non-spatial information, such as: the Plants of Southern Africa (POSA)database; Red Lists; the iSpot citizen-science portal, and many others **BGIS** (Biodiversity-GIS): a webpage through which users can access spatial biodiversity data and supporting contextual information. The online interactive map component of BGIS allows users to query data, print and add maps. **SABIF (the South African Biodiversity Information Facility)**: which hosts primary biodiversity data and is a node of the Global Biodiversity Information Facility.			***Relevance to NBSAP***	***Cross-linkages***	***International alignment***
			Cross-cutting, but of particular relevance to SO6, Outcomes 6.1 (activity 6.1.1) and 6.5 (activity 6.5.1)	• The National Scientific Collections Facility • IPBES • The Biodiversity Sector Research and Evidence Strategy • The National Biodiversity Monitoring Framework • The National Ecosystem Classification System	ABTs: 18 and 19 SDGs: cross-cutting support, and especially 16 and 17 Encyclopaedia of Life Biodiversity Heritage Library Global Biodiversity Information Facility
29. DHEST/SANBI National Scientific Collections Facility	**Date**	**Lead developer /agency**	**Partners**	**Timeframe**	**Likely revision**
	2017	DHEST, SANBI	**DHEST, SANBI**, Museums, herbaria, universities	Not determined	Not determined
Description: This is a **virtual facility for natural science collections**. Its purpose is to build a **network** of South Africa's institutions holding natural history collections, with a central coordinating base in SANBI. Launched in 2017,			***Relevance to NBSAP***	***Cross-linkages***	***International alignment***
			NBSAP SO 6, Outcome 6.1 (activity 6.1.1)	• National Biodiversity Information System	ABT 19

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it is one of 13 infrastructure facilities identified in South Africa's Research Infrastructure Roadmap.				• Biodiversity Sector Research and Evidence Strategy	SDGs: 17 Biodiversity Heritage Library
30. National Biodiversity Monitoring Framework	**Date**	**Lead Developer**	**Partners**	**Timeframe**	**Likely revision**
	2021	SANBI	**SANBI, DFFE,** SANParks, provincial environmental departments and conservation authorities, local governments, experts, NGOs	Not time-bound	Regular updating of indicators according to need
Description: The goal of this framework is to lay the foundation for a national biodiversity observation and monitoring system, built on collaborative efforts, which allows for global, national and provincial level reporting on key aspects of the state of biodiversity to inform policies that support decision making and guide research. There are three key objectives of the framework: **Objective 1**. A regularly updated and accessible suite of biodiversity indicators that are sensitive to change, clearly interpretable and aligned with South Africa's national and international monitoring and reporting commitments is in place. The wide array of data underpinning the indicators are collated, curated and freely available. The methods of data collection, cleaning and analysis are clearly presented, defensible and repeatable. **Objective 2**. Ensure the biodiversity observation and monitoring system is a cooperative effort connecting people, sites and projects. Develop and maintain a register of contributors and reviewers along with clear			***Relevance to NBSAP***	***Cross-linkages***	***International alignment***
			Cross-cutting, but with particular relevance under NBSAP SO6 (Outcome 6.2).	Cross-cutting, but with particular links to: • National Biodiversity Assessment • National Biodiversity Information System • National Ecosystem Classification System	Supports all ABTs SDGs: 14, 15, 17

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protocols for data curation, refinement and update of methods, review of outputs, and interpretation of the indicators. **Objective 3**. Gaps in the monitoring system are identified and filled through collaborative projects focused on input data and methods. Emerging monitoring and reporting needs are met through the development and or implementation of new indicators. *[under development at the time of writing, to be finalized during 2021]*					
31. National Coastal Management Programme	**Date**	**Lead Developer**	**Partners**	**Timeframe**	**Likely revision**
	2015	*DFFE*	**SANBI,** DFFE**,** SANParks, provincial coastal environmental departments and conservation authorities, local governments, experts, NGOs	2015 to 2021	2nd NCMP in development and planned for publication by the end of the 2021/22 financial year
Description:			***Relevance to NBSAP***	***Cross-linkages***	***International alignment***
Among the myriad of implementation tools that are available within the National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008) (ICM Act), Coastal Management Programmes (CMPs) are arguably the most powerful integrating instruments in an ICM toolbox. A CMP is a policy directive for the management of the coastal zone, inclusive of strategies and plans for the effective implementation of the ICM Act that will enable organs of state to plan accordingly, to set a course for the coastal environmental future of a nation by addressing the resolution of current management problems and user-conflicts. The National Coastal Management Programme (NCMP) is the most important tool within the ICM Act for integrating coastal management in			Cross-cutting, but of particular relevance to: NBSAP SO 3, Outcome 3.1 (activities 3.1.1; 3.1.2) Outcome 3.2 (activities 3.2.1; 3.2.3; 3.2.6; 3.2.7) Outcome 3.3 (activities 3.3.1; 3.3.2) Outcome 3.4	• National Biodiversity Assessment • Framework for Integrated Coastal Management • NPAES (and counterparts in coastal provinces) • Operation Phakisa and Presidential 9-point Plan	ABTs: 6, 11 SDG: 14

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South Africa. It provides the direction and guidance towards a structured and standardised approach to coastal management in South Africa, including an appropriate cooperative governance framework – a critical element for effective implementation of integrated coastal management. The NCMP establishes a new vision for the coast: one that encapsulates the ultimate goal for the effective management of the coast – what we want the coastal zone to look like, stand for, achieve and contribute to and for the people of South Africa. However, this vision does not stand alone. For the vision to be realised in the future, tangible and iterative steps need to be made in the present and near future to lead us toward this vision. It is for this reason that the NCMP deliberately sets forth priority areas, including facilitation of coastal access, the management of estuaries, planning for coastal vulnerability to global change, the management of pollution, establishing effective compliance and enforcement, developing and enhancing the facilitation of coastal information and research, strengthening awareness, education, and training, as well as fostering and enhancing effective collaborations and partnerships for ICM. Each priority area is accompanied by sets of management objectives and actions with committed timeframes for delivery. The NCMP, therefore, represents the commitment of DFFE and government towards realistic and tangible goals that - both on their own and as puzzle pieces of larger systems and networks – will benefit the coastal environment and ensure its sustainability.			(activities 3.4.5; 3.4.6)		
32. Marine Spatial Planning Framework	**Date**	**Lead Developer**	**Partners**	**Timeframe**	**Likely revision**
	2017	DFFE	**SANBI,** DFFE**,** SANParks, provincial coastal environmental departments and conservation authorities, local governments, experts, NGOs	Not specified	Not specified
Description:			***Relevance to NBSAP***	***Cross-linkages***	***International alignment***

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The provides the framework for marine spatial planning in South Africa's ocean space. It provides high-level direction for undertaking marine spatial planning in the context of the South African legislation and policies as well as existing planning regimes. It contains a dedicated section on biodiversity management on the oceans, in which it is stated that the approach for biodiversity planning and management in respect of the terrestrial realm needs to be adopted for the ocean realm to ensure appropriate representation, especially within the coastal region where land and sea planning initiatives overlap.			Cross-cutting, but of relevance to: NBSAP SO 1, Outcome 1.1 (Activity 1.1.1) NBSAP SO 3, Outcome 3.1 (Activities 3.1.1; 3.1.2) Outcome 3.2 (Activities 3.2.1; 3.2.3; 3.2.6; 3.2.7)	• NPAES (and counterparts in coastal provinces) • Operation Phakisa and Presidential 9-point Plan	ABTs: 6, 11 SDG: 14
33. National Water Security Framework	**Date**	**Lead Developer**	**Partners**	**Timeframe**	**Likely revision**
	2020	National Planning Commission	DWS, DFFE, SANBI	Not specified	Not specified
Description: The National Water Security Framework (NWSF) responds to the question of the extent of the threat and the actions required in the short, medium and long term to mitigate or offset the threat. It frames a national pathway to a water secure country up to 2050 to enable inclusive economic growth, poverty eradication and reducing inequality, in line with the National Development Plan (NDP) imperatives. The NWSF guides, complements and dovetails with existing national policies and strategies. It enhances the water security component of the National Water Resources Strategy II (NWRS2), South Africa's blueprint for the management of its water resources, as well as the National Water and Sanitation Master Plan (NWSMP~~)~~ of the Department of Water and Sanitation (DWS), which is the positioned as an implementation plan for the NWRS2 and NWSF.			***Relevance to NBSAP***	***Cross-linkages***	***International alignment***
			NBSAP SO 2, Outcome 2.1 (activity 2.1.1)	Strategic water source areas: management framework and implementation guidelines for planners and managers	Ramsar Convention on Wetlands ABTs: 9, 11, 14, 15 SDGs: 1, 6, 8,9, 13, 15
34. South African National Ecosystem Classification System	**Date**	**Lead Developer**	**Partners**	**Timeframe**	**Likely revision**

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	Initiated 2013	SANBI	**SANBI**, DFFE, DHSWS, CSIR, SAEON, WRC, SAIAB, SANParks, Provincial conservation authorities	To be developed over five years	Not specified
Description: National ecosystem types are important units underpinning the work of the South African biodiversity sector. They form the basis of systematic biodiversity plans that inform policy, management, monitoring and decision-making, including the national biodiversity assessment, development of protected area expansion strategies, listing of threatened ecosystems and environmental impact assessment; they provide the basis for ecosystem accounting, and the development of biodiversity offsets; and are strategic informants of a wide-range of surveys and research activities. Currently, a standardised set of terrestrial ecosystems based on vegetation types is well-developed in the country, but further development of the classification system is necessary to incorporate freshwater, estuarine, coastal and marine systems. The South African National Ecosystem Classification System (SA-NECS) provides a **consistent set of ecosystem types** for terrestrial, freshwater, estuarine, coastal and marine ecosystems that is stable over time, and endorsed by national scientific community. The system provides spatial data and maps, a unique code and name for each ecosystem type, a description and list of associated species. The classification system is overseen by the National Ecosystem Classification Committee (NECC), which is convened by SANBI, and various subcommittees, which are working according to a five-year plan, feeding into the current National Biodiversity Assessment (to be published in 2019) and the listing of threatened ecosystems in terms of the Biodiversity Act.			***Relevance to NBSAP***	***Cross-linkages***	***Alignment with international commitments***
			Of cross-cutting relevance under SOs 1, 2, 3 and 6, and specific relevance to SO 6, Outcome 6.1 and activity 6.1.5	• National Biodiversity Assessment • NPAES and provincial counterparts • National Biodiversity Monitoring Framework • National Biodiversity Information System	ABTs: 8, 18, 19 SDGs: 14, 15
35. National Natural Capital Accounting Strategy: A ten-year strategy for Advancing Natural Capital Accounting in South Africa.	**Date**	**Lead Developer**	**Partners**	**Timeframe**	**Likely revision**
	2021	Statistics South Africa	DFFE, DMPE, DSI, DWS, NBI, National Treasury, SANParks and WRC	2021 to 2031	Not specified

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Description: The purpose of the strategy is to respond to the need to focus the efforts of Statistics South Africa (Stats SA) and other institutions engaged in National NCA on developing priority natural capital accounts and effective statistical systems and institutional mechanisms to inform South Africa's sustainable development policy objectives.			***Relevance to NBSAP***	***Cross-linkages***	***Alignment with international commitments***
			NBSAP SO 3, Outcome 3.1 *NBSAP SO 4, Outcome 4.1* *NBSAP SO 6, Outcome 6.5*	• National Biodiversity Assessment • NPAES and provincial counterparts • National Biodiversity Monitoring Framework	***ABT: 1, 2, 19***
36. Strategic water source areas: management framework and implementation guidelines for planners and managers	**Date**	**Lead Developer**	**Partners**	**Timeframe**	**Likely revision**
	2018	WRC	CSIR, DWS, DFFE, SANBI	Not time-bound	Not specified
Description: This Management Framework and Implementation Guideline Report is intended to facilitate and support well-informed and proactive land management, land-use and development planning in these nationally important and critical areas. The aim or primary principle is to protect the quantity and quality of the water produced by maintaining or improving the condition of the SWSAs.			***Relevance to NBSAP***	***Cross-linkages***	***Alignment with international commitments***
37. Environmental Impact Assessment and Management Strategy for South Africa (EIAMS)	**Date**	**Lead Developer**	**Partners**	**Timeframe**	**Likely revision**
	2014	DFFE	DWA, Provincial Competent Authorities and Local Authorities; NGOs; Environmental Law Association; Chamber of Mines; Business Unity South Africa (BUSA); SALGA; Academic sector; the South African affiliate of the International Association for Impact Assessment.	Not specified	Not specified

Description:	***Relevance to NBSAP***	***Cross-linkages***	***Alignment with international commitments***
The Environmental Impact Assessment and Management Strategy (EIAMS) aims to provide a more effective and efficient IEM system that is supported by a range of EM instruments and tools. The strategy process considered the desired future state for the IEM system and sought to define the way to achieve it within the mandate provided by Chapter 5 of NEMA – as far as possible – and largely within the context of existing environmental policies.	NBSAP SO1, SO2, SO3, SO4 and SO6 Outcome 10 (Output 4)	National Biodiversity Assessment Ecosystem service: -preservation of biodiversity -provision of livelihood to people -preservation of human cultural history/religious sites	Convention on Biodiversity Diversity Ramsar CMS

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3.2. Accelerators for implementing the NBSAP priorities

Given the ambitious nature and breadth of the objectives and priorities identified in the NBSAP and related strategies, and in light of the implementation constraints (financial, technical and human resources) facing government and other partners in the sector, setting priorities for action is essential. While progress across the full spectrum of strategic objectives and outcomes is necessary, not all can be pursued with the same emphasis, in parallel. Priority should be given to measures which have the greatest potential to speed up progress across goals and targets, taking into account their integrated nature, the specific national context, and the imperative of achieving economic, social and environmental harmony.

'**Accelerators'** are measures that can most effectively remove bottlenecks and/or systemic or underlying barriers to implementation, or that provide the best opportunities for fast-tracking implementation, or achieving multiple goals simultaneously.

The set of acceleration measures recommended in ***Table 5*** was identified through a process which included: (i) detailed analysis of the NBSAP to extract the high priority activities; (ii) cross-referencing these with priorities identified in other strategies; and (iii) a stakeholder consultation process involving 19 key institutions in the biodiversity sector, and other selected stakeholders identified on a targeted basis. During the consultation process, stakeholders were asked what they are already doing to implement priorities identified in the NBSAP (or other strategies), and what they envisage should or could be done to accelerate implementation in the next five years. These inputs were used to identify the measures that are included in Table 5, but it is important to recognize that there may also be other suitable measures that were not identified during the consultation process, but that might serve as effective accelerators.

It is also important to note the acceleration measures identified here do not represent new activities that institutions must implement in addition to their already-heavy workloads; rather, they represent a collation of priorities that have already been identified, but in numerous, separate documents and plans, or through consultation with stakeholders. ***Table 5*** brings these together in one place, in a way that enables alignment between the NBSAP and NBA and other strategic priorities to maximise impact.

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Table 5: Recommended acceleration measures, organized by NBSAP Strategic Objectives, Outcomes and high priority activities

NBSAP SO 1: Management and conservation of biodiversity assets and their contribution to the economy, rural development, job creation and social well-being is enhanced	
Relevant national strategies/frameworks/systems: The National Protected Areas Expansion Strategy, 2016; The Operation Phakisa Marine Protection and Governance Strategy, 2014; The Man and the Biosphere Reserve Strategy and Implementation Plan, 2016; The National Buffer Zone Strategy for National Parks, 2012; The People and Parks Co-Management Framework , 2010; The National Botanical Garden Expansion Strategy, 2020; The National Plant Conservation Strategy, 2015; The Business Case for Biodiversity Stewardship, 2015; The National Biodiversity Economy Strategy, 2017 (incorporating the Wildlife Economy Strategy)	
NBSAP Outcome 1.1: The network of protected areas and conservation areas includes a representative sample ecosystems and species, and is coherent and effectively managed	
High priority NBSAP activities: *1.1.1. Expand the protected area estate across all ecosystems* *1.1.2. Expand the network of conservation areas through mechanisms under the Biodiversity Act* *1.1.3. Strengthen capacity for Biodiversity Stewardship Programmes*	
Recommended acceleration measures	Implementation
1.1.1. Expand the protected area estate across all ecosystems • **Ensure that the NPAES is published** • **Achieve 5-year national targets in the NPAES for % representation of ecosystems included in protected areas**: through: **(i)** **Declaration of priority offshore marine protected areas** in line with the Phakisa MPSG and NPAES, and coastal MPAs that have an offshore component (e.g. Addo and Namaqua MPAs) **(ii)** **Expansion of national parks** as per the SANParks expansion strategy and 3-year Land Inclusion Plan (focus on under-represented ecosystems: Nama Karoo, Grasslands and Succulent Karoo) **(iii)** Implementation of protected area expansion plans as per **provincial conservation authority** operational plans, including through identifying and declaring priority biodiversity stewardship sites **(iv)** Declaration (in terms of the National Forestry Act) of **prioritized forests as forest nature reserves**	• DFFE (i) DFFE (MCM), Oceans Secretariat (ii) SANParks (iii) Provincial conservation authorities, CPAs, NGOs (iv) DAFF, provincial conservation agencies, private sector partners

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1.1.2. Expand the network of conservation areas through mechanisms under the Biodiversity Act • Institutionalize, resource and implement the **buffer zone function within SANParks** • Develop and apply **biodiversity management plans for priority ecosystems**	• DFFE, SANParks • National and provincial conservation authorities, SANBI, scientists, landowners, CPAs
1.1.3. Strengthen capacity for Biodiversity Stewardship Programmes • **Implement the recommendations of the Business Case for Biodiversity Stewardship**, beginning with an assessment of the specific resource requirements of each provincial biodiversity stewardship programme • **Implement the recommendations of the first National Biodiversity Stewardship Conference** held in September 2017, as endorsed by MinTech and the Protected Area CEO's Forum and the key recommendations from the National Land Reform and Biodiversity Stewardship Learning Exchange held in February 2020. • Convene a **national biodiversity stewardship conference** or forum annually • **Implement the 2019 Biodiversity Stewardship Guidelines**, and develop and mainstream a **Biodiversity Stewardship Implementation Framework** • Develop and implement a **sustainable finance mechanism for provincial biodiversity stewardship programmes** • Explore innovative models for expanding areas brought under protection, such as **Locally Managed Marine Areas** (LMMAs)	**DFFE, SANBI**, SANParks, provincial conservation authorities, BDS TWG, DALRRD, NGOs, landowners and community representatives
NBSAP Outcome 1.2: Species of Special Concern are sustainably managed	
Relevant NBSAP high priority activities: *1.2.2. Sufficient ex situ conservation of threatened and useful species* *1.2.4. Maintain an effective Scientific Authority*	
Recommended acceleration measures	Implementation
1.2.2 Sufficient ex situ conservation of threatened and useful species • Secure budget, formalize and maintain relevant institutional partnerships to **support expansion of South Africa's botanical garden network**, specifically to **operationalize the Kwelera National Botanical Garden and National Botanical Garden in Limpopo Province** • **Expand *ex situ* collections** to **increase representation of threatened and other species of special concern**	SANBI, EPWP, ECPTA, DEDEAT, LEDET, Treasury, NBGs, RBG Kew, botanical researchers and experts
1.2.4. Maintain an effective scientific authority • Assess the effect of trade on priority species and populations (in order to undertake non-detriment findings)	• Scientific Authority

• **Develop listing proposals** for species threatened by international trade but not-yet CITES-listed and , **early warning systems** to flag new species potentially threatened by trade implemented • **Develop, implement and sustainably fund** Biodiversity **Management Plans** for CR and EN species that are being unsustainably harvested	• Scientific Authority • SANBI, SANParks, provincial authorities, local governments
Outcome 1.3: The biodiversity economy is expanded, strengthened and transformed to be more inclusive of the rural poor	
Relevant high priority NBSAP activities: *1.3.1. Strengthen the contribution of the natural products sector to the national economy and the NBES* *1.3.2. Strengthen the contribution of the wildlife sector to the national economy and the NBES* *1.3.5. Pilot Biodiversity Economy transformation nodes to demonstrate multiple benefits*	
Recommended acceleration measures	Implementation
1.3.1. Strengthen the contribution of the natural products sector to the national economy and the NBES • **Launch and operationalize BioPANZA**, and develop a **Bioprospecting Charter** for the sector, including principles for environmental sustainability • **Co-ordinate research and surveys of species used in bioprospecting and biotrade and** develop management tools to ensure sustainable use • **Explore options (for example through feasibility studies)** for cultivation of indigenous trees and plants that are used for medicinal purposes to secure resource supply and reduce pressure on wild populations, with community participation	• DFFE, DTIC, DHEST, DALRRD, DAFF, provincial conservation departments, sector stakeholders – private sector and communities) • DFFE, DHEST, ARC, CSIR, Private Sector, Provincial Conservation authorities; research institutions, NGOs, communities • BioPANZA, SANBI, the Scientific Authority, research institutions, national and provincial conservation agencies
1.3.2. Strengthen the contribution of the wildlife sector to the national economy and the NBES • **Expand membership of the Wildlife Forum**, re-position it to serve as an effective interdepartmental/industry coordination platform, with the NBES as its implementation mandate • **Streamline the regulatory environment and permitting system**	• DFFE, Wildlife Forum, sector stakeholders

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• **Map priority areas for transformation of the wildlife sector** within the BENS and use these to guide implementation of the Biodiversity Economy Strategy • **Strengthen links** between the wildlife economy and biodiversity stewardship • **Develop and implement relevant policy, guidelines or minimum requirements for ecologically friendly wildlife ranching**, possibly linked to certification • **Work with local communities to develop and implement business plans** for wildlife economy projects in priority BENs (as determined in the NBES)	• DFFE, provincial conservation authorities • DFFE, SANBI, SANParks, CPAs, DALRRD, District and Local municipalities • Wildlife Forum, provincial conservation authorities, CPAs, NGOs, private sector role-players, local chambers of commerce.
1.3.5. Pilot Biodiversity Economy transformation nodes to demonstrate multiple benefits • Undertake **detailed mapping, determine strategic priorities, uptake areas and community priorities to operationalize at least 2 BENS** (guided by the priorities identified in the NBES and WES), in conjunction with the Biosphere Reserve Programme and biodiversity stewardship programmes (including the Land Reform Biodiversity Stewardship Initiative)	• DFFE, SANBI, SANParks, provincial conservation authorities, biosphere reserves, CPAs, NGOs, private sector
Outcome 1.4: Biodiversity conservation supports the land reform agenda and socio-economic opportunities for communal landholders	
Relevant high priority NBSAP activities: *1.4.1. Strengthen the Land Reform Biodiversity Stewardship Initiative including approval of guidelines, strategies and implementation plans developed through the DFFE-DALRRD-SANBI alliance* *1.4.2. Facilitate settlement of land claims in protected areas and the conservation estate*	
Recommended acceleration measures	Implementation
1.4.1. Strengthen the Land Reform Biodiversity Stewardship Initiative including approval of guidelines, strategies and implementation plans developed through the DFFE-DALRRD-SANBI alliance • **Finalise, formalise and implement the national strategy for the land reform and biodiversity stewardship initiative (LRBSI)** • **Resource and implement the Land Reform and Biodiversity Stewardship Initiative** • **Facilitate learning opportunities related to land reform and biodiversity stewardship** with a focus on knowledge exchange and skills development for building a biodiversity economy: convene the National Land Reform and Biodiversity Stewardship Learning Exchange annually.	• DFFE-SANBI-DALRRD • DFFE-SANBI-DALRRD • DFFE-SANBI-DALRRD

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1.4.2. Facilitate settlement of land claims in protected areas and the conservation estate • **Finalize settlements and biodiversity stewardship agreements** on land of high biodiversity value and set co-management agreements in place, according to provincial priorities identified in protected area expansion plans • **Support land claimants on restituted land** with the identification and development of sustainable wildlife economy or nature-based enterprises	• National and provincial conservation authorities • Provincial conservation authorities, SANParks, biosphere reserve management agencies
NBSAP Strategic Objective 2: Investments in ecological Infrastructure enhance resilience and ensure benefits to society	
Relevant national strategies/frameworks/systems: The Framework for Investing in Ecological Infrastructure, 2014; The Overarching Strategy and Implementation Plan for Ecosystem-based Adaptation, 2016; The National Action Plan to Combat Desertification and Land Degradation and Mitigate the Effects of Drought (version 2, 2016, in draft); The National Water Resource Strategy v.2, 2013; National Water Security Framework, 2020, Strategy for dealing with biological invasions in South Africa, 2014; Framework for investment in environmental and natural resources (ENRM) for a green economy, 2016; Climate Change Adaptation Plans for Biomes in South Africa, 2015; The Biodiversity Sector Climate Change Response Strategy, 2014; the Water RDI Roadmap, 2015; National Climate Adaptation Strategy; Strategic water source areas: management framework and implementation guidelines for planners and managers; National Natural Capital Accounting Strategy: A ten-year strategy for Advancing Natural Capital Accounting in South Africa.	
Outcome 2.1: Investments in ecological infrastructure enhance resilience and ensure benefits to society	
Relevant high priority NBSAP activities: *2.1.1. Support the implementation of Chapter 5 (water resource protection) of the National Water resource strategy* *2.1.2. Develop a systematic approach including methods, techniques and expertise for mapping and prioritising ecological infrastructure* *2.1.3. Scale-up and improve integration efforts to restore degraded ecological infrastructure and maintain ecological infrastructure in good condition*	
Recommended acceleration measures	Implementation
2.1.1. Support the implementation of Chapter 5 (water resource protection) of the National Water resource strategy • **Secure Strategic Water Source Areas** (SWSAs) through a range of mechanisms, including formal protection, land-use planning and environmental authorisations	• DALRRD, EPWP, Working For programmes, DFFE, DHSWS, CMAs, SANParks,

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• Accelerate implementation **of intensive wetland rehabilitation programmes**, to protect priority wetlands and stimulate job creation • Implement the UNDP-supported, and GEF-financed multi-partner projects that addresses multiple objectives and high priority activities such as the Ecological Infrastructure for Water Security. • Finalise and implement the emerging Green Climate Fund (GCF) supported project on securing of the Strategic Water Source Areas as an adaptation measure to climate change exacerbated water scarcity.	provincial conservation authorities, municipalities • DFFE, DHSWS, EPWP, SANBI, SANParks, Provincial conservation authorities, CMAs
2.1.2. Develop a systematic approach including methods, techniques and expertise for mapping and prioritising ecological infrastructure • **Continue to invest in improving the National Wetland Inventory** as part of the National Ecosystem Classification System • Develop and apply **ecological infrastructure maps** (including a focus on inland aquatic and coastal EI), as part of provincial spatial biodiversity planning, National Biodiversity Assessment, and other relevant projects (such as the Ecological Infrastructure for Water Security project).	• SANBI, WfWet, CSIR, WRC, DHEST, SAEON, Research institutions, national and provincial conservation authorities, NGOs • SANBI, CSIR, WRC, SAEON, NGOs, researchers, scientists in national and provincial conservation authorities
2.1.3. Scale-up and improve integration efforts to restore degraded ecological infrastructure and maintain ecological infrastructure in good condition • Develop and implement **strategic plans for maintenance and restoration of ecological infrastructure at a range of appropriate scales, including national, provincial and local** • **Integrate investment in ecological infrastructure into Catchment Management Strategies** • Establish a **National Alien and Invasive Species Co-ordination Forum** • **Strengthen the EI community of practice** through knowledge sharing and information exchange, building on existing forums	• DFFE (including DFFE's Environmental Programmes); SANBI; SANParks; provincial authorities; municipalities • DHSWS, CMAs, DFFE, provincial authorities, municipalities • DFFE, SANBI, DHSWS, Provinces, municipalities, CMAs, stakeholders

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	• DFFE, SANBI, DHSWS, Provinces, national and provincial conservation authorities, municipalities, CMAs, stakeholders
Outcome 2.2: Ecosystem-based adaptation is shown to achieve multiple benefits in the context of sustainable development	
Relevant high priority NBSAP activities: *2.2.1: Develop, fund and implement an implementation plan for ecosystem-based adaptation in the context of climate change adaptation and sustainable development*	
Recommended acceleration measures	Implementation
2.2.1 Develop, fund and implement an implementation plan for ecosystem-based adaptation in the context of climate change adaptation and sustainable development • **Establish and maintain co-ordination mechanisms for implementation of the Ecosystem-based Adaptation Strategy**, including the cross-sectoral Coordination Steering Committee (CCS) • Build an **active community of practice** for Ecosystem-based Adaptation • **Implement priority activities of the Ecosystem-based Adaptation Strategy** in line with resource availability • Finalize and implement the emerging GCF supported project on securing of the Strategic Water Source Areas as an adaptation measure to climate change exacerbated water scarcity. • Strengthen the focus on Ecosystem-based Adaptation (EbA) and other sector relevant adaptation measures to enhance resilience to climate change	• DFFE, SANBI, stakeholders • SANBI, DFFE, Adaptation Network, NGOs • DFFE, SANBI, stakeholders
NBSAP SO 3: Biodiversity considerations are mainstreamed into policies, strategies and practices of a range of sectors	
Relevant national strategies/frameworks/systems: The National Biodiversity Economy Strategy, 2017; Framework for investment in ENRM for a Green Economy, 2016, The Biodiversity and Climate Change Response Strategy, 2014; The National Strategy for dealing with Biological Invasions, 2014; The National Strategy for Combatting Wildlife Trafficking, 2017; Phakisa MPSG, 2014; The Compliance and Enforcement Strategy for the Environmental Monitoring Inspectorate, 2015; BIOFIN Plan, 2017; Water RDI Roadmap, 2015; Biodiversity messaging strategy; Environmental Impact Assessment and Management Strategy for South Africa; National Natural Capital Accounting Strategy: A ten-year strategy for Advancing Natural Capital Accounting in South Africa.	
Outcome 3.1: Effective science-based biodiversity tools inform planning and decision-making	

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Relevant high priority NBSAP activities: *3.1.1. Develop new science-based tools to inform planning and decision making* *3.1.2. Maintain new and existing science-based policy tools*	
Recommended acceleration measures	Implementation
3.1.1. Develop new science-based tools to inform planning and decision making • Revise provincial spatial biodiversity plans regularly, to ensure that they are up to date and able to provide the basis for science-based tools to inform planning and decision-making Develop and apply **biodiversity planning tools**, including biodiversity sector plans, bioregional plans and biodiversity management plans (according to provincially determined priorities) • Develop **biome-specific Biodiversity and Climate Change Adaptation Action Plans** (building on the recommendations in DFFEs 2015 Report on CCA Plans for South African Biomes)	• Provincial conservation authorities, SANBI • SANBI, DFFE, CSIR, researchers, SANParks, provincial conservation authorities, municipalities, NGOs, • DFFE, SANBI, CSIR, SAEON, researchers, provinces
3.1.2. Maintain new and existing science-based policy tools • **Review and update provincial biodiversity sector plans and published bioregional plans** in line with provincially determined plans and priorities, and mainstream into land-use planning and decision-making	• SANBI, DFFE, provincial conservation authorities, municipalities
Outcome 3.2: Embed biodiversity considerations into national, provincial and municipal development-planning and monitoring	
NBSAP Priority activities: *3.2.1: Integrate biodiversity into tools being implemented to support environmental decision-making for SIPs* *3.2.3. Integrate biodiversity priority areas into integrated coastal management plans and offshore plans* *3.2.4 Develop and publish guidelines for invasive species monitoring, control and eradication plans* *3.2.6. Integrate biodiversity priority areas into spatial development frameworks, integrated development plans and land-use schemes*	
Recommended acceleration measures	Implementation
3.2.1 Integrate biodiversity into tools being implemented to support environmental decision-making for SIPs • Ensure that appropriate biodiversity information is included in **Strategic Environmental Assessments for SIPs** • Ensure application of the **new EIA screening tool** [3]by EAPS	DFFE, The Presidency, SANBI, provincial environment departments

[3] The 2014 Environmental Impact Assessment Regulations (Regulation. 16 [1][b][v]) require that all applications for an environmental authorisation be accompanied by, *inter alia*, a report generated by the national, web-based environmental screening tool. The screening tool uses spatial environmental data (with different categories of

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	and conservation authorities, other relevant government departments and public entities, EA consultants
3.2.3 Integrate biodiversity priority areas into integrated coastal management plans and offshore plans • Ensure that appropriate biodiversity information is included in **marine spatial plans** developed in terms of the marine spatial planning framework • Develop and apply **implementation plans and enforcement measures for the marine spatial planning framework** (as per Phakisa MPSG)	Oceans Secretariat, DFFE (MCM), SANBI, DALRRD, sector bodies, provincial environmental departments and municipalities coastal
3.2.4 Develop and publish guidelines for invasive species monitoring, control and eradication plans • Develop and implement **National Control Plans for listed species** in priority areas determined by the relevant authority • Develop **invasive species control plans for all national parks and buffer zones and prioritised provincial nature reserves**	DFFE, SANBI, provincial environment departments, municipalities
3.2.6 Integrate biodiversity priority areas into spatial development frameworks, integrated development plans and land-use schemes • **Support inclusion of biodiversity priority areas into planning instruments** developed in terms of the Spatial Planning and Land Use Management Act 2013 (SPLUMA, Act No. 16 of 2013) • Finalise and support implementation of the **standard requirements for biodiversity information as part of the environmental layer in SDFs** • **Integrate biodiversity priorities into land capability and agricultural zoning** through mainstreaming of systematic biodiversity plans • Develop **ecosystem guidelines**[4] for environmental assessment and land-use planners and decision makers, and mainstream their use in integrated environmental management and land-use planning	• DFFE, SANBI, DALRRD, provincial conservation authorities • DFFE, SANBI, DALRRD, provincial conservation authorities • DFFE, SANBI, DAFF, provincial departments and conservation

data applicable to different kinds of applications), to determine if the application for authorisation (Basic Assessment, Scoping or Environmental Impact Assessment) has considered the major environmental issues at the proposed land-use site.

[4] Ecosystem Guidelines provide practical guidance and a consistent framework for addressing the biodiversity-related aspects of land-use planning, landscape management and environmental regulation. They enable users to contextualize and interpret spatial biodiversity priorities, understand the key drivers of ecosystem functioning, understand what the acceptable limits of change are in particular ecosystems or landscapes, and interpet how those need to be managed and monitored to ensure that biodiversity and ecosystem processes are adequately safeguarded. Ecosystem Guidelines have been developed for the Western Cape and for the Grassland Biome, and new guidelines are planned for the Savannah and Thicket Biomes.

• **Develop and implement relevant training programmes** to strengthen capacity in all relevant institutions for use of existing and new tools to integrate biodiversity into planning and decision making in multiple sectors	authorities, municipalities • SANBI, researchers, provincial environment departments and conservation authorities, municipalities, environmental assessment practitioners • DFFE, SANBI, training institutions, NGOs, government departments in all spheres, private sector
Outcome 3.3: Strengthen and streamline development authorisations and decision-making	
Relevant high priority NBSAP Activities: 3.3.3. *Identify areas of high sensitivity where certain types of development are prohibited*	
Recommended acceleration measures	Implementation
3.3.3. Identify areas of high sensitivity where certain types of development are prohibited • Complete the process for **delineating one or more of Strategic Water Source Areas and publishing restrictions or prohibitions** in relation to those SWSAs in terms of Section 24 (2A) of NEMA	• DFFE, DHSWS, DMR, relevant provincial conservation authorities, CSIR, NGOs
• **Use CBA Maps and accompanying land-use guidelines** to identify and inform decision-making about areas where development that results in loss of natural habitat should be avoided	• Competent environmental authorities in terms of NEMA, provincial conservation authorities, SANBI
• **Capture ecological infrastructure features in provincial biodiversity plans/biodiversity sector plans/bioregional plans**	• SANBI, Provincial conservation authorities municipalities
Outcome 3.4: Compliance with authorisations monitored and enforced	

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Relevant high priority NBSAP activities *3.4.1. Strengthen environmental regulatory and compliance frameworks* *3.4.2. Implement the Environmental Compliance and Enforcement Strategy* *3.4.4. Improve the enforcement of trade regulations*	
Recommended acceleration measures	Implementation
3.4.1. Strengthen environmental regulatory and compliance frameworks • **Update and apply the national legal framework** for monitoring and enforcement • Strengthen links between EMI institutions and make them more accessible to the public (for example through use of the **E-Legislation** (NEMA/SEMA) tab on the DFFE website)	DFFE, SANParks, provincial conservation agencies, provincial environment departments
3.4.2. Implement the Environmental Compliance and Enforcement Strategy • Secure approval for, implement, and monitor **the Compliance and Enforcement Strategy for the Environmental Management Inspectorate**[5]	DFFE, DALRR, DHSWS, SAPS, SSA, provincial conservation agencies and environmental departments, customs, municipalities
3.4.4. Improve the enforcement of trade regulations • Approve and implement the **National Integrated Strategy to Combat Wildlife Trafficking** • **Implement CITES decisions and amended resolutions** relating to all species of special concern • **Maintain CITES inspection and permit issuing offices in provinces**	• DFFE • DFFE, Scientific Authority, SANParks, provincial conservation agencies, provincial conservation authorities and environmental departments
Outcome 3.5: Appropriate allocation of resources in key sectors and spheres of government facilitates effective management of biodiversity, especially in biodiversity priority areas	
Relevant high priority NBSAP activities: *3.5.2. Develop a resource mobilisation strategy for biodiversity*	

[5] A *National Compliance and Enforcement Strategy for the Environmental Management Inspectorate* was developed by DFFE in 2014. It is based on 7 core principles to guide the work of the Inspectorate, and enhance its effectiveness between 2015 and 2020.

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Recommended acceleration measures	Implementation
3.5.2. Develop a resource mobilisation strategy for biodiversity • Implement and update resource mobilize action plan • Revise the **BIOFIN Finance Plan to align to CBD outcomes**	• DFFE, National Treasury, SANBI
Outcome 3.6: Biodiversity considerations are integrated into the development and implementation of policy, legislative and other tools	
Relevant NBSAP high priority activities: *3.6.1. Develop, implement, review and update legislative and other tools that ensure the protection of species and ecosystems* *3.6.2. Integrate the value of biodiversity into national accounting and reporting systems* *3.6.3. Integrate biodiversity into sector policies and legislation*	
Recommended acceleration measures	Implementation
3.6.1 Develop, implement, review and update legislative and other tools that ensure the protection of species and ecosystems • Finalize, approve and publish the **amendments to NEMA** that are currently under development • Complete, approve, publish, and implement the National Biodiversity Offset Guideline to guide the consistent implementation of biodiversity offsets in the country.	DFFE
3.6.2. Integrate the value of biodiversity into national accounting and reporting systems • Develop and **undertake a strategic set of studies** to assess the contribution of biodiversity conservation and management to the economy, building on existing work • Implement the priorities identified in the National NCA Strategy. • Develop natural capital accounts for Strategic Water Source Areas, ecological infrastructure assets and water resources.	• DFFE, CSIR, SANBI, relevant experts • Statistics South Africa, SANBI, DFFE, DHSWS
3.6.3. Integrate biodiversity into sector policies and legislation • Support **inclusion of biodiversity priority areas in agricultural policy, legislation and spatial tools** • **Support implementation of the Mining and Biodiversity Guideline**	• DFFE, DAFF, SANBI, • DFFE, DMR, SANBI

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NBSAP SO4: Mobilise people	
Relevant national strategies/frameworks/information systems: National Plant Conservation Strategy, 2015; National MAB Reserve Strategy, 2016	
Outcome 4.1: People's awareness of the value of biodiversity is enhanced through more effective co-ordination and messaging	
Relevant high priority NBSAP activities: *4.1.1. & 4.1.2. Develop, fund a co-ordinated national biodiversity communication, education and awareness strategy, implementation plan and monitoring framework* *4.1.3. Strengthen environmental literacy through citizen science programmes*	
Recommended acceleration measures	Implementation
4.1.1. & 4.12. Develop, fund a co-ordinated national biodiversity communication, education and awareness strategy, implementation plan and monitoring framework • Develop, resource and implement a **co-ordinated national biodiversity communication, education and awareness strategy, implementation plan and monitoring framework** to co-ordinate communication work in the sector, building on the work done in the "Making the Case" project previously undertaken by DFFE and SANBI	• DFFE, SANBI, NGOs, tertiary and research institutes
4.1.3 Strengthen environmental literacy through citizen science programmes • Strengthen the work of citizen science programmes by establishing a **national citizen science forum for information exchange, learning, strategic prioritization** • **Strengthen support to Biosphere Reserves, Marine Hope Spots, and other landscape-initiatives** as vehicles for promoting awareness and behaviour-change and supporting citizen science programmes, especially through engagement of youth	• SANBI, DHEST, NGOs, national collections institutions (museums, herbaria) • DFFE, SANParks, Conservation authorities, NGOs
NBSAP SO5: Conservation and Management of Biodiversity is improved through the development of an equitable and suitably skilled workforce	
Relevant strategies/frameworks/systems: The Biodiversity Human Capital Development Strategy, 2010; Environmental Sector Skills Development Plan, 2010; Strategy for Gender Mainstreaming in the Environmental Sector, 2010; IPBES	

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Outcome 5.1: Macro-level conditions enabled for skills planning, development and evaluation	
Relevant high priority NBSAP activities: *5.1.3. Develop and integrate existing mechanisms for the monitoring and evaluation of biodiversity human capital development initiatives* *5.1.4. Ensure that national strategies receive adequate finding and support*	
Recommended acceleration measures	Implementation
5.1.3. Develop and integrate existing mechanisms for the monitoring and evaluation of biodiversity human capital development initiatives and 5.1.4. Ensure that national strategies receive adequate finding and support • Support the further development and implementation of an effective and sustainably-funded **national-level co-ordination mechanism for biodiversity human capital development and monitoring**[6] • Ensure that **capacity building needs for implementation of IPBES recommendations** are matched with resources through catalysing financial and in-kind support	• DFFE, NESPF, SANBI, DHEST, DHSWS, DBSA, DPME, NRF, Greenmatter • DFFE, NESPF, DHEST
Outcome 5.2: An improved skills development system incorporates the needs of the biodiversity sector	
Relevant high priority NBSAP activities: *5.2.1. Develop and implement an updated BHCD Plan in support of the BHCDS*	
Recommended acceleration measure	Implementation
5.2.1. Develop and implement an updated BHCD Plan in support of the BHCDS • Develop an updated **Biodiversity Human Capital Development Implementation Plan**	• DFFE, SANBI, NESPF, GreenMatter
NBSAP SO6: Knowledge foundations	
Relevant national strategies/ frameworks/systems: IPBES; The National Biodiversity Research and Evidence Strategy, 2015; Environmental Sector Research, Development and Evidence Strategy, 2015; The National Plant Conservation Strategy, 2015; The National Biodiversity Monitoring Framework; The National Biodiversity Ecosystem Classification System; The National Biodiversity Information System	
Outcome 6.1: Relevant foundational datasets on species and ecosystems are in place and well-co-ordinated	

[6] South African National Biodiversity Institute (SANBI). 2019. National Biodiversity Assessment 2018: The status of South Africa's ecosystems and biodiversity. Synthesis Report suggests potential indicators that should be monitored on a regular basis to inform the human capital development strategy and financial resource allocations for the environmental sector (Box 14).

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Relevant high priority NBSAP activities: *6.1.5. Maintain and formalise the National Ecosystem Classification System* ***(with relevance to Outcome 6.5)***	
Recommended acceleration measures	Implementation
6.1.5. *Maintain and formalise the National Ecosystem Classification System* • Formalize, implement and maintain the **National Ecosystem Classification System**	SANBI, DFFE, SANParks, DHEST, NRF, CSIR, provincial conservation authorities, universities, NGOs, other participants in Ecosystem Classification Committees convened by SANBI
Outcome 6.2: The status of species and ecosystems is regularly monitored and assessed	
Relevant high priority NBSAP activities *6.2.1. Develop and implement methods and approaches for assessing the status of ecological infrastructure* *6.2.2. Regularly map key pressures on biodiversity, including landcover change, pressures in the marine environment (fisheries, trawling, mining) and distribution of invasive species* *6.2.3. Monitor and report on the state of ecosystems and species, including the status and trends for priority harvested marine resources, impact of trade in wildlife and wild plants on biodiversity including change in TOPS- and CITES-listed species, invasive alien species and their impacts and the effectiveness of control measures, change in status of Red Listed species, impacts of GMOs on biodiversity assets and ecological infrastructure, and the impacts of climate change on species and ecosystems.* *6.2.4. Revise and update the National Biodiversity Assessment at least every seven years*	
Recommended acceleration measures	
Cross-cutting: • **Complete, adopt and apply (identify, develop and build further on large-scale, long-term monitoring datasets) the National Biodiversity Monitoring Framework** (under development, due for release in 2021); • **Complete and publish the NBA 2018** [7], and mainstream into policy and planning at provincial and local levels	• SAEON, SANBI, DFFE, CSIR, research institutions and centres of excellence, SANParks, Provincial conservation

[7] South African National Biodiversity Institute (SANBI). 2019. National Biodiversity Assessment 2018: The status of South Africa's ecosystems and biodiversity. Synthesis Report, published October 2019 and available online: http://biodiversityadvisor.sanbi.org/planning-and-assessment/national-biodiversity-assessment-nba-2018/

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• Undertake foundational research that supports the sustainable development of the wildlife economy (such as research on ecological impacts of game farming and ranching) • Undertake foundational research that supports investment in ecological infrastructure (such as research on critical thresholds for the functioning of ecological infrastructure).	authorities and environment departments • SANParks, provincial conservation authorities SANBI, DFFE, SANParks, Provincial conservation authorities and environment departments • SANBI, DFFE, SANParks, DHEST, NRF, CSIR, provincial conservation authorities, universities, NGOs, other participants in Ecosystem Classification Committees convened by SANBI
Outcome 6.4: Management-relevant and policy-relevant research and analysis is undertaken through collaboration amongst scientists and practitioners	
Relevant high priority NBSAP activities: *6.4.3 Engage with funding agencies and research community to align funding grants in support of priority projects.*	
Recommended acceleration measures	Implementation
• Mobilise additional resources for the Foundational Biodiversity Information Programme	• DFFE, SANBI, DSI
Outcome 6.5: Knowledge base is accessible and is presented in a way that informs decision-making	
Relevant high priority NBSAP activities: *6.5.1. Develop infrastructure that facilitates serving various forms of information and tools in an appropriate format for decision-making to as broad a group of users as possible.*	
Recommended acceleration measures	Implementation

• Ensure adequate resourcing to facilitate ongoing **development and expansion of the National Biodiversity Information System**	• SANBI, DFFE, DHEST, data-providers in partner institutions

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3.3. National guidelines that support the implementation of the identified acceleration measures

In addition to the national strategies, frameworks and systems that guide the work of the biodiversity sector discussed in Section 3.1, various guidelines have also been developed to support and strengthen the conservation and management of biodiversity and to ensure sound practice within the biodiversity sector. These include guidelines, norms and standards, and other forms of guidance. ***Table 6*** presents an overview of 22 guidelines that support the implementation of the acceleration measures identified in this Framework. Only those guidelines that support the implementation of the acceleration measures identified in this Framework, and that are readily available, have been included in the list of 22 guidelines. Provincial, local or institution-specific guidelines, whilst important, have been excluded from the overview.

Table 6: Overview of national guidelines that support the implementation of the acceleration measures identified in the NBF.

1. Ecosystem Based Adaptation Guidelines	**Date**	**Lead developer**	**Partners**	**Linkages of the Guidelines to recommended accelerated measures**
	2017	DFFE & SANBI	DFFE & SANBI	*2.2.1 Develop, fund and implement an implementation plan for ecosystem-based adaptation in the context of climate change adaptation and sustainable development* • **Establish and maintain co-ordination mechanisms for implementation of the EbA Strategy**, including the cross-sectoral Coordination Steering Committee (CCS) • Build an **active community of practice** for EbA • **Implement priority activities of the EbA Strategy** in line with resource availability *3.1.1. Develop new science-based tools to inform planning and decision making* • Develop **biome-specific Biodiversity and Climate Change Adaptation Action Plans**
The Ecosystem based Adaptation (EbA) Guidelines provide clarity about the scope of EbA, the principles that define it, criteria for identifying appropriate EbA projects, safeguards to maximise the chances of successful outcomes and processes for user groups to develop or enhance interventions. The Guidelines are intended for use when undertaking adaptation planning nationally, when designing projects and research programmes, when assessing eligibility for EbA funding and when determining opportunities for convergence with existing government policies and programmes of work. The EbA Guidelines are intended to be used by four broad user groups				

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i.e. project and programme planners and implementers; the private sector and government; researchers; policy-makers and funders of EbA projects and research.				
2. Mining and Biodiversity Guidelines	**Date**	**Lead developer**	**Partners**	**Linkages of the Guidelines to recommended accelerated measures**
	2013	DFFE & DMRE	Chamber of Mines, South African Mining and Biodiversity Forum, and SANBI	3.6.3. Integrate biodiversity into sector policies and legislation • **Support implementation of the Mining and Biodiversity Guideline**
The guideline provides best practice guidance on how to integrate biodiversity priorities and considerations into mining projects, from exploration through to mine closure. It uses spatial information on biodiversity priority areas as a fundamental starting point, interpreting this information specifically for a mining audience to provide a detailed national map of four levels of risk for mining from a biodiversity perspective.				
3. Technical Guidelines for Critical Biodiversity Areas Maps: Guidelines for developing a map of Critical Biodiversity Areas & Ecological Support Areas using systematic biodiversity planning	**Date**	**Lead developer**	**Partners**	**Linkages of the Guidelines to recommended accelerated measures**
	2017	SANBI	None	*2.1.2. Develop a systematic approach including methods, techniques and expertise for mapping and prioritising ecological infrastructure* • Develop and apply **ecological infrastructure maps** (including a focus on inland aquatic and coastal EI), as part of provincial spatial biodiversity planning and the National Biodiversity Assessment *3.1.1. Develop new science-based tools to inform planning and decision making* • Develop and apply **biodiversity planning tools**, including biodiversity sector plans, bioregional plans and biodiversity management plans (according to provincially determined priorities) *3.1.2. Maintain new and existing science-based policy tools* • **Review and update provincial biodiversity sector plans and published bioregional plans** in line with provincially determined plans and priorities, and mainstream into land-use planning and decision-making

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				3.2.3. Integrate biodiversity priority areas into integrated coastal management plans and offshore plans • Ensure that appropriate biodiversity information is included in **marine spatial plans** developed in terms of the marine spatial planning framework *3.2.6 Integrate biodiversity priority areas into spatial development frameworks, integrated development plans and land-use schemes* • **Support inclusion of biodiversity priority areas into planning instruments** developed in terms of the SPLUMA • Finalise and support implementation of the **standard requirements for biodiversity information as part of the environmental layer in SDFs** • **Integrate biodiversity priorities into land capability and agricultural zoning** through mainstreaming of systematic biodiversity plans • Develop **ecosystem guidelines** for environmental assessment and land-use planners and decision makers, and mainstream their use in integrated environmental management and land-use planning *3.3.3. Identify areas of high sensitivity where certain types of development are prohibited* • **Use CBA Maps and accompanying land-use guidelines** to identify and inform decision-making about areas where development that results in loss of natural habitat should be avoided • **Capture ecological infrastructure features in provincial biodiversity plans/biodiversity sector plans/bioregional plans** • **Develop and implement relevant training programmes** to strengthen capacity in all relevant

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				institutions for use of existing and new tools to integrate biodiversity into planning and decision making in multiple sectors *3.6.3. Integrate biodiversity into sector policies and legislation* • Support **inclusion of biodiversity priority areas in agricultural policy, legislation and spatial tools**
This document provides guidelines for biodiversity planning practitioners in South Africa on how to develop and present a map of Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), or "CBA Map", based on a systematic biodiversity plan. These guidelines set out the rationale for CBA Maps and provide minimum technical requirements as well as recommended good practice for developing these maps, based on the collective experience of the biodiversity planning community in South Africa over more than a decade. These guidelines are designed to be used by biodiversity planning practitioners in South Africa, including government officials who are tasked with developing provincial biodiversity plans, biodiversity sector plans or bioregional plans, and consultants who are appointed as service providers to assist in these processes.				
5. Guidelines regarding the determination of the Bioregions and the Preparation of and Publication the Bioregional Plans	**Date**	**Lead developer**	**Partners**	**Linkages of the Guidelines to recommended accelerated measures**
	2009	DFFE	SANBI	*3.1.1. Develop new science-based tools to inform planning and decision making* • Develop and apply **biodiversity planning tools**, including biodiversity sector plans, bioregional plans and biodiversity management plans (according to provincially determined priorities) *3.1.2. Maintain new and existing science-based policy tools* • **Review and update provincial biodiversity sector plans and published bioregional plans** in line with provincially determined plans and priorities, and mainstream into land-use planning and decision-making *3.2.6. Integrate biodiversity priority areas into spatial development frameworks,*

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				integrated development plans and land-use schemes • **Support inclusion of biodiversity priority areas into planning instruments** developed in terms of the SPLUMA • Finalise and support implementation of the **standard requirements for biodiversity information as part of the environmental layer in SDF** *3.3.3. Identify areas of high sensitivity where certain types of development are prohibited* • **Capture ecological infrastructure features in provincial biodiversity plans/biodiversity sector plans/bioregional plans**
The purpose of this Guideline is to provide guidance on the manner in which bioregions should be proposed and bioregional plans drawn up for the Minister to support designation or publication. It sets out the process to be followed by those wishing to have an area determined as a bioregion or wishing to draw up and have published a bioregional plan. It is intended to be used by provincial conservation authorities and/or national or provincial environmental affairs departments; bioregional programmes or NGOs; and organs of state, NGOs, planning consultants, or members wishing to develop or facilitate the development and publication of bioregional plans or the designation of a bioregion.				
6. Making the case for Biodiversity: the biodiversity case study development toolkit	**Date**	**Lead developer**	**Partners**	**Linkages of the Guidelines to recommended accelerated measures**
	2016	SANBI	SANBI	*4.1.1. & 4.12. Develop, fund a co-ordinated national biodiversity communication, education and awareness strategy, implementation plan and monitoring framework* • Develop, resource and implement a **co-ordinated national biodiversity communication, education and awareness strategy, implementation plan and monitoring framework** to co-ordinate communication work in the sector, building on the work done in the "Making the Case" project

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				previously undertaken by DFFE and SANBI *4.1.3 Strengthen environmental literacy through citizen science programmes* • Strengthen the work of citizen science programmes by establishing a **national citizen science forum for information exchange, learning, strategic prioritization** • **Strengthen support to Biosphere Reserves, Marine Hope Spots and other landscape-initiatives** as vehicles for promoting awareness and behaviour-change and supporting citizen science programmes, especially through engagement of youth
The purpose of this toolkit is to equip researchers for the collection of compelling information and the formulation of evocative case studies. An overview of the factors that contribute to effective communication as well as a case study preparation framework and a case study collection worksheet are provided.				
7. Norms and Standards for Biodiversity Management Plans for Species (BMP-S)	**Date**	**Lead developer**	**Partners**	**Linkages of the Guidelines to recommended accelerated measures**
	2009	DFFE	SANBI	*1.2.4. Maintain an effective scientific authority* • **Develop, implement and sustainably fund Biodiversity Management Plans** for CR and EN species that are being unsustainably harvested *3.1.1. Develop new science-based tools to inform planning and decision making* • Develop and apply **biodiversity planning tools**, including biodiversity sector plans, bioregional plans and biodiversity management plans (according to provincially determined priorities)
The purpose of these Norms and Standards is to provide a national approach and minimum standards for the development of biodiversity management plans for species and to set indicators to measure compliance with these norms and standards. The norms and standards sets and				

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provides the scope of BMP-S; the process for developing BMP-S; standardised format of BMP-S; steps involved in approval of the BMP-S; and conditions for the implementation of BMP for species**.**				
8. Norms and Standards for Biodiversity Management Plans for Ecosystem	**Date**	**Lead developer**	**Partners**	**Linkages of the Guidelines to recommended accelerated measures**
	2012	DFFE	SANBI	*3.1.1. Develop new science-based tools to inform planning and decision making* • Develop and apply **biodiversity planning tools**, including biodiversity sector plans, bioregional plans and biodiversity management plans (according to provincially determined priorities)
The published Norms and Standards for BMP-Es seeks to provide a consistent approach across the country in the way in which BMP-Es are developed, while being sufficiently flexible to accommodate the variability of ecosystems and their management requirements. These Norms and Standards provide guidance to the stakeholders desiring to contribute to biodiversity management through Biodiversity Management Plan for Ecosystem (BMP-E) on the set process for developing BMP-Es. It is, therefore, the intentions of these Norms and Standards to ensure that all the BMP-Es developed within the country are based on the best available science and that are understood and used by a wide range of people, organisations or organs of state desiring to contribute to biodiversity management.				
9. Draft Biodiversity Stewardship Guidelines	**Date**	**Lead developer**	**Partners**	**Linkages of the Guidelines to recommended accelerated measures**
	2019	SANBI, DFFE & BirdLife SA	Cape Nature; Wilderness Foundation, Conservation Outcomes & WWF-SA	*1.1.3. Strengthen capacity for Biodiversity Stewardship Programmes* • **Implement the Biodiversity Stewardship Guidelines (2019),** develop and mainstream a **Biodiversity Stewardship Implementation Framework** • Develop and implement a **sustainable finance mechanism for provincial biodiversity stewardship programmes**. *1.4.1. Strengthen the Land Reform Biodiversity Stewardship Initiative including approval of guidelines, strategies and implementation plans developed through the DFFE-DRDLR-SANBI alliance* • Finalise, formalise and implement the national strategy for the Land Reform and Biodiversity Stewardship Initiative (LRBSI)

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				• Resource and implement the Land Reform and Biodiversity Stewardship Initiative • Facilitate learning opportunities related to land reform and biodiversity stewardship with a focus on knowledge exchange and skills development for building a biodiversity economy
The revised guidelines provide a comprehensive approach to implementing biodiversity stewardship across the country. This guideline provides the community of practice with structured, best practice approach to the implementation of the stewardship approach. It includes the significant role of NGOs in implementing biodiversity stewardship, through their support to conservation agencies, private and communal land owners; a focus on land reform and biodiversity stewardship; as well as incentives and considerations to be taken into account when working with communal land owners. The intended audience for these Guidelines includes the biodiversity stewardship and protected area expansion staff; managers and planners in conservation agencies within national and provincial government, as well as in conservation NGOs; environmental assessment practitioners; municipal spatial planners and private sector property developers.				
10. Draft Guidelines for Integrating Biodiversity into Land Use (zoning) Schemes	**Date**	**Lead developer**	**Partners**	**Linkages of the Guidelines to recommended accelerated measures**
	2019	SANBI	DFFE, The Presidency, SANBI, provincial environment departments and conservation authorities, other relevant government departments and public entities, EA consultants	*3.2.6 Integrate biodiversity priority areas into spatial development frameworks, integrated development plans and land-use schemes* • **Support inclusion of biodiversity priority areas into planning instruments** developed in terms of the SPLUMA • Finalise and support implementation of the **standard requirements for biodiversity information as part of the environmental layer in SDFs** • **Integrate biodiversity priorities into land capability and agricultural zoning** through mainstreaming of systematic biodiversity plans • Develop **ecosystem guidelines** for environmental assessment and land-use planners and decision makers, and mainstream their use in integrated environmental

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				management and land-use planning *3.3.3. Identify areas of high sensitivity where certain types of development are prohibited* • **Use CBA Maps and accompanying land-use guidelines** to identify and inform decision-making about areas where development that results in loss of natural habitat should be avoided
The Guidelines aim to provide a step-by-step guide on how a municipality can incorporate biodiversity into their land use (zoning) scheme. These Guidelines will also provide details on how overlay zones can provide for the protection of priority biodiversity areas and provide some guidance on the types of restrictions the municipality can impose on that overlay zone. Once completed, the guidelines will ideally form an annexure to the National Land Use Scheme Guidelines which have been developed by the DRDLR.				
11. NFEPA Implementation Manual	**Date**	**Lead developer**	**Partners**	**Linkages of the Guidelines to recommended accelerated measures**
	2011	CSIR, SANBI, WRC, DWA, DFFE, WWF, SAIAB & SANParks	CSIR, SANBI, WRC, DWA, DFFE, WWF, SAIAB & SANParks	*2.1.1. Support the implementation of Chapter 5 (water resource protection) of the National Water resource strategy* • **Secure Strategic Water Source Areas** (SWSAs) through a range of mechanisms, including formal protection, land-use planning and environmental authorisations • Accelerate implementation **of intensive wetland rehabilitation programmes**, to protect priority wetlands and stimulate job creation *2.1.2. Develop a systematic approach including methods, techniques and expertise for mapping and prioritising ecological infrastructure* • **Continue to invest in improving the National Wetland Inventory** as part of the National Ecosystem Classification System

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				• Develop and apply **ecological infrastructure maps** (including a focus on inland aquatic and coastal EI), as part of provincial spatial biodiversity planning and the National Biodiversity Assessment *3.3.3. Identify areas of high sensitivity where certain types of development are prohibited* • Complete the process for **listing one or more of Strategic Water Source Areas** in terms of Section 24 (2)(a) of NEMA • **Capture ecological infrastructure features in provincial biodiversity plans/biodiversity sector plans/bioregional plans**
The purpose of this implementation manual is to provide guidance on how to use the FEPA maps in the water sector, the biodiversity sector and other key sectors whose planning and decision-making impacts on freshwater ecosystems. They indicate how many rivers and wetlands, and which ones, should remain in good condition (equivalent to an A or B ecological category as defined by DWA). It is aimed at those involved with, or contributing to, any planning or decision-making process that should take freshwater ecosystems into account. Intended users include water resource planners, land use planners, and those involved in conservation and rehabilitation.				
12. Minimum Environmental Requirements for Spatial Development Frameworks	**Date**	**Lead developer**	**Partners**	**Linkages of the Guidelines to recommended accelerated measures**
	2019	DFFE, SANBI & DRDLR	DFFE, SANBI & DRDLR	*3.2.6 Integrate biodiversity priority areas into spatial development frameworks, integrated development plans and land-use schemes* • **Support inclusion of biodiversity priority areas into planning instruments** developed in terms of the SPLUMA • Finalise and support implementation of the **standard requirements for biodiversity information as part of the environmental layer in SDFs** • **Integrate biodiversity priorities into land capability and agricultural**

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				zoning through mainstreaming of systematic biodiversity plans
The document aims to provide guidance on how municipalities can integrate environmental requirements, including biodiversity into the SDF's. In addition, the document provides the information portal where municipalities can get the information and provides a step-by-step guide on how they can incorporate this information into their SDF. If a municipality develops its SDF in line with this document and the Provincial Environmental Affairs Department signs off on the SDF, that SDF can be adopted as an environmental management instrument and be used to delist activities from the NEMA Listing Notices.				
13. Guidelines for the Monitoring, Control and Eradication Plans for Listed Invasive Species by Management Authorities of Protected Areas and Organs of State	**Date**	**Lead developer**	**Partners**	**Linkages of the Guidelines to recommended accelerated measures**
	2015	DFFE	DWS, SANPARKs, KZN Wildlife, Eastern Cape Parks Board, Cape Nature, SANBI, Provincial Departments, Municipalities, Isimangaliso, MTPA, North West Parks Tourism Board	*3.2.4 Develop and publish guidelines for invasive species monitoring, control and eradication plans* • Develop and implement **National Control Plans for listed species**, as per priorities determined by DWS • Develop **invasive species control plans for all national parks and buffer zones and prioritised provincial nature reserves** *2.1.3. Scale-up and improve integration efforts to restore degraded ecological infrastructure and maintain ecological infrastructure in good condition* • Develop and implement **strategic plans for maintenance and restoration of ecological infrastructure at a range of appropriate scales, including national, provincial and local** • **Integrate investment in ecological infrastructure into Catchment Management Strategies** • Establish a **National Alien and Invasive Species Co-ordination Forum**

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				• **Identify, develop and build further on large-scale, long-term monitoring datasets**
The Guidelines have been developed particularly to provide guidance on the development of the "Control Plans" for the management of the Alien and Invasive Species published in terms of section 70 (1) of the Biodiversity Act. These Guidelines include a generalised Table of Contents of a Control Plan, as a template which the Protected Area Management Authorities and other organs of state in all spheres of government, including all municipalities may adopt while developing the "Control Plan". Of importance is that these Guidelines have been kept as simple and straight-forward as possible with minimal use of specialized terminology and acronyms. They are relevant regardless of the type of statutory body that is responsible for the land parcel, the size of the land parcel, the ecosystems it includes, and the type of Listed Invasive Species that are to be managed in the land parcel. The Guidelines are intended to be used by any landowner or manager.				
14. National Guideline Towards the Establishment of Coastal Management Lines	**Date**	**Lead developer**	**Partners**	**Linkages of the Guidelines to recommended accelerated measures**
	2017	DFFE		*3.2.3 Integrate biodiversity priority areas into integrated coastal management plans and offshore plans* • Ensure that appropriate biodiversity information is included in **marine spatial plans** developed in terms of the marine spatial planning framework • Develop and apply **implementation plans and enforcement measures for the marine spatial planning framework** (as per Phakisa MPSG)
The purpose of this document is to provide guidance to Lead Agencies of Coastal Provinces on the establishment of Coastal Management Lines by the Members of Executive Council (MECs). These Guidelines are intended to serve as an advisory / guiding document for institutions involved in coastal management, when determining CMLs. The document unpacks Section 25 of the ICM Act; identifies additional legislation that needs to be considered; provides guidance on the process to follow for the establishment of CMLs; provides a broad overview of risk and its components; propose a potential process for the establishment of CMLs; identifies the broad research areas to be considered; provides additional considerations when delineating CMLs for estuaries; identifies relevant stakeholders; discuss available data that can be used in the process; and finally provides information regarding the inclusion of CMLs into planning tools. The Guidelines will be useful to the coastal managers, policy makers, planners, engineers, researchers, spatial information practitioners, developers and those involved in the decision -making process.				
15. Guidelines for the Development of Provincial,	**Date**	**Lead developer**	**Partners**	**Linkages of the Guidelines to recommended accelerated measures**

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Regional and Municipal Spatial Development Frameworks and Precinct Plans	2014	DRDLR		*3.2.6 Integrate biodiversity priority areas into spatial development frameworks, integrated development plans and land-use schemes* • **Support inclusion of biodiversity priority areas into planning instruments** developed in terms of the SPLUMA • Finalise and support implementation of the **standard requirements for biodiversity information as part of the environmental layer in SDFs** • **Integrate biodiversity priorities into land capability and agricultural zoning** through mainstreaming of systematic biodiversity plans • **Develop and implement relevant training programmes** to strengthen capacity in all relevant institutions for use of existing and new tools to integrate biodiversity into planning and decision making in multiple sectors
These Guidelines are intended to establish and clearly communicate the expectations of the SDF's role, resources, content, and use as per the requirements set out in the SPLUMA. The Guidelines serve to clarify the roles and responsibilities of government spheres in preparing SDFs at provincial, regional, municipal and local scales. These SFD Guidelines provide a framework for evaluating the effectiveness of SDFs as a spatial transformation instrument. The SDF guidelines are intended for the use by national, provincial and municipal officials responsible for the development of SDFs; public sector officials whose work has a spatial dimension; political office bearers responsible for the preparation, approval and implementation of SDFs; and community and business stakeholders who have an interest in or are affected by SDFs, such as civic associations and the property development industry.				
16. Draft Species Protocol Best Practice Guidelines	**Date**	**Lead developer**	**Partners**	**Linkages of the Guidelines to recommended accelerated measures**
	2019	DFFE	SANBI & Provincial departments of environmental affairs	*3.2.1 Integrate biodiversity into tools being implemented to support environmental decision-making for SIPs* • Ensure that appropriate biodiversity information is included in **Strategic Environmental Assessments for SIPs**

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Printed by and obtainable from the Government Printer, Bosman Street, Private Bag X85, Pretoria, 0001
Contact Centre Tel: 012-748 6200. eMail: info.egazette@gpw.gov.za
Publications: Tel: (012) 748 6053, 748 6061, 748 6065

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Government Gazette
Staatskoerant

REPUBLIC OF SOUTH AFRICA
REPUBLIEK VAN SUID AFRIKA

Vol. 686 26 August Augustus 2022 No. 46798

PART 2 OF 4

N.B. The Government Printing Works will not be held responsible for the quality of "Hard Copies" or "Electronic Files" submitted for publication purposes

ISSN 1682-5845

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AIDS HELPLINE: 0800-0123-22 Prevention is the cure

				• Ensure application of the **new EIA screening tool** by EAPS *3.3.3. Identify areas of high sensitivity where certain types of development are prohibited* • **Use CBA Maps and accompanying land-use guidelines** to identify and inform decision-making about areas where development that results in loss of natural habitat should be avoided
The DFFE has developed a web-based EIA Screening Tool to enable pre-screening of environmental sensitivities across the landscape before the applicant submits an EIA application. Protocols (inclusive of the Terrestrial Ecosystems, Aquatic Ecosystems, Plant and Animal Protocols) are associated with the sensitivity rating of the environmental features identified on the proposed site. Protocols provide a consistent framework for approaching specialist assessments in the EIA process by setting out minimum information requirements and on -site assessments required for the environmental assessment process. The purpose of the Species Protocol Best Practice Guidelines is to give comprehensive background to the framework provided in the protocol to guide specialist assessments in EIAs.				
17. Draft Terrestrial and Aquatic Ecosystems Protocol Best Practice Guidelines	**Date**	**Lead developer**	**Partners**	**Linkages of the Guidelines to recommended accelerated measures**
	2019	DFFE	SANBI and Provincial departments of environmental affairs	*3.2.1 Integrate biodiversity into tools being implemented to support environmental decision-making for SIPs* • Ensure that appropriate biodiversity information is included in **Strategic Environmental Assessments for SIPs** • Ensure application of the **new EIA screening tool** by EAPS *3.2.6 Integrate biodiversity priority areas into spatial development frameworks, integrated development plans and land-use schemes* • Develop **ecosystem guidelines** for environmental assessment and land-use planners and decision makers, and mainstream their use in integrated environmental

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				management and land-use planning • **Develop and implement relevant training programmes** to strengthen capacity in all relevant institutions for use of existing and new tools to integrate biodiversity into planning and decision making in multiple sectors *3.3.3. Identify areas of high sensitivity where certain types of development are prohibited* • **Use CBA Maps and accompanying land-use guidelines** to identify and inform decision-making about areas where development that results in loss of natural habitat should be avoided
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18. Mainstreaming Biodiversity: Key Principles from the Grassland Programme	**Date**	**Lead developer**	**Partners**	**Linkages of the Guidelines to recommended accelerated measures**
	2013	SANBI	SANBI, GEF and UNDP	*3.2.6 Integrate biodiversity priority areas into spatial development frameworks, integrated development plans and land-use schemes* • **Support inclusion of biodiversity priority areas into planning instruments** developed in terms of the SPLUMA) • Finalise and support implementation of the **standard requirements for biodiversity information as part of the environmental layer in SDFs**

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				• **Integrate biodiversity priorities into land capability and agricultural zoning** through mainstreaming of systematic biodiversity plans • Develop **ecosystem guidelines** for environmental assessment and land-use planners and decision makers, and mainstream their use in integrated environmental management and land-use planning • **Develop and implement relevant training programmes** to strengthen capacity in all relevant institutions for use of existing and new tools to integrate biodiversity into planning and decision making in multiple sectors *4.1.1. & 4.12. Develop, fund a co-ordinated national biodiversity communications, education and awareness strategy, implementation plan and monitoring framework* • Develop, resource and implement a **co-ordinated national biodiversity communications, education and awareness strategy, implementation plan and monitoring framework** to co-ordinate communication work in the sector, building on the work done in the "Making the Case" project previously undertaken by DFFE and SANBI
The document provides summary of the successes and lessons learned from implementing the Grasslands Biome Programme, an $8.3 million GEF investment. The focus of the Grasslands Programme has been chiefly on mainstreaming biodiversity in key production sectors, including mining, forestry and urban development, to reduce their footprint and prevent further loss of biodiversity priority areas in the grassland biome. Some of the successes highlighted in the document include notable achievements made in securing areas important for biodiversity conservation, influencing policies and regulations, strengthening institutional capacity, and catalysing pilot projects that demonstrate biodiversity gains across sectors. The constraints and				

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opportunities for mainstreaming biodiversity into the production sectors are also explained in the document. Most importantly, the document identifies and summarises six key ingredients that emerged as common when biodiversity was successfully mainstreamed into production sectors.				
19. Fynbos Forum Ecosystem Guidelines for Environmental Assessment in the Western Cape	**Date**	**Lead developer**	**Partners**	**Linkages of the Guidelines to recommended accelerated measures**
	2005	*SANBI*	Fynbos Forum	*3.2.6 Integrate biodiversity priority areas into spatial development frameworks, integrated development plans and land-use schemes* • Develop **ecosystem guidelines** for environmental assessment and land-use planners and decision makers, and mainstream their use in integrated environmental management and land-use planning
These ecosystem-specific guidelines have been prepared to assist all stakeholders in the Western Cape who are involved in land-use planning and environmental assessment to take biodiversity concerns into consideration. The Guidelines aim to answer key questions about biodiversity that should be asked by a planner, environmental assessment practitioner and/or landowner embarking on a plan, project or activity, whether urban, industrial, agricultural or recreational.				
20. Grassland Ecosystem Guidelines	**Date**	**Lead developer**	**Partners**	**Linkages of the Guidelines to recommended accelerated measures**
	2013	SANBI	WWF	*3.2.6. Integrate biodiversity priority areas into spatial development frameworks, integrated development plans and land-use schemes* • **Integrate biodiversity priorities into land capability and agricultural zoning** through mainstreaming of systematic biodiversity plans • Develop **ecosystem guidelines** for environmental assessment and land-use planners and decision makers, and mainstream their use in integrated environmental management and land-use planning

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				3.3.3. Identify areas of high sensitivity where certain types of development are prohibited • **Use CBA Maps and accompanying land-use guidelines** to identify and inform decision-making about areas where development that results in loss of natural habitat should be avoided • **Develop and implement relevant training programmes** to strengthen capacity in all relevant institutions for use of existing and new tools to integrate biodiversity into planning and decision making in multiple sectors
The Grassland Ecosystem Guidelines are a practical guide that provides a consistent benchmark and framework for addressing the biodiversity-related aspects of land-use planning, landscape management and environmental regulation in South Africa's grasslands. They address key questions about grassland biodiversity that should be asked when planning or embarking on an activity in grassland. These Guidelines are designed for use by a wide range of individuals and institutions whose activities take place in, or impact upon, grasslands including decision-makers in national, provincial or local government and other regulators of land-use; spatial planners; environmental assessment practitioners; property developers; all industry or sector role-players; and agriculture and conservation extension officers, and other specialist advisors.				
21. Draft Ecosystem Guidelines for the THICKET Biome	**Date**	**Lead developer**	**Partners**	**Linkages of the Guidelines to recommended accelerated measures**
	2019	SANBI	DFFE	*3.2.6 Integrate biodiversity priority areas into spatial development frameworks, integrated development plans and land-use schemes* • Develop **ecosystem guidelines** for environmental assessment and land-use planners and decision makers, and mainstream their use in integrated environmental management and land-use planning • **Develop and implement relevant training programmes** to strengthen capacity in all relevant

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				institutions for use of existing and new tools to integrate biodiversity into planning and decision making in multiple sectors *3.3.3. Identify areas of high sensitivity where certain types of development are prohibited* • **Use CBA Maps and accompanying land-use guidelines** to identify and inform decision-making about areas where development that results in loss of natural habitat should be avoided
Ecosystem Guidelines provide practical guidance and a consistent framework for addressing the biodiversity-related aspects of land-use planning, landscape management and environmental regulation. They enable users to contextualize and interpret spatial biodiversity priorities, understand the key drivers of ecosystem functioning, understand what the acceptable limits of change are in particular ecosystems or landscapes, and interpret how those need to be managed and monitored to ensure that biodiversity and ecosystem processes are adequately safeguarded. To date the Ecosystem Guidelines have been developed for Fynbos and for the Grassland Biome, and new guidelines are planned for the Thicket Biomes.				
22. Draft Ecosystem Guidelines for the Savanna Biomes	**Date**	**Lead developer**	**Partners**	**Linkages of the Guidelines to recommended accelerated measures**
	2019	SANBI	DFFE	*3.2.6 Integrate biodiversity priority areas into spatial development frameworks, integrated development plans and land-use schemes* • Develop **ecosystem guidelines** for environmental assessment and land-use planners and decision makers, and mainstream their use in integrated environmental management and land-use planning • **Develop and implement relevant training programmes** to strengthen capacity in all relevant institutions for use of existing and new tools to integrate biodiversity into planning and decision making in multiple sectors

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Section 4: Mechanisms for Co-ordination, Cooperation and Implementation

The importance of working through strong, collaborative partnerships is a key principle underlying this NBF. Cross-institutional partnerships create a sense of common purpose, facilitate alignment and more strategic allocation of limited resources, and build cohesion at a larger scale. They also make it possible to leverage greater implementation capacity than is possible when institutions act in isolation.

4.1. National mechanisms for coordination in the sector

National mechanisms for co-ordinating the work of the biodiversity sector include government-led committees, working groups and task teams that facilitate strategy and policy coherence, and co-operation between key institutions responsible for biodiversity management and conservation. The work of these structures is complemented by numerous other structures and task teams that operate provincially, locally, or internally within specific institutions or multi-stakeholder programmes, to co-ordinate implementation and operational workplans. Some of the key **national-level structures** relevant to co-ordination of the work of the biodiversity sector are included in ***Table 7,*** below.

Key amongst these, in the context of the NBF, is **MinMEC**, **MinTech Working Group 1 (Biodiversity and Conservation)**, whose remit includes expansion of the conservation estate, mitigation of threats to biodiversity and ecosystems, ecosystem services, biodiversity legislation and regulation, and sustainable use of ecosystems. However, given the broad scope of the NBSAP, and the other strategies and frameworks that are in effect in the biodiversity sector, the deliberations of other working groups also have relevance, in particular WG 3 (Planning and Coordination), WG 4 (Compliance and Enforcement), WG 5 (Environmental Impact Management and Water Affairs), WG 6 (Environmental

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Jobs), WG 7 (Education, Development and Information Management), WG 8 (Oceans and Coasts), and WG 10 (Climate Change).

Table 7: Key national coordination mechanisms operating in the biodiversity sector

Committee/Task Team	Role, participants, frequency of meetings
Minister and Members of Executive Councils (MinMEC) Committee	Committees to promote co-operative governance between national ministers and their counterparts (MECs) at provincial level. The Environmental MinMEC comprises the Minister of Environmental Affairs, the Director-General of DFFE, and the provincial MECs for Environmental Affairs. MinMEC committees meet quarterly.
Ministerial Technical Committee (MinTech)	Forums to facilitate coordination, policy and strategy coherence between national and provincial departments. The environmental MinTech comprises the DG of DFFE, representatives of public entities including SANBI and SANParks, and heads of provincial departments responsible for environmental management and biodiversity conservation. MinTech committees meet quarterly.
MinTech Working Groups	These working groups bring together senior officials in national and provincial government at quarterly meetings to discuss and advise on technical issues relating to Biodiversity and Conservation (WG1), Air Quality (WG2), Planning and Coordination (WG3), Compliance and Enforcement (WG4),Environmental Impact Management and Water (WG5), Environmental Sector Jobs (WG6), Education, Development and Information Management (WG7), Oceans and Coasts (WG 8), Waste and Chemical Management (WG 9), Climate Change (10), Environmental Policy and Law Reform (WG11), Communications (WG12). Ad hoc task teams are convened under these working groups to DFFE with specific issues, according to need.
Protected Area CEO's Forum	Convened by DFFE, with the DDG: Biodiversity and Conservation as chairperson, this Forum promotes co-operative governance between national and provincial government departments and agencies in relation to protected area management. It serves as an advisory body to Environment MINTECH and MINMEC. The broad remit of the Forum is to co-ordinate the development of protected areas in ways that promote synergies on operational and strategic issues, support effective protected area management, build capacity and promote transformation in the sector. The Forum is responsible for coordinating the implementation of protected area expansion strategies, implementing strategic decisions of relevant international and regional bodies and programmes, setting up monitoring programmes, and for sharing information, ideas and experiences on issues of common interest to protected area management authorities. Membership of the Forum includes the Chief Executive Officers (CEOs) and nominated representatives from Protected Area Management Authorities, and nominated delegates from DFFE, SANBI and provincial departments. The Forum may appoint sub-committees and task teams to address specific issues and may engage technical experts as needed. The Forum convenes twice yearly.

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Committee/Task Team	Role, participants, frequency of meetings
Protected Areas Technical Task Team (PATTT)	This Task Team serves to ensure cooperation and implementation of MinMEC recommendations relating to legal and spatial issues affecting protected areas in the country (for example determination of protected area boundaries), and to ensure effective alignment of activities of all protected area management authorities in terms of the Protected Areas Act. Some of its specific functions are to: provide technical inputs to the development of relevant norms and standards and regulations, review the NPAES and the development and implementation of provincial counterparts, coordinate annual reporting to MinTech WG1 under Outcome 10, and share databases and information. The Task Team is convened at least twice a year by DFFE, and participants include SANParks, Isimangaliso Wetland Park Authority and representatives of provincial conservation authorities and Provincial government responsible for environmental affairs issues.
Biodiversity Stewardship Technical Working Group (BDS TWG)	This working group, which is convened twice a year by SANBI, addresses technical, legal, policy and operational challenges faced by biodiversity stewardship programmes that are operating in the provinces. The working group refers relevant issues to the Protected Areas Task Team for further consideration and action. Membership of the working group includes SANBI, DFFE, SANParks, provincial conservation authorities, relevant NGOs.
People and Parks Steering Committee	The People and Parks Steering Committee, which is convened by DFFE at least once a year, oversees the operations of the People and Parks Programme. It deals with issues relating to the settlement of land claims in protected areas; strengthening governance, participation, access and benefit sharing; and the development and implementation of an awareness-raising and capacity building strategy. Membership includes government and community representatives. A number of Regional Committees and Park Forums (convened by SANParks) meet quarterly, or at intervals specific to particular Parks, to engage communities and address issues that have bearing on the collective good of the Park and its adjacent communities
The South African Biosphere Reserve Committee	Chaired by the DDG: Biodiversity and Conservation within DFFE, this Committee operates in accordance with an approved terms of reference to oversee implementation of the Man and Biosphere Programme in South Africa. It oversees the implementation of the MAB Strategy and Implementation Plan, reviews effectiveness, and deals with strategic issues. It also promotes cooperation, coordination and communication between biosphere reserves. Meetings take place twice a year. Membership includes representatives from DFFE, biosphere management agencies and provincial forums, provincial conservation authorities, SALGA, CoGTA and a representative from the SA national commission to UNESCO. Operating in association with the Committee is a small Management Committee (to implement resolutions) and provincial MAB Forums, which are platforms for cooperation, networking, information exchange and lesson-sharing relevant to specific Biosphere Reserves.

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Committee/Task Team	Role, participants, frequency of meetings
Interdepartmental Committee on Inland Water Ecosystems	This committee was formed in 2011 to share and effectively influence joint water resource management issues and decisions regarding inland water ecosystems, in a proactive manner. It is convened by DHSWS, with membership drawn from: DHSWS, DFFE, SANBI, SANParks, WRC and CMAs. It meets twice a year.
The Scientific Authority	The Scientific Authority has been established under section 60 of the Biodiversity Act, to assist with regulating and restricting trade in TOPS- and CITES-listed species. It is administered by SANBI. Membership includes representatives from DFFE, SANBI, provincial conservation authorities, SANParks and national zoological gardens. Meetings are held twice a year, with special meetings convened according to need. The Authority is active in all provinces, and participates in relevant international meetings (e.g. CITES). Its main functions are to monitor the legal and illegal trade in listed species; make recommendations to issuing authorities on applications for permits to undertake restricted activities with TOPS species; make and publish non-detriment findings on the impact of trade on the survival of species in the wild; assist with identifying species in trade and issue certificates in which the identification of a specimen is verified as being taxonomically accurate.
National Ecosystem Classification Committee	The National Ecosystems Classification Committee, which is chaired by SANBI, is a technical working committee that oversees the ongoing development of the National Ecosystem Classification System. It has subcommittees that deal with specific realms, including freshwater, estuarine, coastal and marine ecosystems. The work of these committees is to identify, map and describe a standardised set of ecosystem types that will serve as consistent units of reference in a wide range of assessment, planning, policy, decision-making and management processes in the biodiversity sector. Participants include relevant experts from SANBI, DFFE, DHSWS, DALRRD, SANParks, PCAs, CSIR, SAEON, WRC, SAIAB and universities.

4.2 National communities of practice for knowledge sharing

Communities of practice are vital mechanism for co-ordinating, enriching and advancing the work of the sector and ensuring a consistent approach in the operating environment. As such, they are directly relevant to supporting the purpose of the NBF. There are numerous communities of practice operating at different scales in the country; those included in ***Table 7***, below, are the key *national forums* of relevance under the six strategic objectives of the NBSAP.

Table 8: Communities of Practice that operate nationally to facilitate cooperation, lesson-sharing and knowledge exchange in the biodiversity sector

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Name of CoP	Convenor(s)	Participants	Frequency of meetings
People and Parks Forum	SANParks/DFFE	SANParks, local communities, private sector role-players, provincial conservation authorities, local businesses and other stakeholders living adjacent to national parks	Every two years
Core business: The People and Parks Forum brings together all relevant role-players at a conference every two years to share experiences and best practices, exchange information, identify issues of common concern and propose solutions with regard to implementation of the People and Parks Programme. Issues of key concern include co-management arrangements and other aspects of landscape management, settlement of land claims, access and benefit-sharing, developing opportunities for strengthening the rural economy, youth conservation and the Kids in parks project, and other issues of mutual interest and concern. Aligned with NBSAP SO 1, Outcome 1.1, 1.3 and 1.4			
Marine Protected Areas Forum	DFFE; Oceans and Coasts	Government, MPA Management Agencies (SANParks, provincial conservation agencies, metros), Research Organizations (SAIAB, SAEON, ORI) and Academia, NGO's (WWF), Coastal Communities	Annual Forum, and training events
Core business: To foster collaboration and information sharing between MPA stakeholders in Southern Africa to enable implementation of an integrated, multi-stakeholder approach to MPA Governance in Southern Africa, and improve MPA management effectiveness and capacity development. The mission of the South African MPA Forum is to work with all the role players in the SA MPA sector to maintain and improve communication, management and training of staff in all our MPAs. The Forum, which is managed by a Secretariat which identifies priority projects that require implementation by the full-time MPA Coordinator. Aligned with NBSAP SO 1, Outcome 1.1			
The Wildlife Forum	DFFE	DFFE, DAFF, provincial conservation and environmental authorities, SAPS, representatives of the organized and wildlife hunting industry	Quarterly
Core business: The Wildlife Forum's purpose it to promote conservation through sustainable use of renewable wildlife resources; contribute to building a responsible, self-regulatory wildlife and hunting sector; promote sustainable growth in wildlife-related tourism, with equitable benefit sharing; and create enabling conditions for transformation of the sector. The Forum makes inputs to relevant law-making processes, alerts government to issues on which collaboration or improvement is required and facilitates collaboration and cooperation within the industry. The Forum appoints standing or *ad hoc* sub-committees or technical teams to DFFE with specific issues according to need. Aligned with NBSAP SO 1, Outcome 1.3 and 1.4			

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Name of CoP	Convenor(s)	Participants	Frequency of meetings
BioPANZA (Bioproducts Advancement Network)	DFFE, and co-chaired by DHEST and DTIC	Government and industry role-players	Twice per year
BioPANZA has been established as a mechanism to promote applied research, local processing, innovation and product development in the bioprospecting/biotrade sector. The network brings together relevant government and industry role-players in partnerships to harness existing initiatives, address the innovation chasm and ensure access to bioproducts resources and equitable benefit-sharing. BioPANZA will work closely with the Bioprospecting Forum. Aligned with NBSAP SO1, Outcomes 1.3 and 1.4			
Bioprospecting Forum	DFFE	Industry, traditional knowledge holders, academia, NGOs and relevant government institutions	Twice per year
Core business: The Bioprospecting Forum (the formation of which was identified as a priority in the National Biodiversity Economy Strategy), is a platform that promotes coordination and facilitates formal communication and information exchange between sector role-players on matters and challenges facing the bioprospecting/ biotrade industry. Forum membership is by invitation from the Secretariat (DFFE), but other individuals/institutions may be invited to make presentations at Forum meetings, upon request from the members. The Forum has two objectives: (i) implementation of the bioprospecting/biotrade aspects of the National Biodiversity Economy Strategy; and (ii) the implementation of the Biodiversity Economy Indaba Action Plan (this is an Action Plan arising from the Biodiversity Economy Indaba, which is convened annually). A number of Working Groups also operate under the aegis of the Forum, to tackle specific issues and propose possible solutions, in relation to Discovery, Bioprospecting Best Practices in the Natural Products Sector; Permitting; and Traditional Knowledge and Benefit-Sharing. Working Groups are convened on a needs-driven basis, and participation is open to all relevant, interested parties. Aligned with NSAP SO 1, Outcomes 1.3 and 1.4			
The Adaptation Network	Environmental Monitoring Group	Government, public and private entities, civil society groups, academics, businesses	variable
Core business: Founded in 2009, the Adaptation Network is a creative platform for sharing experiences, learning opportunities and practical approaches and frameworks relating to climate change adaptation. Its operation is governed by a Steering Committee which is elected at annual general meetings. Aligned with NBSAP SO 2, Outcome 2.2			
Freshwater Ecosystem Network	SANBI	Representatives from government, national and provincial agencies, NGOs and the private sector.	Annual

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Name of CoP	Convenor(s)	Participants	Frequency of meetings
Core business: The Freshwater Ecosystem Network (FEN) was established in 2013 and is a community of practice related to freshwater ecosystems. The idea for the network emerged from a consultation process involving key role-players in the freshwater ecosystem sector. The forum serves to stimulate and support collaborative efforts and networks and is a platform for joint learning, coordination and networking around freshwater ecosystems. Aligned with NBSAP SOs 2 and 3			
The National Biodiversity and Business Network (NBBN)	EWT (in partnership with DFFE)	Founding partners, supporting partners and members draw from the business community and NGO networks	Annual Biodiversity and Business Indaba, and other meetings as relevant
Core business: The aim of the Network is to assist businesses from various sectors to integrate and mainstream biodiversity issues into their strategies and operations. It is designed to be an open and inclusive association of likeminded organisations that have recognised the need to raise awareness of, and stimulate conversation about, biodiversity issues amongst the business community. The primary role of the Network is to bring national stakeholders in business and biodiversity together to share ideas and engage in dialogue, with the following objectives: provide a national platform to facilitate strategic discussions about biodiversity and business; create national momentum about mainstreaming biodiversity considerations into businesses; facilitate the development of a national agenda in terms of biodiversity and business; facilitate cohesion and integration in the discussion and agenda about biodiversity and business; and, facilitate focused, pragmatic and useful interventions to support businesses in the mainstreaming process. The EWT is spearheading the activities of the NBBN in alignment with the model of the Global Partnership for Business and Biodiversity of the Convention on Biological Diversity and in collaboration with the founding and supporting partners, as well as the other members of the Network. Aligned with NBSAP SOs 1 (especially Outcome 1.3), 2 and 3			
Biodiversity Planning Forum	SANBI	Biodiversity planners in government, NGOs and private sector; scientists; land-use managers and conservationists; students	Annual conference
***Core business**:* The Biodiversity Planning Forum was established in 2004. It provides an opportunity for individuals, agencies and departments involved in spatial biodiversity planning to share and synthesise valuable lessons from biodiversity planning projects across South Africa. The Forum is intended primarily for those involved in producing or using biodiversity planning products. Although the core focus of the Forum is on systematic biodiversity planning a key theme is planning for implementation. The Forum attracts practitioners, scientists and managers from a range of institutions and organisations including national, provincial and local government, conservation NGOs, universities and research institutes and independent biodiversity planning consultants. The Forum encourages students and interns to attend and offers funding, when possible, to support student involvement. Each year the Forum identifies key issues that are presented, discussed and debated in plenary and parallel sessions.			

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Name of CoP	Convenor(s)	Participants	Frequency of meetings
Aligned with NBSAP SOs 1,2,3 and 6			
Provincial and Metro Biodiversity Planning Working Group	SANBI	Biodiversity planners from government departments, provincial environment departments and conservation authorities, local governments, private consultancies and NGOs, individual experts	Workshop approximately annually, more frequently if required.
Core business: The Working Group convenes approximately annually to discuss and resolve technical and process issues related to biodiversity planning and to ensure sufficient consistency across provinces and metros to maintain the usefulness and integrity of biodiversity plans. Its work draws from and feeds into the Biodiversity Planning Forum. Aligned with NBSAP SOs 3 and 6			
SA Mining and Biodiversity Forum	Minerals Council South Africa	Mining industry role-players, conservationists, government departments	¾ times per year
Core business: The Mining and Biodiversity Forum was established in 2005 to enhance biodiversity management in the mining industry. The Forum brings together all key role-players with the aim of facilitating cross-sectoral interaction and cooperation to improve biodiversity management and conservation, management and performance of the mining sector. The Forum was a key partner in the development of the Mining and Biodiversity Guidelines published in 2015. Aligned to NBSAP SO 3, especially Outcome 3.5			
National Environmental Skills Planning Forum (NESPF)	DFFE	Relevant government departments and other public entities, NGOs, institutes and universities	Quarterly
Core business: The Forum brings together role-players that are actively engaged in catalysing and supporting nationally relevant skills development planning interventions. The Forum has 3 goals, which are to: raise and deliberate on matters that need to be addressed at national level; initiate action to ensure that resources are allocated to address these issues; and respond to the absence of a dedicated SETA and skills-focussed professional boy in the environmental sector and advise on implementation of the Environmental Sector Skills Plan. Aligned with NBSAP SO 5 (cross- cutting)			
National Biodiversity Evidence and Research Indaba	DFFE	Government departments (national, provincial, local), SANBI, CSIR, NRF, universities and research institutions, NGOs, business partners	Annual

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Name of CoP	Convenor(s)	Participants	Frequency of meetings
The Indaba provides an annual opportunity to report on progress and share knowledge and experiences related to research and evidence needs and priorities identified in the National Biodiversity Research and Evidence Strategy. Aligned with NBSAP SO 6			
Biodiversity Information Management Forum	SANBI	Biodiversity information managers form local, provincial and national government departments, universities, research institutions, museums, conservation bodies and NGOs	Annual
Core business: The Biodiversity Information Management Forum (BIMF) is the only national platform dedicated to discussing biodiversity information management issues. The BIMF brings together key role-players in biodiversity information management to ensure initiatives are aligned, co-ordinated and relevant in a rapidly changing world. The BIMF offers opportunities for strategic thinking, innovation, knowledge sharing, training and networking. It is primarily aimed at people who are involved in mobilising, managing, serving and using biodiversity information. While the primary focus is on South African issues, the forum has been enriched by delegations from African and other countries that have shared their knowledge and expertise and brought an international perspective. Aligned with NBSAP SO 6			
Management, Research and Planning Forum (MAREP)	SANBI	Researchers, planners, managers and practitioners involved in natural resource management	Several times a year
Core business: The MAREP brings together researchers, managers and other practitioners involved in natural resource management, including in DFFE's Environmental Programmes. MAREP meetings are held at both national and regional levels, and DFFE with a range of strategic thematic areas relevant to natural resource management, providing a platform for strengthening the links between research and practice. Aligned with NBSAP SO 2			
Biodiversity Economy Indaba	DFFE	Government departments (national, provincial, local), Funders, Universities and research institutions, NGOs, business partners, civil society.	Bi-annual
Core business: Biodiversity Economy Indaba is a biennial platform that aims at bringing together various stakeholders from bioprospecting and wildlife sectors to discuss challenges facing these sectors and trying to find solutions. Aligned with NBSAP SO 1			
National Natural Capital Accounting Forum	SANBI and Stats SA	DFFE, DPME, DRDLR, DWS, and National Treasury, SANBI, Stats SA and NGOs.	Annual

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Name of CoP	Convenor(s)	Participants	Frequency of meetings
Core business: It aims to explore how natural capital accounting can support South Africa's progress towards a green economy, including its linkages to South Africa's National Development Plan (NDP) and the global Sustainable Development Goals (SDGs). The National Forum is an important step for natural capital accounting in South Africa and a model for creating a productive dialogue on this important topic. Aligned with NBSAP SO 3			
National Indaba on Ecological Infrastructure	SANBI and Water Research Commission	Government departments (national, provincial, local), SANBI, WRC, DBSA, CSIR, Universities and research institutions, NGOs, business partners, civil society.	Annual
Core business: The event is a platform for showcasing the alignment of the concept and practice of investing in ecological infrastructure for water security across sectors. It has had a strong focus on ecological infrastructure for water security to date, but could be expanded to include a broader focus, for example on ecological infrastructure for food security, in future. Aligned with NBSAP SO 2			

Strengthening and expanding communities of practice

Strengthening opportunities for lesson-sharing and knowledge exchange is identified as a priority activity in most of the strategies reviewed in the NBF. Some areas of work currently do not have established communities of practice at national scale, and these should be prioritised. Amongst these is biodiversity stewardship (see below). It is further recommended that priority be given to identifying and addressing other gaps in the community-of-practice network, with special attention to ensuring greater social inclusiveness.

Building a national community of practice for Biodiversity Stewardship

Biodiversity stewardship has become firmly established as a cost-effective and socially-inclusive way of bringing land of high biodiversity value under protection or improved biodiversity management, with benefits for stimulating rural economies (SANBI, 2017b). The NPAES 2018 reveals that biodiversity stewardship agreements account for 67 percent of the land that has been added to the protected area estate over the last 10 years, and that biodiversity stewardship is likely to be the dominant mechanism for achieving further expansion and consolidation of protected areas into the future.

It is a direct recommendation of the Business Case for Biodiversity Stewardship (SANBI, 2017b) that the community of practice for biodiversity stewardship should be strengthened and expanded. Currently, the National Biodiversity Stewardship Technical Working Group plays a role in creating a community of practice to support sharing of experience and lessons, and biodiversity stewardship working groups operate in some provinces, such as the Western Cape and KwaZulu-Natal. Two successful national biodiversity stewardship conferences were convened by SANBI and partners in 2017 and 2018 as well as a National Land Reform and Biodiversity Stewardship learning exchange in 2020. Great strides have been made to establish a national community of practice.

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However, more work is needed to formalise, national-level community of practice for biodiversity stewardship to promote co-learning, and sharing of legal, training and knowledge resources.

Following the recommendations made in the Business Case, it is ***recommended*** that priority should be given to supporting the further development of a fully-fledged national community of practice for biodiversity stewardship that meets annually (in a manner similar to the Biodiversity Planning Forum).

4.3 Mechanisms for co-ordination at sub-national level

There are many forums, communities of practice and other partnerships and networks operating at sub-national level in the biodiversity sector. The NBF identifies two main areas of opportunity for enhancing co-ordination at regional and sub-regional scale, to achieve greater site-level impact. These are: linking the NBSAP to action plans at provincial and local level; and strengthening multi-stakeholder partnerships.

4.3.1 Linking the NBSAP to action plans at provincial and local level

Provinces and municipalities may choose to develop Biodiversity Strategy and Action Plans (PBSAPs and LBSAPs). The NBSAP and its sub-national counterparts should be well-aligned and mutually strengthening. Provincial and local biodiversity strategies and action plans (PBSAPs and LBSAPs) provide an opportunity to select from and adapt national-level objectives, outcomes and priorities to the provincial or local context, to achieve impact on the ground. In the South African context, it is also important that PBSAPs and LBSAPs be informed by and well-aligned with the other national strategies and frameworks that guide work in the sector.

The information presented in the NBF contributes to achieving this alignment. Furthermore, the NBF recommends a nominal list of acceleration measures that can be used as a starting point to inform the identification of priorities and targets at provincial and local level. Indicators identified in the National Biodiversity Monitoring Framework may also be useful informants of PBSAPs and LBSAPs.

4.3.2. Strengthening multi-stakeholder partnerships

Over the past decade, the biodiversity sector has demonstrated the effectiveness of working through multi-stakeholder (and often cross-sectoral) partnerships that operate at different scales to address biodiversity conservation and social development challenges in an integrated way. These partnerships are a powerful mechanism for co-ordination of the work of the biodiversity sector at sub-national level, across government, private sector and NGO lines and provide excellent opportunities for addressing multiple NBSAP priorities simultaneously. Multi-stakeholder partnership programmes can be determined spatially (landscape-scale initiatives) or thematically (large-scale projects dealing with particular aspects of biodiversity conservation or management), or a combination of these criteria.

Landscape initiatives

Multi-partner, landscape-level initiatives operate in biodiversity priority areas that include a mosaic of land uses and include interventions that operate at a variety of spatial scales. They provide opportunities for broadening stakeholder participation to be more socially inclusive, and to cross sectoral boundaries. They also enable local partnerships and communities of practice to emerge and

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flourish, and many examples of these exist. Landscape initiatives include corridor programmes (such as the Barberton Tourism and Biodiversity Corridor, BATOBIC), Biosphere Reserves, Marine Hope Spots, and others such as the Umngeni Ecological Infrastructure Partnership and a large number of other projects, many led from within the NGO sector.

Biosphere Reserves are model landscapes for testing the landscape approach to biodiversity conservation and management and achieving multiple outcomes of the NBSAP and related strategies (such as the People and Parks Strategy of SANParks). They provide practical mechanisms for integrating protected areas into broader landscapes, reconciling the potentially conflicting interests of diverse stakeholders, and testing and demonstrating diverse approaches such as strengthening biodiversity stewardship, supporting development of Biodiversity Economy Nodes, raising community awareness, and involving people in improved landscape management, with equitable sharing of benefits. Biosphere Reserves hold great potential for leveraging additional capacity for implementation as they operate through collaborative partnerships, often involving a large cohort of volunteers drawn from business, citizen science groups, and the public at large. They hold the additional benefit of being linked to a well-established international programme with clear governance and reporting mechanisms and have access to a large pool of expertise and best practices that can be adapted for the local context. Although funding is a challenge for local biosphere reserves, being part of the UNESCO MAB programme does facilitate access to a diversity of potential funding avenues, which otherwise would not be available.

It is recommended that support to Biosphere Reserves can be enhanced by:

(i) Conducting a thematic learning review of the benefits of biosphere reserves and capturing these in appropriate knowledge products to raise the profile of biosphere reserves within government, and the public.

(ii) Providing support to facilitate more opportunities for lesson-sharing and information exchange between biosphere reserves (involving stakeholders on the ground, as opposed to high-level interactions), including, but not limited to, the possibility of establishing a local chapter of the MAB Youth Forum.

UNDP-supported, GEF-financed and Green Climate Fund supported multi-partner projects

The implementation of a number of GCF supported, GEF-financed, and UNDP supported projects is currently underway in South Africa. These include projects dealing with Biodiversity and Land Use (aligned with NBSAP SO 3), Protected Area Management Effectiveness (NBSAP SO 1), Nagoya Protocol Access & Benefit Sharing (NBSAP SO1) , Sustainable Land Management (NBSAP SO2), the Orange River Senqu Basin (regional, with a South African Secretariat; NBSAP SO2), Operation Phakisa marine governance and protection projects (NBSAP SO 1), Biodiversity and Illegal Wildlife Trade (NBSAP SO 1 & 3), Ecological Infrastructure for Water Security (NBSAP SO 2) towards enhancing adaptation to climate change exacerbated water security. The Ecological Infrastructure for Water Security Project also involves work on Natural Capital Accounting (NCA). These are large, five-year interventions with dedicated resources and governance and implementation capacity, involving multiple stakeholders with a high level of institutional commitment. Support for these initiatives should continue to be prioritised as an effective means of addressing multiple objectives and high priority activities identified

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in the NBSAP and NBF, through coordinated activity of multiple role-players operating across the broader landscape/seascape.

4.4 Strengthening biodiversity monitoring and reporting

The biodiversity sector in South Africa is well-established, institutionally complex and extremely active. Currently, the conservation outcomes of this activity are not monitored in a consistent way across institutions, or areas of work. Although many institutions have systems for monitoring in place, different sets of indicators are used to monitor the implementation of different strategies in different parts of the sector (though some of the objectives are common), and in different reporting systems (for example, internal reporting such as State of the Environment reporting, and accounting to international bodies such as the Convention on Biological Diversity). This makes it difficult to obtain a clear picture of the impact that the work of the sector is having in terms of conservation outcomes on the ground (i.e. the state of biodiversity), which, in turn influences work-planning, prioritisation and allocation of resources.

The National Biodiversity Assessment provides a five to seven-yearly assessment of the status of ecosystems and species using high-level headline indicators, but these cannot be used for all monitoring and reporting requirements. The **National Biodiversity Monitoring Framework** is being developed to address this. It identifies an operational set of trackable indicators that can be applied consistently across institutions and reporting processes, to reflect status and trends with respect to biodiversity conservation and management outcomes, on a regular basis. The indicator framework will be updated frequently in response to reporting requirements.

It is recommended that the National Biodiversity Monitoring Framework be adopted and implemented within DFFE, national and provincial conservation bodies, and local governments, as a matter of priority, as it will contribute in significant measure to strengthening coordination with respect to biodiversity monitoring, thus improving the effectiveness with which the sector operates.

4.5 Regional priorities and mechanisms for co-ordination

A number of the issues affecting biodiversity conservation and management in South Africa transcend the national boundaries. This means that it is important to identify regional priorities and mechanisms to promote coordinated action on issues of common interest or concern and build synergy and facilitate lesson-sharing within the Southern African region. South Africa is an active member of the Southern African Development Community (SADC) and the African Union (AU), is a strong supporter of NEPAD (New Partnership for Africa's Development), and an active participant in numerous regional, biodiversity-related initiatives led by international organizations such as the International Union for the Conservation of Nature (IUCN). These provide multiple opportunities for addressing regional issues that influence South Africa's ability to address transboundary threats and risks to biodiversity, maintain the integrity of ecosystems at landscape scale, fulfil the vision of its NBSAP, and contribute meaningfully to ensuring that natural resources continue to provide the basis for socio-economic development in the broader southern African region.

Priorities for regional cooperation are to:

(a) Strengthen transboundary management of water resources

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(b) Collaborate in combatting illegal wildlife trafficking
(c) Strengthen development of integrated management and tourism plans for trans frontier conservation areas and transboundary World Heritage Sites, with benefits for developing rural economies
(d) Improve collaboration and monitoring at border points to reduce biological invasions
(e) Develop, implement and strengthen programmes to promote international collaboration, sharing of information, technology transfer, and biodiversity training
(f) Collaborate on the adoption of ecosystem-based approaches to strengthen ecological and social resilience to climate change.

To this effect, the following priorities for Africa over the next ten years has been adopted:

(a) Ecosystem restoration;
(b) Climate change and biodiversity;
(c) Coastal and marine biodiversity and the blue economy;
(d) Mainstreaming biodiversity into relevant sectors;
(e) Invasive alien species;
(f) Natural capital accounting;
(g) Access and benefit-sharing and traditional knowledge;
(h) Biosafety;
(i) Strategic environmental assessment (Article 14 of the Convention on Biological Diversity); and
(j) Poaching and illegal wildlife trade.

Relevant strategies/mechanisms for promoting regional cooperation and coordination include:

(a) The SADC Regional Biodiversity Strategy (developed in 2002, and still in effect)
(b) The AU Guidelines for Co-ordinated implementation of the Nagoya Protocol
(c) The AU Convention on Natural Resource Conservation
(d) NEPAD Planning and Coordinating Agency investment programmes, and the NEPAD Strategic Framework (2016 – 2020)
(e) The Nairobi Workplan on Ecosystem-based Adaption (2015)
(f) The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
(g) The Peace Parks Foundation Advisory Committee
(h) The Leadership for Conservation in Africa Initiative (co-led by IUCN, DFFE and SANParks)
(i) The UNP-supported, GEF-financed Senqu Basin project

4.6 Mobilising finance for the biodiversity sector

Limited financial resources (for example, for funding biodiversity stewardship programmes or protected area management) is one of the ongoing challenges compromising the ability of institutions in the biodiversity sector to fulfil their mandates (NBSAP, 2015). Additional resources can be mobilised by: (i) increasing allocations from existing sources (the national fiscus and non-state resources); (ii) improving the effectiveness with which existing funds are used (through more strategic allocations and reducing costs); and (iii) mobilising resources from new sources (DEA, 2017b: the BIOFIN Plan).

The BIOFIN Biodiversity Finance Plan for South Africa (DEA, 2017b, hereafter referred to as 'the Plan'), has been developed to identify and support the implementation of innovative **biodiversity finance**

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solutions that augment existing sources of funding from government, the private sector and other sources. The Plan has been developed under the auspices of the UNDP-led Biodiversity Finance Initiative (BIOFIN), being implemented in South Africa through DFFE with collaboration of National Treasury. A systematic process and detailed analyses were used to identify and prioritise **15 finance solutions,** each of which has significant impact on aligning incentives, increasing financing, and improving cost effectiveness and service delivery. Collectively – and in combination with strong commitment and financing by the public sector, and technical and financial support of the private sector, foundations, donors, and NGOs – these finance solutions will serve as effective accelerators for strengthening biodiversity management, creating jobs and supporting the achievement of South Africa's development agenda as set out in the National Development Plan, and the global Sustainable Development Goals (SDGs).

Implementation of the Plan will require a coordinated effort and technical capacity from key institutions including the Department of Forestry, Fisheries and Environment, (DFFE), national and provincial conservation authorities, National Treasury, the South African National Biodiversity Institute (SANBI), a broad range of Non-Government Organizations (NGOs), other government agencies and civil society groups. Monitoring of the Plan will be coordinated by DFFE using existing collaborative or new frameworks (DEA, 2017).

In addition, financing of the biodiversity sector priorities should involve a high-level analysis of budget allocations of different departments responsible for biodiversity conservation and management, identify opportunities for synergies and rationalization, and investigate new models for resourcing implementation.

The COP: CBD post 2020 GBF process has unlocked guidance on good practice approaches to resource mobilisation that can usefully be incorporated into the fast expanding work on resource mobilisation that is unfolding across the sector. The new Global Biodiversity Framework is currently under development, and for the first time, this framework is unlocking the means of implementation as a priority and standalone goal. The draft GBF timeframe of 2020-2030, coincides with the UN- Decade on ecosystem restoration and has a strong emphasis on resource mobilization. The identification of key priority areas for action on restoration such as the reduction of damaging incentives, spending existing funds more effectively, and unlocking new funding flows, should inform national priorities. In addition, as we further refine our approach to resource mobilisation in South Africa, we recognise that the responsibility for funding the safeguarding and maintenance of the natural capital that underpins South Africa's development agenda must be seen as a shared responsibility across a range of sectors, thus positioning mainstreaming as a crucial part of biodiversity finance as we engage with a wide range of partners'.

The case for investing in ecological infrastructure maintenance and rehabilitation: There is a mounting body of evidence demonstrating that investing in ecological infrastructure (and specifically the management of invasive alien plants - IAPs - in strategic catchments above major dams) represents a highly cost-effective means of enhancing water security, ensuring demands are met through increased supply. The contribution that the maintenance and rehabilitation of ecological infrastructure offers to disaster risk reduction -both in terms of the costs incurred to the fiscus in times of draught, and the role ecological infrastructure plays in safeguarding and extending the lifespan of built infrastructure - is significant and can be seen as a cost saving measure as opposed to a cost to the fiscus. We can be

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guided by our Critical Biodiversity Area maps and delineated SWSAs in prioritizing many of the areas critical for maintaining good ecological functioning.

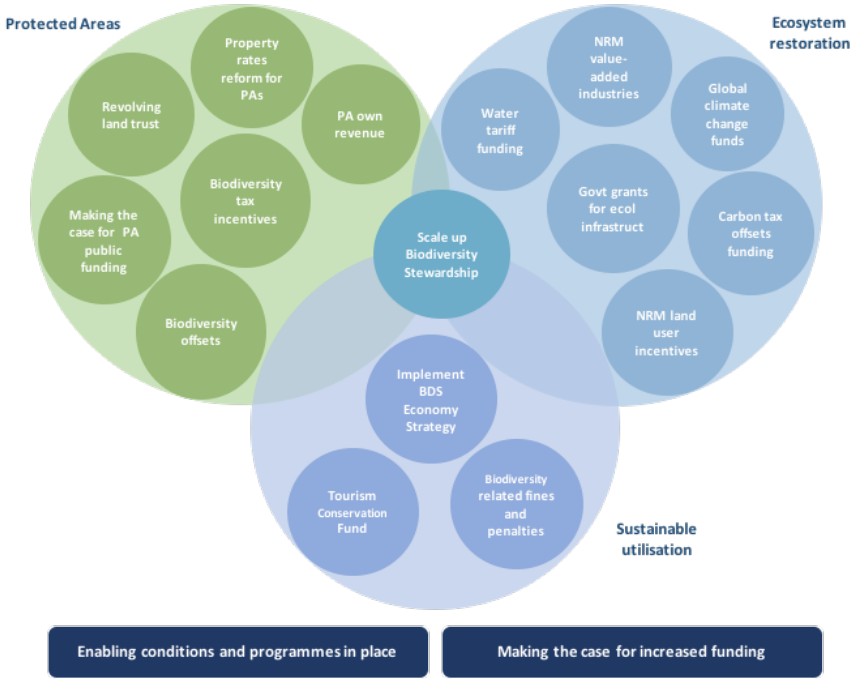


Figure 3: The 16 biodiversity finance solutions proposed in the BIOFIN Finance Plan for South Africa *(from DEA, 2017b)*

4.7 Implementation and monitoring of the NBF

The Department of Forestry, Fisheries and the Environment carries overall responsibility for overseeing implementation and monitoring of the NBF, but catalysing the actions listed in the NBF is the joint responsibility all role-players in the sector. As the NBF is a framework for co-ordination, and not an action plan, its implementation does not have to be monitored in the same way as the NBSAP.

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Section 5: Annexures

5.1. List of strategies and frameworks reviewed in the NBF
5.2. List of guidelines that support the implementation of the acceleration measures
5.3. References
5.4. The 17 Sustainable Development Goals (SDGs)
5.5. The 20 Aichi Biodiversity Targets (ABTs)
5.6. Acronyms and abbreviations

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Annexure 5.1: List of strategies, frameworks and systems included in the overview presented in the National Biodiversity Framework

The strategies are listed in the sequence in which they appear in Table 4. Where they are commonly referred to in abbreviated form, the abbreviation appears at the start of the reference, followed by full citation details, where these apply. Active weblinks are provided to enable easy access by users.

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Annexure 5.2: General References

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Annexure 5.3: The Sustainable Development Goals (or Global Goals)

SDG	Description
1	End poverty in all its forms everywhere
2	End hunger, achieve food security and improved nutrition and promote sustainable agriculture
3	Ensure healthy lives and promote well-being for all at all ages
4	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
5	Achieve gender equality and empower all women and girls
6	Ensure availability and sustainable management of water and sanitation for all
7	Ensure access to affordable, reliable, sustainable and modern energy for all
8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
9	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
10	Reduce inequality in and among countries
11	Make cities and human settlements inclusive, safe, resilient and sustainable
12	Ensure sustainable consumption and production (SCP) patterns
13	Take urgent action to combat climate change and its impacts
14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development
15	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
17	Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development



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For a full description of the goals, their targets and indicators, visit:
http://www.un.org/sustainabledevelopment/sustainable-development-goals/

Annexure 5. 4: The Aichi Biodiversity Targets

CBD Strategic Goal	Target	Description
A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society	**1**	Awareness of biodiversity increased
	2	Biodiversity values integrated
	3	Incentives reformed
	4	Sustainable consumption and production
B: Reduce the direct pressures on biodiversity and promote sustainable use	**5**	Habitat loss halved or reduced
	6	Sustainable management of aquatic resources
	7	Sustainable agriculture, aquaculture and forestry
	8	Pollution reduced
	9	Invasive alien species prevented and controlled
	10	Ecosystems vulnerable to climate change
C: Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity	**11**	Protected areas
	12	Reducing the risk of extinction
	13	Safeguarding genetic diversity
D: Enhance the benefits to all from biodiversity and ecosystem services	**14**	Ecosystem services
	15	Ecosystem restoration and resilience
	16	Access to sharing benefits form genetic resources
E: Enhance implementation through participatory panning, knowledge management and capacity building	**17**	Biodiversity strategies and action plans
	18	Traditional knowledge
	19	Sharing information and knowledge

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The Aichi Targets



For full descriptions of the goals, their targets and indicators, visit: www.cbd.int

Annexure 5.5: Acronyms and Abbreviations

ABT	Aichi Biodiversity Target
ACT	African Conservation Trust
ARC	Agricultural Research Council
AU	African Union
BDS TWG	Biodiversity Stewardship Technical Working Group
BHCDS	Biodiversity Human Capital Development Strategy
BioPANZA	Bioproducts Advancement Network of South Africa
BotSoc	The Botanical Society of South Africa
CATHSSETA	Culture, Arts, Tourism, Hospitality and Sport Sector Education Training Authority
CBD	Convention on Biological Diversity
CBNRM	Community-based Natural Resource Management
CBO	Community-based Organisation
CITES	Convention on International Trade in Endangered Species
CMA	Catchment Management Agency
CoGTA	Department of Cooperative Governance and Traditional Affairs
CPA	Community Property Association
CSIR	Council for Scientific and Industrial Research
DSAC	Department of Sports, Arts and Culture
DALRRD	Department of Agriculture, Land Reform and Rural Development
DARDLEA	Department of Agriculture, Rural Development, and Environmental Affairs
DBSA	The Development Bank of Southern Africa
DFFE	The Department of Forestry, Fisheries and Environment
DEA&DP	Department of Environmental Affairs and Development Planning (Western Cape)

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DEDEAT	Department of Economic Development, Environment and Tourism (Eastern Cape)
DEDTEA	Department of Economic Development, Tourism and Environment Affairs (KwaZulu-Natal)
DENC	Department of Environment and Nature Conservation (Northern Cape)
DHEST	The Department of Higher Education, Science and Technology
DIRCO	The Department of International Relations and Cooperation
DMRE	The Department of Mineral Resources and Energy
DPME	The Department of Planning, Monitoring and Evaluation
DoDMV	The Department of Defence and Military Veterans
DoH	The Department of Health
DOJ&CD	The Department of Justice and Constitutional Development
DoT	The Department of Transport
DALRRD	Department of Agriculture, Land Reform and Rural Development
dtic	Department of Trade Industry and Competition
DHSWS	Department of Human Settlements, Water and Sanitation
EA(P)	Environmental Assessment (Practitioner)
EbA	Ecosystem-based Adaptation
ECPTA	Eastern Cape Parks and Tourism Authority
EIA	Environmental Impact Assessment
EKZNW	Ezemvelo KZN Wildlife
EMI	Environmental Monitoring Inspectorate/Inspector
ENRM	Environmental and Natural Resource Management
EPWP	Expanded Public Works Programme
EWT	Endangered Wildlife Trust
FEPA	Freshwater Ecosystem Priority Area
GDARD	Gauteng Department of Agriculture and Rural Development
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIS	Geographic Information System
GSPC	Global Species Conservation Programme
ICLEI	Local Governments for Sustainability
IDP	Integrated Development Plan
IPBES	Intergovernmental Platform for Biodiversity and Ecosystem Services
IUCN	International Union for the Conservation of Nature
LBSAP	Local Biodiversity Strategy and Action Plan
LEDET	Limpopo Department of Economic Development, Environment and Tourism
LRBSI	Land Reform and Biodiversity Stewardship Initiative
LTPB	Limpopo Tourism and Parks Board
MAB	Man and Biosphere (Programme)
MEC	Member of the Executive Council
MinMEC	Minister and Members of the Executive Councils Committee
MinTECH	Ministerial Technical Committee
MTSF	Medium Term Strategic Framework
NAP	National Action Plan
NBA	National Biodiversity Assessment
NBBN	National Business and Biodiversity Network
NBES	National Biodiversity Economy Strategy
NBF	National Biodiversity Framework
NBG	National Botanical Garden

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NBIS	National Biodiversity Information System
NBSAP	National Biodiversity Strategy and Action Plan
NDP	National Development Plan
NECS	National Ecosystems Classification System
NEMA	National Environmental Management Act
NEPAD	New Partnership for Africa's Development
NESPF	National Environmental Skills Planning Forum
NICC	National Implementation Coordinating Committee
NISCWT	National Integrated Strategy for Combatting Wildlife Trafficking
NIE	National Implementing Entity (of the Adaptation Fund)
NPAES	National Protected Areas Expansion Strategy
NPCS	National Plant Conservation Strategy
NPO	Non-profit Organization
NRF	National Research Foundation
NSBA	National Spatial Biodiversity Assessment
NSSD	National Strategy for Sustainable Development
NW READ	North West Department of Rural, Environmental and Agricultural Development
NWPB	North West Parks Board
NWRS	National Water Resource Strategy
PATTT	Protected Areas Technical Task Team
PBSAP	Provincial Biodiversity Strategy and Action Plan
PCA	Provincial conservation authority
PPF	Peace Parks Foundation
RDI	Research, Development and Innovation
RBG	Royal Botanic Garden
SADC	South African Development Community
SAEON	South African Environmental Observation Network
SAHRC	South African Human Rights Commission
SAIAB	South African Institute for Aquatic Biology
SALGA	South African Local Government Association
SANBI	South African National Biodiversity Institute
SANDF	South African National Defence Force
SANParks	South African National Parks
SAPS	South African Police Service
SARS	South African Revenue Service
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
SEEA	System of Environmental-Economic Accounting
SDG	Sustainable Development Goal (or Global Goal)
SIPS	Strategic Infrastructure Projects
SO	Strategic objective
SPLUMA	Spatial Planning and Land Use Management Act, 2013 (Act No. 16 of 2013)
SSA	State Security Agency
TOPS	Threatened or Protected Species
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization

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UNFCCC	United Nations Framework Convention on Climate Change
UNSD	United Nations Statistics Department
WESSA	Wildlife and Environment Society of Southern Africa
WfW	Working for Water
WftC	Working for the Coast
WfWet	Working for Wetlands
WHS	World Heritage Site
WonEco	Working on Ecosystems
WRC	Water Research Commission
WWF-SA	World Wide Fund for Nature South Africa

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DEPARTMENT OF HEALTH

NO. 2424 **26 August 2022**

ALLIED HEALTH PROFESSIONS ACT 63 OF 1982

REGULATIONS RELATING TO THE PROFESSION OF UNANI-TIBB

The Minister of Health intends, in terms of section 38(1)(i) of the Allied Health Professions Act, 1982 (Act No 63 of 1982), after consultation with the Allied Health Professions Council, to make regulations in the Schedule.

Interested persons are invited to submit substantiated comments or representations in writing on the proposed amendments to the regulations, to the Director-General: Health, Private Bag X828, Pretoria, 0001 (for the attention of the Director: Public Entities Governance, Ms M Mushwana, mihloti.mushwana@health.gov.za and Mr G. Tsebe, godfrey.tsebe@health.gov.za), within one month of the date of the publication of this Notice.

Dr M.J Phaahla, MP
Minister of Health
Date: 26/07/2022

SCHEDULE

Definitions

1. In these Regulations any expression or word defined in the Act bears that meaning and, unless the context otherwise indicates –

"basic substance" means any substance used in Unani-Tibb for medicinal purposes from which or out of which a dilution or mixture is prepared or manufactured, or any stronger concentration of such substance;

"compound" means compound as defined in the General Regulations made in terms of the Medicines and Related Substances Act, 1965 (Act 101 of 1965);

"council-accepted" or **"accepted by the council"** means that the recommendations of the relevant professional board have been accepted by the Council by way of due process;

"**cupping therapy**" means a body work therapy, which may or may not involve prior scarification of the skin –

(a) that entails the application by a practitioner of glass, plastic, silicone or other cups to specific areas of the patient's body using a pump or flame to create a vacuum within the cup before it is applied to the body; and

(b) which is used to treat acute and chronic conditions that present with pain, inflammation or congestion; and

(c) which is intended to improve circulation to facilitate the healing process.

"dietotherapy" means the special prescription of a diet to improve health, promote recovery from disease, and prevent disorders from developing according to Unani-Tibb principles;

"dispense" means dispense as defined in the General Regulations made in terms of the Medicines and Related Substances Act, 1965 (Act 11 of 1965);

"dry cupping" means the practice of applying a partial vacuum by means of heat (fire cupping) or suction (vacuum gun) in one or several bell-shaped vessels (suction cups) to specific locations on the skin resulting in the uplifting of tissues beneath (skin doming);

-"**humours**" means the four body fluids – blood, yellow bile, black bile and phlegm – that according to the principles and philosophies of Unani-Tibb - are responsible for maintaining temperament and for determining health or disease in human beings;

"**massage therapy**" means the art of rubbing with or without the use of medicinal agents such as medicated massage oils, to stimulate the qualities of heat, coldness, moistness or dryness in the individual in accordance with the principles and philosophies of Unani-Tibb;

"Medicines and Related Substances Act" means the Medicines and Related Substances Act, 1965 (Act No 101 of 1965) and includes the regulations made thereunder;

"pharmacopoeia" means any Council-accepted publication for the profession of Unani-Tibb in which the medicinal properties or the physical character of substances, the natural history of the effect of substances on the body in health and disease, the collective symptoms obtained from

experimental study of substances or the therapeutics relating to the application of substances in disease, are described;

"practitioner" means a person registered in terms of the Act to practise Unani-Tibb;

"pulse diagnosis" means the examination of the pulse of a human being in order to make a diagnosis based on the principles and philosophies of Unani-Tibb;

"regimental therapies" means methods through which care of a sick person and the maintenance of general health is performed according to the principles of Unani-Tibb, with the aid of certain procedures, tools and equipment described by eminent past physicians including Rhazes, Avicenna and Abulcasis;

"substance" means anything which, whether used alone or in combination in either its original or natural state or in compounded, manipulated or prepared form, constitutes an Unani medicine or forms part of an Unani medicine or which is a basic substance and is recorded in a council-approved pharmacopoeia;

"stool analysis" means the analysis of physical features of faecal mass namely, colour, odour, texture, quantity and frequency, to determine the qualitative and humoural imbalance of a human being in accordance with the principles and philosophies of Unani-Tibb;

"temperamental evaluation" means the assessment of a person's physical, mental, emotional and spiritual attributes according to the principles of Unani-Tibb;

"the Act" means the Allied Health Profession Act, 63 of 1982;

"tongue diagnosis" means the examination of the tongue in order to make a diagnosis based on the principles and philosophies of Unani-Tibb;

"Unani-Tibb" means the ancient Greek system of traditional medicine as developed by Arab civilization that is based on the idea that all things in nature are comprised of the four elements of earth, air, fire and water, and the concept of Temperament in human beings, comprised of the state of balance of humours, as being definitive of a person's disposition using those medicines or substances for treatment of any patient according to any council-accepted Unani-Tibb pharmacopoeia or any council-accepted equivalent Unani-Tibb standard text;

"urine analysis" means the examination of the physical features of urine namely colour, odour, texture, sediment and foam, to determine the qualitative and humoural imbalance of the individual according to the principles and philosophies of Unani-Tibb; and

"wet cupping" means a minor surgical procedure, where negative pressure (suction force) is applied to the skin surface using cups creating skin doming around capillaries and resulting in increased capillary filtration and local collection of filtered fluids, either preceded or followed by light scarification of the skin for the purpose of removing filtered fluid into the cup which may then be collected and removed.

Acts specifically pertaining to the profession of Unani-Tibb

2. The following are acts specially pertaining to the profession of an Unani-Tibb practitioner–

(a) The physical and psychological examination of any person for the purpose of diagnosing any defect, illness, disease or deficiency in such person in accordance with the principles and philosophy of Unani-Tibb, including but not limited to –

(i) a temperamental evaluation;
(ii) pulse or tongue diagnosis; or
(iii) urine or stool analysis.

(b) The use or request of any medical diagnostic investigations which may include the withdrawal of intravenous blood;

(c) The treatment or prevention of any defect, illness, disease or deficiency in any person by means of -

(i) Dietotherapy;
(ii) Regimental therapies, including but not limited to –
(aa) exercise;
(bb) massage therapy;
(cc) fomentation;
(dd) hydrotherapy;
(ee) diaphoresis;
(ff) diuresis;
(gg) purgation;
(hh) emesis;
(ii) enema;
(jj) cupping therapy;
(kk) nebulisation using Unani medicines or substances or essential oils;
(ll) irrigation of the nose, ear, vagina or colon; or
(mm) mind-body and stress reduction techniques

including but not limited to –

(mmi) breath work;

(mmii) meditation;

(mmiii) relaxation techniques; or

(mmiv) counselling in accordance with Unani principles; and

(mmv) Unani medicines or substances.

(d) Advising any person on his or her physical or mental health;

(e) Any other acts specifically pertaining to the profession of Unani-Tibb based on the education and training of practitioners of Unani-Tibb as approved by the Council, from time to time, at the recommendation of the applicable professional board and published in the *gazette*.

Remedies relating to the profession of Unani-Tibb

3. Subject to the provisions of the Medicines and Related Substances Act, a practitioner registered as an Unani-Tibb practitioner, may for the purposes of his or her practice–

(a) Possess or have under his or her control or administer or prescribe or supply to a patient–

(i) any Unani medicine, substance, or preparation;

(ii) Unani substances that are unscheduled or scheduled under the Medicines and Related Substances Act;

(iii) Unani substances, including scheduled substances,

that are used as basic substances in the compounding and dispensing of Unani medicines, substances or preparations;

(iv) those scheduled Unani substances which are recorded in a council-accepted Unani-Tibb pharmacopoeia, in quantities and concentrations that do not exceed what is reasonably necessary for this purpose;

(v) such scheduled Unani substances, other than those contemplated in subparagraph (iv), as are determined to be necessary for the practice of Unani-Tibb by the Council, at the recommendations of the relevant professional board and published in the *gazette*;

(b) Prescribe for, or administer to, or dispense to, a patient-

(i) any Unani substance, or preparation or mixture of substances, or medicines in any therapeutic dose;

(ii) basic substances and preparations and mixtures of Unani substances whether they include scheduled substances or substances unscheduled under the Medicines and Related Substances Act;

(iii) medicines, substances, preparations and mixtures of substances that are scheduled or unscheduled substances including-

(aa) vitamins;

(bb) minerals;

(cc) animal extracts, products and derivatives;

(dd) fats, oils and fatty acids;

(ee) carotenoids;

(ff) polyphenols and bioflavonoids;

(gg) amino-saccharides;

(hh) saccharides (including prebiotics);

(ii) probiotics; and

(jj) health supplements.

(kk) Unani substances referred to in sub-paragraphs (aa), (bb) and (cc), water and saline, in an injectable form, where applicable; and

(c) Compound and dispense-

(i) any Unani substance, preparations and mixtures of substances that are recorded in a council-accepted Unani-Tibb pharmacopoeia or any scheduled or unscheduled substance for the purpose of making an Unani medicine;

(ii) Unani substances referred to in paragraph (a) (i) – iv);

(iii) Unani substances referred to in paragraph (b) (i), (ii) and (iii); and

(iv) any Unani substance or preparation or mixture of substances or medicines or substances containing an Unani substance, in any therapeutic dose or strength.

Short title

4. These regulations are called the Regulations Relating to the Profession of Unani-Tibb, 2022.

DEPARTMENT OF HEALTH

NO. 2425 **26 August 2022**

REGULATIONS RELATING TO UNMOUNTED ARTIFICIAL TEETH: AMENDMENT

The Minister of Health has, in terms of sections 33(3) and 50(1)*(p)* of the Dental Technicians Act, 1979, and on the recommendation of the South African Dental Technicians Council, made the Regulations contained in the Schedule.

DR MJ PHAAHLA, MP
MINISTER OF HEALTH
DATE 26/07/2022

SCHEDULE

Contents

Definitions

1. In these Regulations, any word or expression to which a meaning has been assigned in the Act bears that meaning and unless the context indicates otherwise –

"the Act" means the Dental Technicians Act, 19 of 1979; and

"Regulations" means Regulations relating to Unmounted Teeth, 1982, published under GN R. 306 of 26 February 1982, as amended by Government Notices No. R. 286 of 15 February 1985, R. 856 of 9 May 1986, R. 669 of 3 April 1987, R. 846 of 28 April 1989 and 340 in GG 44462 of 19 April 2021.

Amendment of Regulation 1

2. Regulation 1 of the Regulations is amended by –

2.1. the substitution for the definition of "dental supplier" of the following definition –

"**'dental supplier'** means a person who has been issued with a permit in terms of **[contemplated in]** section 33**[(1)(b)]** of the Act to supply, sell and to be in possession of unmounted artificial teeth;"

2.2. the deletion of the definition of "dental trader".

Amendment of Regulation 4

3. Regulation 4 is amended by –

(1) the substitution for sub-regulation (1) of the following sub-regulation –

"4.(1) The application fee payable to the council **[referred to in regulation 1]** for a permit shall be **[R12,745-00]** R13,478-00 and such amount shall only be refundable if the council rejects an application for a permit.

(2) the deletion of sub-regulation (2);

(3) the substitution for paragraph *(a)* in sub-regulation (3) of the following paragraph:

"*(a)* **[R19, 658-00]** R22, 245-00 in respect of a dental **[trader]** supplier; or;"

(4) the deletion of paragraph *(b)* in sub-regulation (3).

(5) the substitution for paragraph *(b)* in sub-regulation (3) of the following paragraph:

"*(c)* a pro rata portion of the fee referred to in sub-regulation 3(a) or (b), as the case may be, calculated from the date of issue of the permit, **[R4,468-50 in respect of a or dental supplier who is issued with a permit during the course of the financial year]** for the unexpired portion of the financial year.".

Short title and commencement

4. These Regulations are called the to the Regulations Relating to Unmounted Teeth, 2022: Amendment

DEPARTMENT OF HEALTH

NO. 2426 **26 August 2022**

ALLIED HEALTH PROFESSIONS ACT 63 OF 1982

REGULATIONS RELATING TO FINES WHICH MAY BE IMPOSED BY AN INQUIRING BODY AGAINST PRACTITIONERS FOUND GUILTY OF UNPROFESSIONAL CONDUCT IN TERMS OF THE ALLIED HEALTH PROFESSIONS ACT, 1982 OR FOR NON-COMPLIANCE WITH ANY CONTINUING PROFESSIONAL DEVELOPMENT ("CPD") REQUIREMENTS

The Minister of Health intends, under section 23(1A) and section 29 as read with section 38(1)(s), and section 38(4) of the Allied Health Professions Act, 1982 (Act No. 63 of 1982), after consultation with the Allied Health Professions Council, to make the regulations in the Schedule.

Interested persons are invited to submit substantiated comments or representations in writing on the proposed amendments to the Regulations, to the Director-General: Health, Private Bag X828, Pretoria, 0001 (for the attention of the Director: Public Entities Governance, Ms M Mushwana, Mihloti.mushwana@health.gov.za, and Mr G. Tsebe, Godfrey.tsebe@health.gov.za within one month of the date of publication of this Notice.

DR M.J. PHAAHLA, MP
MINISTER OF HEALTH
DATE: 26/07/2022

SCHEDULE

Definitions

1. In these regulations any word or expression to which a meaning has been assigned in the Act, shall have that meaning and unless the context otherwise indicates-

"CPD" means Continuing Professional Development;

"Inquiring Body" means the Council, the professional board, a committee of the council or a committee appointed by a professional board, which is conducting an inquiry contemplated in either section 23(1) or 23(1A) or section 29 of the Act and/or the CPD Guidelines for the professions of Aromatherapy, Ayurveda, Chinese Medicine and Acupuncture, Chiropractic, Homeopathy, Naturopathy, Osteopathy, Phytotherapy, Reflexology, Therapeutic Aromatherapy, Therapeutic Massage Therapy, Therapeutic Reflexology and Unani-Tibb; and

"the Act" means the Allied Health Professions Act, 1982 (Act No 63 of 1982).

Fines which may be imposed by an Inquiring Body

2. (1) An Inquiring Body may impose a fine equal to or falling within the range of the minimum and maximum fines stipulated for each category of unprofessional conduct contained in the table of fines, against a registered person or a person who is legally required to be registered and who has been found guilty of unprofessional conduct after an inquiry held by such Inquiring Body or who has not complied with the CPD requirements after an inquiry.

(2) Fines may be imposed alone or in conjunction with each other or with any other penalty the Inquiring Body may seem appropriate; the fines are payable in respect of one or more charges and may be compounded.

(3) The Council may, annually, by Notice in the Gazette increase the fines which may be imposed provided the increment may not be more than 20%.

Table of Fines

UNPROFESSIONAL CONDUCT RELATING TO:	MINIMUM FINE	MAXIMUM FINE
Advertising	R3,000	R20,000
Certificates and Reports	R3,500	R12,000
Overcharging / Overservicing	R2,500	R50,000
Practising beyond scope of own profession	R5,000	R30,000
Maligning the reputation of colleagues	R2,500	R12,500
Fees and/or Commission	R5,000	R70,000
Record keeping	R3,500	R15,000
Financial interest	R4,500	R20,000
Promote, sell or market a product, device of whatsoever nature	R4,500	R20,000
Sharing of consultations rooms	R3,000	R15,000
Practice and/or being associated and/or perceived to be associated with unregistered persons	R5,000	R25,000
Offering of unapproved education and training	R5,000	R30,000
Practice names	R5,000	R15,000
Contract servicing	R5,000	R 50,000
Confidential information	R5,000	R20,000
Exposing patients to danger and/or harm	R5,000	R100,000
Providing treatment without patient's or patient's next of kin's consent	R5,000	R30,000
Lack of professional competence	R5,000	R100,000
Negligence	R5,000	R70,000
Fraud	R10,000	R100,000
Giving and/or receiving kickbacks or any benefit of whatsoever nature	R10,000	R100,000
Engaging in unacceptable relationship	R10,000	R70,000
Corruption	R10,000	R100,000
Disrespect patient's privacy and/or dignity	R10,000	R20,000
Unprofessional conduct not stipulated above	R1,000	R100,000

NON COMPLAINCES WITH CPD REQUIREMENTS	MINIMUM FINE	MAXIMUM FINE
< 5 points short for the CPD cycle	R2,500	R5,000
Between 6 – 10 points short for the CPD cycle	R5,000	R8,000
Between 11 – 20 points short for the CPD cycle.	R8,000	R15,000
More than 20 points short for the CPD cycle	R15,000	R25,000

Short Title

3. These regulations are called the Regulations Relating to Fines which may be Imposed by an Inquiring Body Against Practitioners Found Guilty of Unprofessional Conduct in Terms of the Allied Health Professions Act, 2022.

DEPARTMENT OF TRADE, INDUSTRY AND COMPETITION

NO. 2427 **26 August 2022**

NOTICE OF INTRODUCTION OF ONLINE ASSURANCE OF FOREIGN NATIONALS BY THE COMPANIES AND INTELLECTUAL PROPERTY COMMISION

I, Adv Rory Wayne Voller, Commissioner of the Companies and Intellectual Property Commission (Commission) pursuant to section 6 (13)of the Act read with Companies Regulation 169, hereby designate electronic filing method for the filing of foreign national personal information as listed within Section 24 (5) (a),(b), (c) and (g) of the Companies Act, 71 of 2008 (The Act) and the assurance of such information for the purposes of registering as a customer and appointment and changes of director information, and any other purpose communicated by the Commission.

As from 18 July 2022 or a later date communicated by the Commission on its electronic platform www.cipc.co.za, all foreign national's personal information as stated above together with a certified copy of his or her foreign issued identify document or passport will be required to be submitted in electronic format on the available electronic platforms as communicated by the Commission, to the Commission for assurance before transacting on any of its electronic platforms. The certification of the foreign issued identity document or passport must meet the CIPC requirements for national and/or international certification of documents.

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Adv Rory Wayne Voller
Commissioner: CIPC
Signed: 13 July 2022

DEPARTMENT OF WATER AND SANITATION

NO. 2428 **26 August 2022**

NATIONAL WATER ACT, 1998
(ACT NO. 36 OF 1998)

RESERVE DETERMINATION FOR WATER RESOURCES OF THE BREEDE-GOURITZ WATER MANAGEMENT AREA

I, Senzo Mchunu, in my capacity as Minister of Water and Sanitation, and duly authorised in terms of sections 16(1) of the National Water Act, 1998 (Act No. 36 of 1998), hereby publish the Reserve determination for water resources of the Breede-Gouritz Water Management Area, as set out in the Schedule to this Notice.
.

Director: Reserve Determination
Attention: Mr Yakeen Atwaru
Department of Water and Sanitation
Ndinaye Building 185 Francis Baard Street
Private Bag X313
Pretoria
0001
Email: atwaruy@dws.gov.za

SENZO MCHUNU (MP)
MINISTER OF WATER AND SANITATION
DATE: 13/07/20

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RESERVE DETERMINATION FOR WATER RESOURCES OF THE BREEDE-GOURITZ WATER MANAGEMENT AREA IN TERMS OF SECTION 16(1) AND (2) OF THE NATIONAL WATER ACT, 1998 (ACT NO. 36 OF 1998)

SCHEDULE

1. DESCRIPTION OF WATER RESOURCE

1.1. The Reserve is determined for all or part of every significant water resource within the Breede-Gouritz Water Management Area as set out below:

Water Management Area:	Breede-Gouritz
Drainage Regions:	G40-G50, H10- H90, J11-J40, K10-K70 Tertiary Drainage Region
Rivers:	Breede Overberg Area: Breede River, Rivieronderend River, Overberg River, as well as other smaller coastal rivers. Gouritz Coastal Area: Gouritz River, Buffels River, Touws River, Groot River, Gamka River, Olifants River, Kammanassie River, and smaller coastal rivers.

1.2. The Minister has in terms of section 12 of the National Water Act, 1998 (Act No.36 of 1998) ("the Act"), prescribed a system for classifying water resources by issuing Government Notice No. R. 810, published in Government *Gazette* No. 33541 dated 17 September 2010. In terms of section 16(1) of the Act, the Minister must, as soon as reasonably practicable after the class of all or part of a water resource has been determined, by Notice in the *Gazette*, determine the Reserve for all or part of that water resource.

1.3. The Minister, in terms of section 16(1) of the Act, determines the Reserve for the Breede-Gouritz Water Management Area.

2. PROPOSED RESERVE DETERMINATION AS REQUIRED IN TERMS OF SECTION 16(1) AND (2) OF THE NATIONAL WATER ACT, 1998

2.1. The proposed Reserve which includes the Ecological Water Requirements (EWRs) and the Basic Human Needs Reserve (BHN) for the Rivers at EWR sites and selected biophysical nodes in the Breede-Gouritz Water Management Area is set out in **Section 4**. The Gouritz and Breede-Overberg Catchments and EWR sites are indicated in **Figure 1 and 2 respectively.**

2.2. The Water Quality component of the proposed Reserve for the Rivers at the EWR sites in Breede-Gouritz Water Management Area in terms of section 16(1) of the Act is set out in **Section 5**.

2.3. The proposed Groundwater Reserve for Water Quantity and Quality in terms of section 16(1) of the Act for the Breede-Gouritz Water Management Area is set out in **Section 6.**

2.4. The proposed Estuarine Reserve in terms of section 16(1) of the Act for the Breede-Gouritz Water Management Area is set out in **Section 7**.

2.5. The proposed Wetland Reserve in terms of section 16(1) of the Act for the Breede-Gouritz Water Management Area catchment is set out in **Section 8**.

2.6. The Reserve will apply from the date signed off as determined in terms of section 16(1) of the Act, unless otherwise specified by the Minister.

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3. ACRONYMS AND DEFINITIONS

3.1 Acronyms

BHN	Basic Human Needs
EC	Ecological Category
EcoSpecs	Ecological Specifications
EIS	Ecological Importance and Sensitivity
ER	Ecological Reserve
EWR	Ecological Water Requirement
MAR	Mean Annual Runoff
MCM	Million Cubic Metres
PES	Present Ecological Status
RC	Reference conditions
REC	Recommended Ecological Category
TPCs	Thresholds of Potential Concern
WQSU	Water quality sub-unit

3.2 Definitions

Baseflow is a sustained low flow in rivers during dry or fair-weather conditions, but not necessarily all contributed by groundwater; includes contribution from delayed interflow and groundwater discharge.

Ecological Importance and Sensitivity (EIS): Key indicators in the ecological classification of water resources. Ecological importance relates to the presence, representativeness and diversity of species of biota and habitat. Ecological sensitivity relates to the vulnerability of the habitat and biota to modifications that may occur in flows, water levels and physico-chemical conditions.

Ecological Water Requirements (EWR): The flow patterns (magnitude, timing and duration) and water quality needed to maintain a riverine ecosystem in a particular condition. This term is used to refer to both the quantity and quality components.

Ecological Water Requirement (EWR) Sites: Specific points on the river as determined through the site selection process. An EWR site consists of a length of river which may consist of various cross-sections for both hydraulic and ecological purposes. These sites provide sufficient indicators to assess environmental flows and assess the condition of biophysical components (drivers such as hydrology, geomorphology and physico-chemical) and biological responses (viz. fish, invertebrates and riparian vegetation).

Present Ecological State (PES): A category indicating the current health or integrity of various biological attributes of the water resource, compared to the natural or close to natural reference conditions. The results of the process are provided as Ecological Categories (ECs) ranging from A (near natural) to F (completely modified) for the PES.

Recharge is the addition of water to the zone of saturation, either by downward percolation of precipitation or surface water and/ or the lateral migration of groundwater from adjacent aquifers.

Recommended Ecological Category (REC): An ecological category indicating the ecological management target for a water resource based on its ecological classification that should be attained. Categories range from Category A (unmodified, natural) to Category D (largely modified).

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Reserve: is the quantity and quality of the water required to satisfy the basic human needs by securing a basic water supply and to protect the aquatic ecosystem in order to secure ecologically sustainable development and use of the relevant water resource.

River Node (biophysical node): These are modelling point's representative of an upstream reach or area of an aquatic eco-system (rivers, wetlands, estuaries and groundwater) for which a suite of relationships apply.

Sub-quaternary catchments: A finer subdivision of the quaternary catchments (the catchment areas of tributaries of main stem rivers in quaternary catchments).

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4. SURFACE WATER QUANTITY COMPONENT FOR RIVERS AT SELECTED EWR SITES AND NODES

The Reserve consists of two parts – the Basic Human Need (BHN) Reserve and the Ecological Reserve (ER). The BHN Reserve provides for the essential needs of individuals served by the water resource in question and includes water for drinking, food preparation and for personal hygiene. The ER relates to the water required to protect the aquatic ecosystems of the water resource. The Reserve refers to both the **quantity** and **quality** of the water in the resource and will vary depending on the class of the resource (Class I, II and III).

BREEDE-OVERBERG AREA (ECOLOGICAL RESERVE)

Table 4.1: Summary of the data for Nodes and EWR sites. EWR Sites are indicated in bold.

Quaternary Catchment	Node/ EWR site	Water Resource	PES	EIS	REC	nMAR (MCM)	EWR (% nMAR)
G40C	Piii1	Palmiet	B	High	B	39.9	19.1
G40C	Piv10	Witklippiesskloof	D	High	D	15.1	21.5
G40C	Piv9	Palmiet	D	High	B	78.8	21.5
G40C	Piv8	Klipdrift	D	High	D	13.6	21.5
G40D	Piv4	Klein-Palmiet	D	High	D	13.7	21.5
G40D	Piv7	Krom/Ribbok	D	Very High	A	27.5	21.5
G40D	Piii2	Palmiet	C	Very High	B/C	206.6	31.2
G40D	Piv12	Dwars/Louws	C	Very High	C	25.2	100.0
G40D	Piii3	Palmiet	C	Very High	B	250.4	34.5
G40G	Niii5	Bot	C	Very High	A	31.9	21.3
G40H	Nx6	Onrus	E	High	B	5.1	13.4
G40F	Niv43	Swart	E	High	B	42.1	13.3
G40K	Niv45	Steenbok	E	Very High	A	10.8	12.2
G40J	Nii4	Hartebees	D	Very High	B	18.4	12.5
G40K	Nv23	Klein	D	Moderate	C	43.0	19.3
G40M	Nx8	Uilkraal	C	Very High	A	2.4	19.2
G50B	Ni4	Nuwejaar	D	Moderate	D	12.5	13.0
G50C	Nvii15	Heuninges	D	-	D	17.8	13.1
G50C	Niv44	Heuninges	D	Very High	B	18.8	13.1
G50C	Nii5	Kars	E	Very High	B	21.6	20.4
G50E	Nv24	Kars	C	Moderate	B	15.4	30.3
G50H	Nii7	DeHoop Vlei	B	High	B	27.1	30.0
G50H	Nii6	Sout	D	-	B	4.2	12.6
H10B	Nvii3	Rooikloof	B	High	B	6.807	37.95
H10B	Niv3	Titus	C	Moderate	C	26.2	22.0
H10C	Niv1	Koekedou	D	Very High	A	18.8	14.2
H10C	Niv2	Dwars	C	High	B	74.9	22.0
H10D	Nvi4	Breede	D	Moderate	D	175.509	17.51
H10D	Niv4	Witels	A	Very High	A	84.3	43.3
H10D	Nvi3	Breede	C	High	B	252.8	31.7
H10E	Nvi2	Wit	A	Very High	A	42.6	46.6
H10F	Niv6	Wabooms	D	High	B	7.4	14.4
H10F	**Nviii1/ EWR1**	**Breede**	**D/E**	**High**	**D**	**434.90**	**31.7**
H10G	Niv7	Slanghoek	D	High	B	32.6	14.5
H10G	Niii1	Breede	D	High	B	497.6	25.4
H10J	Niv40	Elands	B	Very High	A	58.1	50.8
H10J	Niv41	Krom	B	Very High	A	9.0	50.8
H10J	**Nvii2/ EWR2**	**Molenaars**	**C**	**Very High**	**B**	**105.6**	**35.0**
H10J	Niv42	Molenaars (Smalblaar)	E	High	B	191.2	17.4

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Quaternary Catchment	Node/ EWR site	Water Resource	PES	EIS	REC	nMAR (MCM)	EWR (% nMAR)
H10K	Niv12	Holsloot	C	High	B	119.5	35.0
H10H	Nvii6	Hartbees	D	Very High	A	4.0	14.4
H10H	Niv9	Hartbees/ de Wetskloof	D	Very High	A	10.2	14.4
H10L	Nv3	Breede	C	High	B	850.9	31.7
H20G	Nvii7	Hex	C	Moderate	C	102.8	22.3
H20H	Niv10	Hex	D	High	B	107.1	22.3
H40B	Nvii5	Koo	D	High	B	0.9	13.1
H40C	Niv11	Nuy	E	High	B	29.4	13.2
H40D	Niv13	Doring	E	High	B	47.4	12.9
H40F	**Nvii8/ EWR3**	**Breede**	**C/D**	**Moderate**	**C/D**	**1042.8**	**45.5**
H40G	Nvii11	Poesnels	D	High	B	16.1	12.8
H40K	Niv14	Keisers	D	Very High	A	12.6	12.5
H40H	Niv15	Vink	D	Very High	A	15.6	12.4
H30C	Niv20	Pietersfontein	D	Moderate	C	17.3	12.0
H30B	Niv18	Kingna	D	High	B	27.1	12.3
H30D	Nvii9	Keisie	D	High	B	21.5	11.9
H30E	Nii2	Kogmanskloof	D	Very High	B	52.0	18.9
H50B	Ni2	Breede	D	High	B	1170.1	17.3
H60B	Nvii10	Du Toits	B	Very High	A	43.9	50.8
H60D	Nv7	Riviersonderend	C	Very High	A	370.2	30.1
H60E	**Niv28/ EWR6**	**Baviaans**	**B**	**High**	**B**	**7.9**	**70.90**
H60E	Niv29	Sersants	D	High	B	4.6	29.9
H60F	Niv30	Gobos	C	Very High	A	12.4	48.1
H60F	**Nv9/EWR5**	**Riviersonderend**	**D**	**High**	**D**	**413.7**	**24.5**
H60G	Niv31	Kwartel	D	High	B	10.7	13.4
H60H	Niv33	Soetmelksvlei	D	Very High	A	4.0	29.9
H60H	Niv34	Slang	D	Very High	A	2.1	29.9
H60H	Nv10	Riviersonderend	D	Very High	A	442.9	24.5
H60K	Niv35	Kwassadie	E	Very High	A	5.9	17.3
H60L	Ni3	Riviersonderend	D	High	B	483.8	24.5
H70A	Niv24	Leeu	E	Very High	A	5.8	12.6
H70B	Nv2	Breede	C	High	B	1701.4	26.4
H70D	Nii3	Tradouw	B	Very High	A	19.4	29.9
H70F	Niv25	Buffeljags	E	High	B	119.4	14.1
H70G	**Niii4/ EWR4**	**Breede**	**C**	**Very High**	**B/C**	**1832.7**	**40.1**
H70J	Niv26	Slang	E	High	B	10.0	14.2

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GOURITZ COASTAL AREA (ECOLOGICAL RESERVE)
Table 4.2: Summary of the data for Nodes and EWR sites. EWR sites are indicated in bold.

Quaternary Catchment	Node/ EWR site	Water Resource	PES	EIS	REC	nMAR (MCM)	EWR (% nMAR)
J11C	giv34	Buffels	B	High	B	13.1	26.5
J11F	gv25	Buffels	B	High	B	24.2	17.8
J11H	**J1BUFF-EWR5**	**Buffels**	**C**	**Moderate**	**C**	**27.4**	**17.9**
J11K	giv32	Groot	D	High	B	30.5	17.9
J12D	giv28	Touws	D	High	B	16.4	11.3
J12H	giv27	Touws	B	Moderate	C	26.4	26.8
J12K	giv26	Brak	C	High	B	2.9	17.7
J12L	**J1DORI-EWR7**	**Doring**	**C/D**	**Low**	**C/D**	**2.9**	**12.0**
J12L	J12L Modelled	Huis	D		D	1.56	40.3
J12M	**J1TOUW-EWR3**	**Touws**	**B/C**	**High**	**B/C**	**33.5**	**17.8**
J13B	gv7	Groot	C	High	B	72.7	18.0
J13C	gii3	Groot	B	High	B	78.1	27.0
J21D	giv3	Gamka	B	High	A	31.9	27.1
J22F	giv1	Koekemoers	C	Very High	A	7.4	17.9
J22K	giv2	Leeu	C	Very High	A	17.1	17.9
J23F	gv17	Gamka	B	High	B	58.1	27.0
J23J	gv27	Gamka	C	High	B	69.6	18.3
J24E	gv14	Dwyka	A	High	B	4.0	39.1
J25A	**J2GAMK-EWR4**	**Gamka**	**C/D**	**High**	**C**	**79.8**	**14.9**
J25E	gii2	Gamka	C	High	B	111.8	15.2
J31D	**J3OLIF-EWR9**	**Olifants**	**C**	**Moderate**	**C**	**11.8**	**17.8**
J32E	giv15	Traka	C	High	C	2.7	17.9
J33B	gv33	Olifants	D	High	B	25.0	11.9
J33E	gv21	Meirings	C	Very High	A	21.4	19.1
J33F	giv11	Olifants	E	High	B	80.0	12.4
J34C	**J3KAMM-EWR10**	**Kammanassie**	**C/D**	**Low**	**C/D**	**41.2**	**15.3**
J34F	giv10	Leeu	E	Very High	A	59.2	12.1
J35E	gv19	Olifants	E	High	B	224.5	12.9
J35F	giv17	Olifants	D	High	B	253.4	12.9
J40B	**J4GOUR-EWR6**	**Gouritz**	**C**	**Moderate**	**C**	**489.1**	**14.8**
J40E	gv9	Gouritz	C	High	B	571.8	14.8
H80B	giii5	Duiwenhoks	E	Very High	A	62.5	20.1
H80E	**H8DUIW-EWR1**	**Duiwenhoks**	**D**	**Low**	**D**	**83.2**	**20.9**
H90C	giv27	Korinte	D	High	B	34.1	14.5
H90C	**H9GOUK-EWR2**	**Goukou**	**C/D**	**Moderate**	**C/D**	**50.9**	**24.2**
H90E	gv41	Goukou	C	High	B	105.0	28.2
K10D	giv25	Brandwag	D	High	B	17.9	9.9
K20A	gvii7	Groot-Brak	B/C	Very High	A	27.0	26.5
K20A	**gviii2- EWR GB1-BC**	**Groot-Brak**	**B/C**	**Very High**	**B/C**	**15.3**	**26.5**
K20A	**gvii3-EWR Var 3**	**Varing**	**D**	**High**	**C/D**	**8.4**	**20.9**
K20A	**gviii12- EWR Var2**	**Varing**	**D**	**High**	**C/D**	**6.0**	**20.9**
K30A	**gviii4-EWR**	**Maalgate**	**B**	**Very High**	**A**	**15.3**	**46.0**

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Quaternary Catchment	Node/ EWR site	Water Resource	PES	EIS	REC	nMAR (MCM)	EWR (% nMAR)
K30A	gvii8	Maalgate	B	High	D	30.1	16.4
K30B	gvii9	Malgas	C	Very High	C	17.3	31.6
K30B	**gviii6 EWR Gwa1 -D**	**Gwaing**	**E**	**High**	**D**	**34.1**	**16.4**
K30C	**gviii7 EWR Sw1 - D**	**Swart**	**D**	**High**	**D**	**16.1**	**14.5**
K30C	**gvii11 EWR Ka1 - D**	**Kaaimans**	**B**	**High**	**B**	**18.6**	**50.2**
K30C	**gviii8 EWR Si1 -B**	**Silver**	**B**	**Very High**	**B**	**14.9**	**50.2**
K30D	gvii12	Touws	B	Very High	A	16.7	30.3
K30D	gx8	Klein Keurbooms	D	Very High	B	2.5	14.1
K40A	**giii10 EWR 2 Diep -B**	**Diep**	**B**	**Very High**	**B**	**12.4**	**30.3**
K40B	giii13	Hoekraal	B	Very High	A	27.9	30.3
K40C	**gvii13 EWR 4 Karatara-AB**	**Karatara**	**B**	**Very High**	**A/B**	**11.2**	**40.2**
K40C	giii11	Karatara	A/B	Very High	A	33.8	40,2
K40E	**Gou 1**	**Goukamma**	**B/C**	**Very High**	**B/C**	**30.4**	**38.5**
K50A	**EWR 1**	**Knysna**	**B**	**High**	**B**	**26.5**	**32.1**
K50A	**Kny 2**	**Knysna**	**B**	**-**	**B**	**46.5**	**32.1**
K50B	**EWR 2**	**Gouna**	**A/B**	**Very High**	**A/B**	**27.6**	**53.4**
K60C	**K6KEUR-EWR8**	**Keurbooms**	**C**	**Very High**	**B/C**	**46.1**	**34.9**
K60D	giv5	Palmiet	A	Very High	A	42.1	48.3
K60F	giv4	Bitou	C	Very High	A	23.6	22.8
K60G	**Noe 1**	**Noetsie**	**B**	**Very High**	**A/B**	**4.8**	**63.4**
K60G	gx3	Piesang	D	Very High	A	7.3	28.5
K60E	gx9	Keurbooms	C	Very High	A	91.3	34.9
K70A	gx4	Buffels	B	Very High	B	1.8	34.3
K70A	gx5	Sout	B	Very High	B	3.8	34.3
K70B	gvii15	Bloukrans	B	Very High	B	31.2	33.9

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Table 4.3: Basic Human Needs for the Breede-Gouritz WMA

Quaternary Catchment	Water Resource	BHN (%NMAR)	Quaternary Catchment	Water Resource	BHN (%NMAR)
G40C	Palmiet	0.008	J11C	Buffels	0.02
G40D	Palmiet	0	J11F	Buffels	0.03
G40G	Bot	0.50	J11H	Buffels	0.03
G40H	Onrus	5.88	J11K	Groot	0.36
G40F	Swart	0.17	J12D	Touws	0.03
G40K	Steenbok	0	J12H	Touws	0
G40J	Hartebees	0.08	J12K	Brak	0
G40K	Klein	0	J12L	Doring	0.21
G40M	Uilkraal	0.125	J12M	Touws	0
G50B	Nuwejaar	1.12	J13B	Groot	0.01
G50C	Heuninges	0	J13C	Groot	0
G50E	Kars	0.84	J21D	Gamka	0
G50G	DeHoop Vlei	0.03	J22F	Koekemoers	0.14
G50H	Sout	0.04	J22K	Leeu	0
H10B	Rooikloof	0	J23F	Gamka	0.10
H10C	Dwars	0.70	J23J	Gamka	0
H10D	Breede	0	J24E	Dwyka	0
H10E	Wit	0	J25A	Gamka	0.003
H10F	**Breede**	**0.04**	J25E	Gamka	**0.03**
H10G	Slanghoek	0	J31D	Olifants	0.02
H10J	Elands	0.02	J32E	Traka	0.03
H10K	Holsloot	0	J33B	Olifants	0.02
H10H	Breede	**0**	J33E	Meirings	**0.56**
H10L	Breede	0.005	J34C	Olifants	0.01
H20G	Hex	0.01	J34F	Kammanassie	0.05
H20H	Hex	1.20	J35E	Leeu	0.004
H40B	Koo	2.22	J35F	Olifants	0.01
H40C	Nuy	0.07	J40B	Olifants	0
H40D	Doring	0	J40E	Gouritz	0.003
H40F	Breede	0.002	H80B	Gouritz	0
H40G	Poesnels	0	H80E	Duiwenhoks	0.005
H40K	Keisers	0.32	H90C	Goukou	0.33
H40H	Vink	0.06	H90E	Goukou	0.06
H30C	Pietersfontein	0.07	K10D	Brandwag	0.06
H30B	Kingna	1.33	K20A	Varing	1.50
H30D	Keisie	0.04	K30A	Maalgate	0.39
H30E	Kogmanskloof	0.17	K30B	Malgas	0.18
H50B	Breede	0.004	K30C	Swart	8.99
H60B	Du Toits	0	K30D	Touws	0.54
H60D	Riviersonderend	0.001	K40A	Diep	0.04
H60E	Baviaans	1.14	K40B	Hoekraal	0
H60F	Gobos	0.007	K40C	Karatara	0.54
H60G	Kwartel	0	K40E	Goukamma	0.39
H60H	Soetmelksvlei	0	K50A	Knysna	0.002
H60K	Kwassadie	0	K50B	Gouna	0.47
H60L	Riviersonderend	0	K60C	Keurbooms	0.03
H70A	Leeu	0	K60D	Palmiet	25.26
H70B	Breede	0.01	K60F	Bitou	0.38
H70D	Tradouw	0	K60G	Piesang	4.34
H70F	Buffeljags	0.02	K60E	Keurbooms	0.02
H70G	Breede	0	K70A	Buffels	1.32
H70J	Slang	0.40	K70B	Bloukrans	0.03

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5.SURFACE WATER QUALITY COMPONENT FOR RIVERS AT EWR SITES

BREEDE-OVERBERG

Table 5.1: PES categories and overall site assessment for Breede River at Node Nviii1 (represented by EWR Site 1)

RIVER	Breede River	**WATER QUALITY MONITORING POINTS**	
WQRU	1(Upper Breede River to Wit River confluence)	**RC**	DWA monitoring station @ Koekedou River in Ceres (H1H013Q01) (1998 -2002, n=38)
EWR SITE	EWR Site 1	**PES**	DWA monitoring station @ Witbrug (H1H006Q01) (1998 -2002, n=143)
Confidence assessment	Medium. EWR site is further downstream of DWA monitoring station.		

Water Quality Constituents		**RC Value**	**PES Value**	**Category/Comment**
Inorganic salts (mg/L) 1:95th Percentile values	$MgSO_4$	7	21	Category B
	Na_2SO_4	8	4	Category A
	$MgCl_2$	5	6	Category A
	$CaCl_2$	12	24	Category B
	NaCl	6	27	Category A
	$CaSO_4$	0	0	Category A
Nutrients (mg/L)	SRP	-	-	No data
	TIN	2.8011	0.318	Category B
	TDS	21.8-50.6	< 45	*B Category*. Increased TDS during Winter months
	TSS	-	< 5	Acceptable
	$P0_4$	0.024	0.042	*C Category.*
Physical Variables	pH (5^{th} – 95^{th} %)	6.2-7.5	6.9 – 7.8	*A Category.*
	Temperature	-	-	No data but no concerns noted about DO concentrations
	Dissolved oxygen	-	-	
	Turbidity (NTU)	-	2	
	Electrical conductivity (mS/m)	-	-	No data
Response variables	Chl a: periphyton	-	-	No data
	Chl a: phytoplankton	-	-	No data
	Macroinvertebrates	SASS score = >110 and an ASPT score >7	SASS score = 69 and ASPT score = 5.3	*D/E Category.* Largely modified. Loss of habitat area through infilling.
	Fish community score			*D/E Category.* Introductions of alien fish species, i.e., bass, trout and blue gills.
Toxics		-	No data but pesticide residues are the concern due to intensive agriculture in Ceres	
OVERALL SITE CLASSIFICATION		***A/B Category***		

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Table 5.2: PES categories and overall site assessment for Molenaars River at Node Nvii2 (represented by EWR Site 2)

RIVER	Molenaars River	**WATER QUALITY MONITORING POINTS**		
WQRU	2 (Complete Molenaars River)	**RC**	The Molenaars River @ Hawequas Forest Reserve (H1H018Q01) (1998 -1992, n=93)	
EWR SITE	EWR Site 2	**PES**	The Molenaars River @ Hawequas Forest Reserve (H1H018Q01) (1998 -2002, n=141)	
Confidence assessment	High. Monitoring point is very close to the EWR site. Historic data shows no trends and hence PES data was used for Reference conditions.			
Water Quality Constituents		**RC Value**	**PES Value**	**Category/Comment**
Inorganic salts (mg/L) 1:95th % values	$MgSO_4$	6	6	Category A
	Na_2SO_4	9	9	Category A
	$MgCl_2$	4	4	Category A
	$CaCl_2$	6	6	Category A
	NaCl	9	9	Category A
	$CaSO_4$	0	0	Category A
Nutrients (mg/L)	SRP		-	
	TIN (1:50th %)	0.151	0.151	Category A
	TDS	22	22	Category A
	TSS	< 5	< 5	Category A
	$P0_4$ (1:50th %)	0.025	0.025	Category C
	NH_3-N	<0.015.	<0.015.	Within range
Physical Variables	pH (5th – 95th %)	5.5 – 7.3	5.5 – 7.3	*A Category*. Typical acidic Western Cape river
	Temperature			Within range, Category A
	Dissolved oxygen	80 - 120% saturation.	80 - 120% saturation.	
	Turbidity (NTU)	-	0	
	Electrical conductivity (mS/m)	-	-	No data
Response variables	Chl a: periphyton	-	-	No data
	Chl a: phytoplankton	-	-	No data
	Macroinvertebrates	SASS score ≥140 and an ASPT score >8	SASS score = 175 and ASPT score = 7.9	*A/B Category*. Catchment is relatively pristine
	Fish community score			*E Category*. No indigenous fish were recorded during the study
Toxics		-	-	No toxic substance concerns
OVERALL SITE CLASSIFICATION		***A Category***		

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Table 5.3: PES categories and overall site assessment for Breede River at Node Nvii8 (represented by EWR Site 3)

RIVER	Breede River		**WATER QUALITY MONITORING POINTS**	
WQRU	3 (Middle Breede from Molenaars confluence to Kogmanskloof confluence)		**RC**	None. No WQ monitoring station could provide reference data for this Resource Unit.
EWR SITE	EWR Site 3		**PES**	Breede River at Le Chasseur (H4H017Q01) (1995 -1999, n=214)
Confidence assessment	Moderate			
Water Quality Constituents		**RC Value**	**PES Value**	**Category/Comment**
Inorganic salts (mg/L) (1:95th %)	$MgSO_4$	-	39	Category D
	Na_2SO_4	-	5	Category A
	$MgCl_2$	-	12	Category A
	$CaCl_2$	-	32	Category B
	NaCl	-	95	Category B
	$CaSO_4$	-	0	Category A
Nutrients (mg/L)	SRP	-		
	TIN (1:50th %)	-	0.242	Category A
	TDS	-	< 45	*B Category.* High TDS loads. Irrigation return flows in tributaries and main stem between Brandvlei Dam and EWR Site 3.
	TSS	-	< 5	High TSS loads. Releases from Brandvlei to alleviate high TDS.
	$P0_4$ (1:50th %)	-	0.032	C Category
Physical Variables	pH (5th – 95th %)	-	6.9 – 7.8	A Category
	Temperature (°C)	-	22.4	Summer temperature
	Dissolved oxygen	-	-	No observed data
	Turbidity (NTU)	-	-	No data. Low sediment production area
	Electrical conductivity (mS/m)	-	-	No data
Response variables	Chl a: periphyton	-	-	No data
	Chl a: phytoplankton	-	-	No data
	Macroinvertebrates	SASS score ≥110 and an ASPT score >7	SASS score = 91 and ASPT score = 7	*A Category.* Suggest there is no significant impact to community structure.
	Fish community score	-		*D Category.* Only 2 of the 7 indigenous freshwater species expected to occur there were sampled.
Toxics		-	-	No data but Pesticides are a concern as a result of intensive agriculture
OVERALL SITE CLASSIFICATION		***D Category.*** *Mainly due to increased summer low flows and increased sediment load.*		

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Table 5.4: PES categories and overall site assessment for Breede River at Node Niii4 (represented by EWR Site 4)

RIVER	Breede River		**WATER QUALITY MONITORING POINTS**	
WQRU	6 (Breede River from Buffelsjags River to Estuary)		**RC**	None. No WQ monitoring station could provide reference data for this Resource Unit.
EWR SITE	EWR Site 4		**PES**	Lower Breede River @ Swellendam (H7H006Q01) (1995 -1999, n=214)
Confidence assessment	Moderate (There were no observed hydrological data for this reach of the river and flow in the river during field visits was often too high to allow for discharge readings to be taken; Monitoring point quite far upstream)			
Water Quality Constituents			**RC Value**	**PES Value**	**Category/Comment**
Inorganic salts (mg/L) (1:95th %)	$MgSO_4$		-	83	Category E/F
	Na_2SO_4		-	3	Category A
	$MgCl_2$		-	49	Category D
	$CaCl_2$		-	62	Category C
	NaCl		-	318	Category D
	$CaSO_4$		-	0	Category A
Nutrients (mg/L)	SRP		-	-	No data
	TIN (1:50th %)		-	0.23	Category A
	TDS		-	-	*C Category*. High TDS loads due to Irrigation return flows in tributaries and main
	TSS		-	-	No data
	$P0_4$ (1:50th %)		-	0.024	*C Category*
	NH_3-N		-	0.3 (Median)	No historic data
	NO_2NO_3-N		-	<1	Recommended winter concentrations but summer can be as low as < 0.3 mg/l
Physical Variables	pH (5th – 95th %)		-	6.9 – 8.1	Category A/B. No significant change.
	Temperature (°C)		-	-	No observed data. Some concerns about short-term fluctuation in DO levels.
	Dissolved oxygen		-	-	
	Turbidity (NTU)		-	-	
	Electrical conductivity (mS/m)		-	-	No data
Response variables	Chl a: periphyton		-	-	No data
	Chl a: phytoplankton		-	-	No data
	Macroinvertebrates		SASS score ≥110 and an ASPT score >7	SASS score = 87 and ASPT score = 6.9	*B Category*. Moderately impacted.
	Fish community score		10 indigenous fish species		*C Category*. Presence of carp and bass.
Toxics			-		No data but pesticide residues are the concern due to intensive agriculture.
OVERALL SITE CLASSIFICATION			***D Category.*** *Dependent on high quality inflow from Buffelsjags River to ensure acceptable WQ in the lower Breede Resource Unit & Estuary*		

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Table 5.5: PES categories and overall site assessment for Riviersonderend at Node Nv7 (represented by EWR site 5)

RIVER	Riviersonderend River	**WATER QUALITY MONITORING POINTS**	
WQRU	7 (Middle Riviersonderend River from Theewaterskloof Dam to Bok River	**RC**	Riviersonderend at Swart River/Nuweberg Forest Reserve (H6H008Q01) (1990 -1992, n=34)
EWR SITE	EWR Site 5	**PES**	Riviersonderend at Theewaterskloof Dam (H6H012Q01) (1998 -2002, n=39) Riviersonderend at Reenen (H6H009Q01) (1995 -1999, n=56)
Confidence assessment	High		

Water Quality Constituents		**RC Value**	**PES Value**	**Category/Comment**
Inorganic salts (mg/L) 1:95th % value	$MgSO_4$	7	12	Category A
	Na_2SO_4	7	13	Category A
	$MgCl_2$	4	14	Category A
	$CaCl_2$	5	14	Category A
	NaCl	11	99	Category B
	$CaSO_4$	0	0	Category A
Nutrients (mg/L)	SRP	-	-	No data
	TIN (1:50th %)	0.068	0.154	Category A.
	TDS	13.6-32	Summer: <100 and winter: < 150	*B Category*. High TDS loads due to agricultural return flows in winter
	TSS	< 5	-	No data
	$P0_4$ (1:50th %)	<0.0165	0.013	Category B. Slightly higher.
	NO_2NO_3-N	0.02	<0.25	Recommended winter concentrations but summer can be as low as < 0.2 mg/l
Physical Variables	pH (5th – 95th %)	6.5 – 7.5	6.4 - 7.4	*A/B Category*.
	Temperature (°C)	+-4 °C	-	No data
	Dissolved oxygen	80 - 120% saturation	-	
	Turbidity (NTU)	-	4	
	Electrical conductivity (mS/m)	-	-	No data
Response variables	Chl a: periphyton	-	-	No data
	Chl a: phytoplankton	-	-	No data
	Macroinvertebrates	SASS score ≥110 and an ASPT score >7	SASS score = 95 and ASPT score = 6.8	*C/D Category*. Most of the reach has good water quality but poor habitat quality.
	Fish community score	Six indigenous fish species		*E Category*. Dominated by large and small mouth bass. Reduction of indigenous fish species.
Toxics		-	-	No data but pesticide residues are the concern due to intensive agriculture upstream of EWR site
OVERALL SITE CLASSIFICATION		***A/B Category*** (The presence of Theewaterskloof Dam has slightly reduced the water quality in the downstream river)		

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Table 5.6: PES categories and overall site assessment for Baviaans River at Node Niv28 (represented by EWR Site 6)

RIVER	Baviaans River	**WATER QUALITY MONITORING POINTS**		
WQRU	9 (Complete Baviaans River)	**RC**	Baviaans River at Genadendal Mission Station (H6H005Q01) (1972 -1994, n=346)	
EWR SITE	EWR Site 6	**PES**	Baviaans River at Genadendal Mission Station (H6H005Q01) (1998 -2002, n=42)	
Confidence assessment	High. Good data record to assess both reference and PES. Historic data shows no trends and hence PES data was used for Reference conditions			
Water Quality Constituents		**RC Value**	**PES Value**	**Category/Comment**
Inorganic salts (mg/L) 1:95th % value	$MgSO_4$	9	9	Category A
	Na_2SO_4	9	9	Category A
	$MgCl_2$	4	4	Category A
	$CaCl_2$	10	10	Category A
	NaCl	25	25	Category A
	$CaSO_4$	0	0	Category A
Nutrients (mg/L)	SRP	-	-	No data
	TIN (1:50th % value)	0.04	0.040	Category A
	TDS	41	41	Category A
	TSS	-	-	No data
	$P0_4$ (1:50th % value)	0.022	0.022	Category A
Physical Variables	pH (5th – 95th %)	4.7 – 7.1	4.7 – 7.0	*A Category*. Regarded as natural for low pH Western Cape Rivers
	Temperature (°C)	-	-	No data but no DO concerns
	Dissolved oxygen	-	-	
	Turbidity (NTU)	-	-	
	Electrical conductivity (mS/m)	-	-	No data
Response variables	Chl a: periphyton	-	-	No data
	Chl a: phytoplankton	-	-	No data
	Macroinvertebrates	SASS score ≥140 and an ASPT score >8	SASS score = 109 and ASPT score = 8.38	*A Category*. Reduced habitat.
	Fish community score	Three indigenous fish species		*A/B Category.* All species expected to occur here historically, were recorded
Toxics		-	-	No data but no toxic substance concerns noted
OVERALL SITE CLASSIFICATION		***A Category***		

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Table 5.7: PES categories and overall site assessment for Duiwenhoks River at H8DUIW-EWR1

RIVER	Duiwenhoks River	**WATER QUALITY MONITORING POINTS**	
WQRU		**RC**	DWS gauging weir H8H001Q01 (1967 – 1979; number of samples (n) = 66 - 71, Electrical Conductivity: n = 110).
EWR SITE	H8DUIW-EWR1	**PES**	DWS gauging weir H8H001Q01 (2007 – 2013; n = 69, Fluorine (F) = 48).
Confidence assessment	Confidence: 3.5		
Water Quality Constituents		**PES Value**	**Category/Comment**
Inorganic salts (mg/L)	SO_4	N/A	-
	Na	382.2	Exceeds the ≤ 70 mg/L (TWQR) for Agricultural Use: Irrigation.
	Mg	67.4	No guideline.
	Ca	55.0	No guideline.
	Cl	805.4	Exceeds the ≤ 100 mg/L (TWQR) for Agricultural Use: Irrigation.
	K	9.25	No guideline.
Nutrients (mg/L)	SRP	0.014	A
	TIN	0.118	A
Physical Variables	pH (5^{th} – 95^{th} %)	6.6 and 8.1	B
	Temperature (°C)	N/A	A/B. Impacts expected at low flows.
	Dissolved oxygen	N/A	B. Impacts expected at low flows.
	Turbidity (NTU)	N/A	B. Changes in turbidity appear to be largely related to natural with minor man-made modifications, e.g. gravel mining upstream
	Electrical conductivity (mS/m)	272	80 mS/m
Response variables	Chl a: phytoplankton	N/A	N/A
	Macroinvertebrates	50.7% SASS score = 78 ASPT score = 56	D
	Diatoms	11.1	C/D (n = 1, Jan 2014)
	Fish community score	51.6%	D (all estuarine spp. that moved into the freshwater zone and aliens).
Toxics	Ammonia (as N)	0.003	A
	Fluoride (as F)	0.33	A
OVERALL SITE CLASSIFICATION		***C Category***	

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Table 5.8: Water quality EcoSpecs and TPCs (C category) for Duiwenhoks River at H8DUIW-EWR1

Metrics	EcoSpecs	TPCs
Inorganic salt ions		
Sulphate as SO_4	N/A	N/A
Sodium as Na	The 95th percentile of the data must be ≤ 380 mg/L.	The 95th percentile of the data must be 300 - 380 mg/L.
Magnesium as Mg	The 95th percentile of the data must be ≤ 67 mg/L.	The 95th percentile of the data must be 53.5 - 67 mg/L.
Calcium as Ca	The 95th percentile of the data must be ≤ 55 mg/L.	The 95th percentile of the data must be 44 - 55 mg/L.
Chloride as Cl	The 95th percentile of the data must be ≤ 800 mg/L.	The 95th percentile of the data must be 640 - 800 mg/L.
Potassium as K	The 95th percentile of the data must be ≤ 9 mg/L.	The 95th percentile of the data must be 7 - 9 mg/L.
Physical Variables		
Electrical conductivity (mS/m)	The 95th percentile of the data must be ≤ 270 mS/m.	The 95th percentile of the data must be 210 - 270 mS/m.
pH	The 5th percentile of the data must be 6.5. – 8.0, and the 95th percentile 8.0 - 8.8.	The 5th percentile of the data is ≤ 6.3 and the 95th percentile is ≥ 8.6.
Temperature[(a)]	Natural temperature range.	Initiate baseline monitoring for this variable.
Dissolved oxygen[(a)](DO)	The 5th percentile of the data must be ≥ 7.0 mg/L.	The 5th percentile of the data must be 7.2 - 7.0 mg/L. Initiate baseline monitoring for this variable.
Turbidity[(a)]	Changes in turbidity are related to minor man-made modifications (e.g. gravel mining upstream). Some silting of habitats is expected.	Initiate baseline monitoring for this variable.
Nutrients		
TIN	The 50th percentile of the data must be ≤ 0.25 mg/L.	The 50th percentile of the data must be 0.2 - 0.25 mg/L.
PO_4-P	The 50th percentile of the data must be ≤ 0.015 mg/L.	The 50th percentile of the data must be 0.012 - 0.015 mg/L.
Response variables		
Chl-a phytoplankton	The 50th percentile of the data must be < 15 µg/L.	The 50th percentile of the data must be 12 - 15 µg/L.
Chl-a periphyton	The 50th percentile of the data must be ≤ 12 mg/m^2.	The 50th percentile of the data must be 10 - 12 mg/m^2.
Toxics		
Fluoride	The 50th percentile of the data must be ≤ 1.5 mg/L.	The 50th percentile of the data must be 1.2 - 1.5 mg/L.
Ammonia (NH_3-N)	The 50th percentile of the data must be ≤ 0.015 mg/L.	The 50th percentile of the data must be 0.012 - 0.015 mg/L.
Other toxics	The 95th percentile of the data must be within the Target Water Quality Range (TWQR) as stated in DWAF (1996) or the A Category boundary as stated in DWAF (2008).	An impact is expected if the 95th percentile of the data exceeds the TWQR as stated in DWAF (1996) or the upper limit of the A Category boundary as stated in DWAF (2008).

(a) N/A- No data were available for this assessment.

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Table 5.9: PES categories and overall site assessment for Goukou River at H9GOUK-EWR2

RIVER	Goukou River	**WATER QUALITY MONITORING POINTS**	
WQRU		**RC**	Reference Condition (RC) was represented by the A Category benchmark tables in DWAF (2008), as no other data were available to describe natural state.
EWR SITE	H9GOUK-EWR2	**PES**	DWS gauging weir H9H005Q01 (2007 – 2014; n = 63 - 71, F = 52).
Confidence assessment	Confidence: 3		

Water Quality Constituents		**PES Value**	**Category/Comment**
Inorganic salts (mg/L)	SO_4	N/A	N/A
	Na	650.4	Exceeds the ≤ 70 mg/L (TWQR) for Agricultural Use: Irrigation.
	Mg	79.0	No guideline.
	Ca	57.1	No guideline.
	Cl	1081.3	Exceeds the ≤ 100 mg/L (TWQR) for Agricultural Use: Irrigation.
	K	20.4	No guideline.
Nutrients (mg/L)	SRP	0.085	D
	TIN	0.055	A
Physical Variables	pH (5^{th} – 95^{th} %)	6.6 and 8.35	B
	Temperature (°C)	N/A	A/B. Impacts expected at low flows.
	Dissolved oxygen	N/A	B. Impacts expected at low flows.
	Turbidity (NTU)	N/A	A/B. Changes in turbidity appear to be largely related to natural.
	Electrical conductivity (mS/m)	408.4	E/F
Response variables	Chl a: phytoplankton	N/A	N/A
	Macroinvertebrates	51.2% SASS score =113 ASPT score = 6.6	D
	Diatoms	14.4 and 11.0	C/D (n = 2; Jan and July 2014)
	Fish community score	47.4%	D
Toxics	Ammonia (as N)	0.01	A
	Fluoride (as F)	0.59	A
OVERALL SITE CLASSIFICATION		***C/D Category***	

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Table 5.10: Water quality EcoSpecs and TPCs (Category: C/D) for Goukou River at GOUK-EWR2

Metrics	EcoSpecs	TPCs
Inorganic salt ions		
Sulphate as SO_4	N/A	N/A
Sodium as Na	The 95th percentile of the data is between ≤ 650 mg/L.	The 95th percentile of the data is between 520 - 650 mg/L.
Magnesium as Mg	The 95th percentile of the data is between ≤ 80 mg/L.	The 95th percentile of the data is between 64 - 80 mg/L.
Calcium as Ca	The 95th percentile of the data is between ≤ 55 mg/L.	The 95th percentile of the data is between 44 - 55 mg/L.
Chloride as Cl	The 95th percentile of the data is between ≤ 1 000 mg/L.	The 95th percentile of the data is between 800 - 1 000 mg/L.
Potassium as K	The 95th percentile of the data is between ≤ 20 mg/L.	The 95th percentile of the data is between 16 - 20 mg/L.
Physical variables		
Electrical conductivity (mS/m)	The 95th percentile of the data is between ≤ 400 mS/m.	The 95th percentile of the data is between 320 - 400 mS/m.
pH	The 5th percentile of the data must be 6.5. – 8.0, and the 95th percentile 8.0 - 8.8.	The 5th percentile of the data is ≤ 6.3 and the 95th percentile is ≥ 8.6.
Temperature[(a)]	Natural temperature range.	Initiate baseline monitoring for this variable.
Dissolved oxygen[(a)]	The 5th percentile of the data is between ≥ 7.0 mg/L.	The 5th percentile of the data is between 7.2 - 7.0 mg/L. Initiate baseline monitoring for this variable.
Turbidity[(a)]	Changes in turbidity are related to minor man-made modifications. Some silting of habitats is expected.	Initiate baseline monitoring for this variable.
Nutrients		
TIN-N	The 50th percentile of the data is between ≤ 0.25 mg/L.	The 50th percentile of the data is between 0.2 - 0.25 mg/L.
PO_4-P	The 50th percentile of the data is between ≤ 0.125 mg/L.	The 50th percentile of the data is between 0.1 - 0.125 mg/L.
Response variables[(a)]		
Chl-a phytoplankton	The 50th percentile of the data is between < 15 µg/L.	The 50th percentile of the data is between 12 - 15 µg/L.
Chl-a periphyton	The 50th percentile of the data is between ≤ 21 mg/m^2.	The 50th percentile of the data is between 17 - 21 mg/m^2.
Toxics		
Fluoride	The 50th percentile of the data is between ≤ 1.5 mg/L.	The 50th percentile of the data is between 1.2 - 1.5 mg/L.
Ammonia (NH_3-N)	The 50th percentile of the data is between ≤ 0.015 mg/L.	The 50th percentile of the data is between 0.012 - 0.015 mg/L.
Other toxics	The 95th percentile of the data is between within the TWQR as stated in DWAF (1996) or the A Category boundary as stated in DWAF (2008).	An impact is expected if the 95th percentile of the data exceeds the TWQR as stated in DWAF (1996) or the upper limit of the A Category boundary as stated in DWAF (2008).

(a) N/A: No data were available for this assessment.

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Table 5.11: PES categories and overall site assessment for Touws River at J1TOUW-EWR3

RIVER	Touws River		**WATER QUALITY MONITORING POINTS**	
WQRU			**RC**	N/A
EWR SITE	J1TOUW-EWR3		**PES**	J1H018Q01 (Water Management System (WMS) code 102147), located upstream of the EWR site. (Data record: 2000 – 2014; number of samples (n) = ± 128).
Confidence assessment	2.5			
Water Quality Constituents			**PES Value**	**Category/Comment**
Inorganic salts (mg/L)	SO_4		N/A	All guidelines exceeded due to high saline geology of the area. It is assumed that some increase in salinity may be expected due to irrigation return flows. No large urban centers are situated in this area.
	Na		2 016.9	
	Mg		370.1	
	Ca		258.2	
	Cl		3 494.6	
	K		37.06	
Nutrients (mg/L)	SRP		0.033	D
	TIN		0.079	A
Physical Variables	pH (5^{th} – 95^{th} %)		7.6 and 8.6	B
	Temperature (°C)		N/A	B. Impacts expected at low flows. B. Impacts expected at low flows, although on-site data still shows high levels. B. Changes in turbidity appear to be largely related to natural with minor man-made modifications.
	Dissolved oxygen		N/A	
	Turbidity (NTU)		N/A	
	Electrical conductivity (mS/m)		1181.8	
Response variables	Chl a: phytoplankton		N/A	N/A
	Macroinvertebrates		74.0%	C
	Diatoms		8.6 (average)	D
	Fish community score		56.8%	D
Toxics	Ammonia (as N)		0.034	A
	Fluoride (as F)		0.43	A
OVERALL SITE CLASSIFICATION			***B/C Category***	

Note:
RC: Information available to the water quality specialist on water quality conditions and land-use were used as no RC data were available and the A Category benchmarks tables in DWAF (2008) were considered unsuitable due to the high geology-based salinities in the area.

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Table 5.12: Water quality EcoSpecs and TPCs (Category B/C) for Touws River at J1TOUW-EWR3

Metrics	EcoSpecs	TPCs
Inorganic salt ions		
Sulphate as SO_4	N/A	
Sodium as Na	The 95th percentile of the data is between ≤ 2000 mg/L.	The 95th percentile of the data is between 1600 - 2000 mg/L.
Magnesium as Mg	The 95th percentile of the data is between ≤ 370 mg/L.	The 95th percentile of the data is between 300 - 370 mg/L.
Calcium as Ca	The 95th percentile of the data is between ≤ 260 mg/L.	The 95th percentile of the data is between 200 - 260 mg/L.
Chloride as Cl	The 95th percentile of the data is between ≤ 3500 mg/L.	The 95th percentile of the data is between 2800 - 3500 mg/L.
Potassium as K	The 95th percentile of the data is between ≤ 37 mg/L.	The 95th percentile of the data is between 30 - 37 mg/L.
Physical variables		
Electrical conductivity (mS/m)	The 95th percentile of the data is between ≤ 1100 mS/m.	The 95th percentile of the data is between 880 - 1100 mS/m.
pH	The 5th percentile of the data is between 6.5 – 8.0, and the 95th percentile 8.0 - 8.8.	The 5th percentile of the data is ≤ 6.3 and the 95th percentile is ≥ 8.6.
Temperature	Natural temperature range.	Initiate baseline monitoring for this variable.
Dissolved oxygen	The 5th percentile of the data is between ≥ 7.0 mg/L.	The 5th percentile of the data is between 7.2 - 7.0 mg/L. Initiate baseline monitoring for this variable.
Turbidity	Changes in turbidity are related to minor man-made modifications. Some silting of habitats is expected.	Initiate baseline monitoring for this variable.
Nutrients		
TIN-N	The 50th percentile of the data is between ≤ 0.25 mg/L.	The 50th percentile of the data is between 0.2 - 0.25 mg/L.
PO_4-P	The 50th percentile of the data is between ≤ 0.075 mg/L.	The 50th percentile of the data is between 0.06 - 0.075 mg/L.
Response variables		
Chl-a phytoplankton	The 50th percentile of the data is between < 15 µg/L.	The 50th percentile of the data is between 12 - 15 µg/L.
Chl-a periphyton	The 50th percentile of the data is between ≤ 21 mg/m^2.	The 50th percentile of the data is between 17 - 21 mg/m^2.
Toxics		
Fluoride	The 50th percentile of the data is between ≤ 1.5 mg/L.	The 50th percentile of the data is between 1.2 - 1.5 mg/L.
Ammonia (NH_3-N)	The 50th percentile of the data is between ≤ 0.015 mg/L.	The 50th percentile of the data is between 0.012 - 0.015 mg/L.
Other toxics	The 95th percentile of the data is between within the TWQR as stated in DWAF (1996) or the A Category boundary as stated in DWAF (2008).	An impact is expected if the 95th percentile of the data exceeds the TWQR as stated in DWAF (1996) or the upper limit of the A Category boundary as stated in DWAF (2008).

(a) N/A: No data were available for this assessment.

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Table 5.13: PES categories and overall site assessment for Gamka River at J2GAMK-EWR4

RIVER	Gamka River	**WATER QUALITY MONITORING POINTS**	
WQRU		**RC**	A category benchmark tables from DWAF (2008) were used.
EWR SITE	J2GAMK-EWR4	**PES**	Data were sourced from DWS gauging weir J2H016Q01 (WMS code 102173), located downstream Gamkapoort Dam and upstream of the EWR site. (Data record: 2007 – 2014; n = 127).
Confidence assessment	3.0		
Water Quality Constituents		**PES Value**	**Category/Comment**
Inorganic salts (mg/L)	SO_4	N/A	
	Na	114.0	Exceeds the 70mg/l (TWQR) for Agricultural Use: Irrigation
	Mg	20.5	No guideline
	Ca	57.6	No guideline
	Cl	155.5	Exceeds the 100mg/l (TWQR) for Agricultural Use: Irrigation
	K	7.9	No guideline
Nutrients (mg/L)	SRP	0.07	D
	TIN	0.523	B
Physical Variables	pH (5^{th} – 95^{th} %)	7.4 and 8.6	
	Temperature (°C)	N/A	Impact expected as the site is downstream of the Gamkapoort Dam (constructed in 1970)
	Dissolved oxygen	N/A	
	Turbidity (NTU)	N/A	
	Electrical conductivity (mS/m)	97.5	C. Natural salinity expected to be higher than the 30Ms/m A category benchmark value in DWAF (2008)
Response variables	Chl a: phytoplankton	N/A	N/A
	Macroinvertebrates	61.4%	C/D
	Diatoms	9.9	D
	Fish community score	60.4%	*C/D*
Toxics	Ammonia (as N)	0.015	A
	Fluoride (as F)	0.53	A
OVERALL SITE CLASSIFICATION		***B/C Category***	

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Table 5.14: Water quality EcoSpecs and TPCs (PES: B/C) for Gamka River at J2GAMK-EWR4

Metrics	EcoSpecs: PES	TPCs: PES
Inorganic salt ions		
Sulphate as SO_4	N/A	N/A
Sodium as Na	The 95th percentile of the data is between ≤ 114 mg/L.	The 95th percentile of the data is between 90 - 114 mg/L.
Magnesium as Mg	The 95th percentile of the data is between ≤ 20 mg/L.	The 95th percentile of the data is between 16 - 20 mg/L.
Calcium as Ca	The 95th percentile of the data is between ≤ 58 mg/L.	The 95th percentile of the data is between 47 - 58 mg/L.
Chloride as Cl	The 95th percentile of the data is between ≤ 155 mg/L.	The 95th percentile of the data is between 124 - 155 mg/L.
Potassium as K	The 95th percentile of the data is between ≤ 8 mg/L.	The 95th percentile of the data is between 6.5 - 8.0 mg/L.
Physical variables		
Electrical conductivity (mS/m)	The 95th percentile of the data is between ≤ 100 mS/m.	The 95th percentile of the data is between 80 - 100 mS/m.
pH	The 5th percentile of the data is between 5.9 - 6.5, and the 95th percentile 8.0 - 8.8.	The 5th percentile of the data is ≤ 5.7 and the 95th percentile is ≥ 8.6.
Temperature[(a)]	Moderate change to temperature due to upstream Gamkapoort Dam.	Initiate baseline monitoring for this variable.
Dissolved oxygen[(a)]	The 5th percentile of the data is between ≥ 7.0 mg/L. Although some impacts are expected due to the upstream Gamkapoort Dam, the size of the river will mitigate the effects.	The 5th percentile of the data is between 7.2 - 7.0 mg/L. Initiate baseline monitoring for this variable.
Turbidity[(a)]	Changes in turbidity are related to minor man-made modifications. Some silting of habitats is expected.	Initiate baseline monitoring for this variable.
Nutrients		
TIN-N	The 50th percentile of the data is between ≤ 0.7 mg/L.	The 50th percentile of the data is between 0.56 - 0.7 mg/L.
PO_4-P	The 50th percentile of the data is between ≤ 0.125 mg/L.	The 50th percentile of the data is between 0.1 - 0.125 mg/L.
Response variables		
Chl-a phytoplankton	The 50th percentile of the data is between < 15 µg/L.	The 50th percentile of the data is between 12 - 15 µg/L.
Chl-a periphyton	The 50th percentile of the data is between ≤ 21 mg/m^2.	The 50th percentile of the data is between 17 - 21 mg/m^2.
Toxics		
Fluoride	The 50th percentile of the data is between ≤ 1.5 mg/L.	The 50th percentile of the data is between 1.2 - 1.5 mg/L.
Ammonia (NH_3-N)	The 50th percentile of the data is between ≤ 0.015 mg/L.	The 50th percentile of the data is between 0.012 - 0.015 mg/L.
Other toxics	The 95th percentile of the data is between within the TWQR as stated in DWAF (1996) or the A Category boundary as stated in DWAF (2008).	An impact is expected if the 95th percentile of the data exceeds the TWQR as stated in DWAF (1996) or the upper limit of the A Category boundary as stated in DWAF (2008).

(a) N/A: No data were available for this assessment.

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Table 5.15: PES categories and overall site assessment for Buffels River at J1BUFF-EWR5

RIVER	Buffels	**WATER QUALITY MONITORING POINTS**	
WQRU		**RC**	Data were sourced from DWS gauging weir J1H028Q01 (WMS code 102152), located downstream Floriskraal Dam and upstream of the EWR site. Note that the monitoring point is not in the same Level II EcoRegion as the EWR site; however, this was the only data point between the dam and the site. (Data record: 1972 – 1977; n = 54, Conductivity: n = 33).
EWR SITE	J1BUFF-EWR5	**PES**	Data were sourced from DWS gauging weir J1H028Q01 (WMS code 102152) (Data record: 2010 – 2014; n = 44).
Confidence assessment	Confidence: 2.5		

Water Quality Constituents		**PES Value**	**Category/Comment**
Inorganic salts (mg/L)	SO_4	61.42	No guideline
	Na	81.44	Exceeds the ≤ 70 mg/L (TWQR) for Agricultural Use: Irrigation.
	Mg	25.2	No guideline.
	Ca	48.68	No guideline.
	Cl	124.0	Exceeds the ≤ 100 mg/L (TWQR) for Agricultural Use: Irrigation.
	K	6.11	No guideline.
Nutrients (mg/L)	SRP	0.015	B. Levels have decreased since the 1970s.
	TIN	0.26	A/B. No change from the 1970s.
Physical Variables	pH (5^{th} – 95^{th} %)	7.5 and 8.5	B. No change from the 1970s.
	Temperature (°C)	N/A	Impact expected as the site is downstream the large Floriskraal Dam (constructed in 1965).
	Dissolved oxygen	N/A	
	Turbidity (NTU)	N/A	
	Electrical conductivity (mS/m)	78.1	No change from the 1970s.
Response variables	Chl a: phytoplankton	N/A	N/A
	Macroinvertebrates	72.0%	C
	Diatoms	11.2 (average)	C/D
	Fish community score	83.7%	B
Toxics	Ammonia (as N)	0.017	A
	Fluoride (as F)	0.66	A. No change from the 1970s.
OVERALL SITE CLASSIFICATION		***B/C Category***	

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Table 5.16: Water quality EcoSpecs and TPCs (Category B/C) for Buffels River at J1BUFF-EWR5

Metrics	EcoSpecs: PES	TPCs: PES
Inorganic salt ions		
Sulphate as SO_4	The 95th percentile of the data is between ≤ 60 mg/L.	The 95th percentile of the data is between 48 - 60 mg/L.
Sodium as Na	The 95th percentile of the data is between ≤ 80 mg/L.	The 95th percentile of the data is between 64 - 80 mg/L.
Magnesium as Mg	The 95th percentile of the data is between ≤ 25 mg/L.	The 95th percentile of the data is between 20 - 25 mg/L.
Calcium as Ca	The 95th percentile of the data is between ≤ 50 mg/L.	The 95th percentile of the data is between 40 - 50 mg/L.
Chloride as Cl	The 95th percentile of the data is between ≤ 125 mg/L.	The 95th percentile of the data is between 100 – 125 mg/L.
Potassium as K	The 95th percentile of the data is between ≤ 6.0 mg/L.	The 95th percentile of the data is between 4.8 - 6.0 mg/L.
Physical variables		
Electrical conductivity (mS/m)	The 95th percentile of the data is between ≤ 85 mS/m.	The 95th percentile of the data is between 68 - 85 mS/m.
pH	The 5th percentile of the data is between 5.9 - 6.5, and the 95th percentile 8.0 - 8.8.	The 5th percentile of the data is ≤ 5.7 and the 95th percentile is ≥ 8.6.
Temperature	Moderate change to temperature expected due to upstream Floriskraal Dam.	Initiate baseline monitoring for this variable.
Dissolved oxygen	The 5th percentile of the data is between ≥ 7.0 mg/L. Although some impacts are expected due to the upstream Floriskraal Dam, the size of the river should mitigate the effects.	The 5th percentile of the data is between 7.2 - 7.0 mg/L. Initiate baseline monitoring for this variable.
Turbidity	Changes in turbidity are related to minor man-made modifications. Some silting of habitats is expected.	Initiate baseline monitoring for this variable.
Nutrients		
TIN-N	The 50th percentile of the data is between ≤ 0.48 mg/L.	The 50th percentile of the data is between 0.38 - 0.48 mg/L.
PO_4-P	The 50th percentile of the data is between ≤ 0.015 mg/L.	The 50th percentile of the data is between 0.012 - 0.015 mg/L.
Response variables		
Chl-a phytoplankton	The 50th percentile of the data is between < 10 µg/L.	The 50th percentile of the data is between 8 - 10 µg/L.
Chl-a periphyton	The 50th percentile of the data is between ≤ 12 mg/m^2.	The 50th percentile of the data is between 10 - 12 mg/m^2.
Toxics		
Fluoride	The 50th percentile of the data is between ≤ 1.5 mg/L.	The 50th percentile of the data is between 1.2 - 1.5 mg/L.
Ammonia (NH_3-N)	The 50th percentile of the data is between ≤ 0.015 mg/L.	The 50th percentile of the data is between 0.012 - 0.015 mg/L.
Other toxics	The 95th percentile of the data is between within the TWQR as stated in DWAF (1996) or the A Category boundary as stated in DWAF (2008).	An impact is expected if the 95th percentile of the data exceeds the TWQR as stated in DWAF (1996) or the upper limit of the A Category boundary as stated in DWAF (2008).

(a) N/A: No data were available for this assessment.

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Table 5.17: PES categories and overall site assessment for Gouritz River at J4GOUR-EWR6

RIVER	Gouritz River	**WATER QUALITY MONITORING POINTS**	
WQRU		**RC**	Data were sourced from DWS gauging weir J4H002Q01 (WMS code 102201), located upstream of the EWR site. (Data record: 1965 – 1967; n = 29)
EWR SITE	J4GOUR-EWR6	**PES**	Data were sourced from DWS gauging weir J4H002Q01 (Data record: 2010 – 2014; n = 85).
Confidence assessment	Confidence 3		

Water Quality Constituents		**PES Value**	**Category/Comment**
Inorganic salts (mg/L)	SO_4	693.0	No guideline, but a reduction over time.
	Na	964.0	Exceeds the ≤ 70 mg/L (TWQR) for Agricultural Use: Irrigation. *Significant increase over time.*
	Mg	127.0	No guideline.
	Ca	123.3	No guideline.
	Cl	1 289.3	Exceeds the ≤ 100 mg/L (TWQR) for Agricultural Use: Irrigation.
	K	9.81	No guideline.
Nutrients (mg/L)	SRP	0.015	B/C
	TIN	0.05	A
Physical Variables	pH (5^{th} – 95^{th} %)	7.8 and 8.65	B
	Temperature (°C)	N/A	Impact expected at low flows.
	Dissolved oxygen	N/A	
	Turbidity (NTU)	N/A	
	Electrical conductivity (mS/m)	542.5	No change from the 1970s.
Response variables	Chl a: phytoplankton	N/A	N/A
	Macroinvertebrates	75.0%	C
	Diatoms	10.2 (average)	C/D
	Fish community score	50.1%	D
Toxics	Ammonia (as N)	0.015	A
	Fluoride (as F)	1.082	A. Substantial increase from the 1960s.
OVERALL SITE CLASSIFICATION		**B/C** ***Category***	

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Table 5.18: Water quality) EcoSpecs and TPCs (Category B/C) for Gouritz River at J4GOUR-EWR6

Metrics	EcoSpecs	TPCs
Inorganic salt ions		
Sulphate as SO_4	The 95th percentile of the data is between ≤ 690 mg/L.	The 95th percentile of the data is between 550 - 690 mg/L.
Sodium as Na	The 95th percentile of the data is between ≤ 960 mg/L.	The 95th percentile of the data is between 770 - 960 mg/L.
Magnesium as Mg	The 95th percentile of the data is between ≤ 130 mg/L.	The 95th percentile of the data is between 105 - 130 mg/L.
Calcium as Ca	The 95th percentile of the data is between ≤ 120 mg/L.	The 95th percentile of the data is between 95 - 120 mg/L.
Chloride as Cl	The 95th percentile of the data is between ≤ 1300 mg/L.	The 95th percentile of the data is between 1050 - 1300 mg/L.
Potassium as K	The 95th percentile of the data is between ≤ 10 mg/L.	The 95th percentile of the data is between 8 - 10 mg/L.
Physical variables		
Electrical conductivity (mS/m)	The 95th percentile of the data is between ≤ 550 mS/m.	The 95th percentile of the data is between 450 - 550 mS/m.
pH	The 5th percentile of the data is between 5.9 - 6.5, and the 95th percentile 8.0 - 8.8.	The 5th percentile of the data is ≤ 5.7 and the 95th percentile is ≥ 8.6.
Temperature	Natural temperature range.	Initiate baseline monitoring for this variable.
Dissolved oxygen	The 5th percentile of the data is between ≥ 7.0 mg/L.	The 5th percentile of the data is between 7.2 - 7.0 mg/L. Initiate baseline monitoring for this variable.
Turbidity	Changes in turbidity are related to minor man-made modifications. Some silting of habitats is expected.	Initiate baseline monitoring for this variable.
Nutrients		
TIN-N	The 50th percentile of the data is between ≤ 0.25 mg/L.	The 50th percentile of the data is between 0.2 - 0.25 mg/L.
PO_4-P	The 50th percentile of the data is between ≤ 0.015 mg/L.	The 50th percentile of the data is between 0.012 - 0.015 mg/L.
Response variables		
Chl-a phytoplankton	The 50th percentile of the data is between < 10 µg/L.	The 50th percentile of the data is between 8 - 10 µg/L.
Chl-a periphyton	The 50th percentile of the data is between ≤ 12 mg/m^2.	The 50th percentile of the data is between 10 - 12 mg/m^2.
Toxics		
Fluoride	The 50th percentile of the data is between ≤ 1.5 mg/L.	The 50th percentile of the data is between 1.2 - 1.5 mg/L.
Ammonia (NH_3-N)	The 50th percentile of the data is between ≤ 0.015 mg/L.	The 50th percentile of the data is between 0.012 - 0.015 mg/L.
Other toxics	The 95th percentile of the data is between within the TWQR as stated in DWAF (1996) or the A Category boundary as stated in DWAF (2008).	An impact is expected if the 95th percentile of the data exceeds the TWQR as stated in DWAF (1996) or the upper limit of the A Category boundary as stated in DWAF (2008).

(a) N/A: No data were available for this assessment.

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Table 5.19: PES categories and overall site assessment for Keurbooms River at K6KEUR-EWR8

RIVER	Keurbooms River	**WATER QUALITY MONITORING POINTS**	
WQRU		**RC**	A Category benchmark tables from DWAF (2008) were used.
EWR SITE	K6KEUR-EWR8	**PES**	Data were sourced from DWS gauging weir K6H001Q01 (WMS code 102295), located far (about 20 km) upstream of the EWR site. (Data record: 2007 – 2014; n = 121; Fluorine (F) = 107)
Confidence assessment	Confidence 3		

Water Quality Constituents		**PES Value**	**Category/Comment**
Inorganic salts (mg/L)	SO_4	27.90	No guideline.
	Na	70.24	Just outside the ≤ 70 mg/L (TWQR) for Agricultural Use: Irrigation.
	Mg	11.25	No guideline.
	Ca	12.08	No guideline.
	Cl	129.02	Just exceeds the ≤ 100 mg/L (TWQR) for Agricultural Use: Irrigation.
	K	2.76	No guideline.
Nutrients (mg/L)	SRP	0.012	B
	TIN	0.06	A
Physical Variables	pH (5^{th} – 95^{th} %)	6.6 and 7.8	B
	Temperature (°C)	N/A	B. Some impacts expected at low flows, although on-site data still shows high levels. B. Changes in turbidity appear to be largely related to natural with minor man-made modifications.
	Dissolved oxygen	N/A	
	Turbidity (NTU)	N/A	
	Electrical conductivity (mS/m)	54.6	B
Response variables	Chl a: phytoplankton	N/A	
	Macroinvertebrates	64.0%	C
	Diatoms	9.9 (average)	C/D
	Fish community score	76.4%	C
Toxics	Ammonia (as N)	0.001	A
	Fluoride (as F)	0.26	A
OVERALL SITE CLASSIFICATION		***B Category***	

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Table 5.20: Water quality EcoSpecs and TPCs (Category B) for Keurbooms River at K6KEUR-EWR8

Metrics	Eco Specs	TPCs
Inorganic salt ions		
Sulphate as SO_4	The 95th percentile of the data is between ≤ 28 mg/L.	The 95th percentile of the data is between 22 - 28 mg/L.
Sodium as Na	The 95th percentile of the data is between ≤ 70 mg/L.	The 95th percentile of the data is between 56 - 70 mg/L.
Magnesium as Mg	The 95th percentile of the data is between ≤ 12 mg/L.	The 95th percentile of the data is between 10 - 12 mg/L.
Calcium as Ca	The 95th percentile of the data is between ≤ 12 mg/L.	The 95th percentile of the data is between 10 - 12 mg/L.
Chloride as Cl	The 95th percentile of the data is between ≤ 130 mg/L.	The 95th percentile of the data is between 104 - 130 mg/L.
Potassium as K	The 95th percentile of the data is between ≤ 3 mg/L.	The 95th percentile of the data is between 2.4 - 3.0 mg/L.
Physical variables		
Electrical conductivity (mS/m)	The 95th percentile of the data is between ≤ 55 mS/m.	The 95th percentile of the data is between 45 - 55 mS/m.
pH	The 5th and 95th percentile of the data is between 6.5 - 8.0.	The 5th and 95th percentile of the data is ≥ 6.3 and ≤ 8.2.
Temperature	Natural temperature range.	Initiate baseline monitoring for this variable.
Dissolved oxygen	The 5th percentile of the data is between ≥ 7.0 mg/L.	The 5th percentile of the data is between 7.2 - 7.0 mg/L. Initiate baseline monitoring for this variable.
Turbidity	Changes in turbidity are related to minor man-made modifications. Some silting of habitats is expected.	Initiate baseline monitoring for this variable.
Nutrients		
TIN-N	The 50th percentile of the data is between ≤ 0.25 mg/L.	The 50th percentile of the data is between 0.2 - 0.25 mg/L.
PO_4-P	The 50th percentile of the data is between ≤ 0.015 mg/L.	The 50th percentile of the data is between 0.012 - 0.0715 mg/L.
Response variables		
Chl-a phytoplankton	The 50th percentile of the data is between < 10 µg/L.	The 50th percentile of the data is between 8 - 10 µg/L.
Chl-a periphyton	The 50th percentile of the data is between ≤ 12 mg/m^2.	The 50th percentile of the data is between 9.6 - 12.0 mg/m^2.
Toxics		
Fluoride	The 50th percentile of the data is between ≤ 1.5 mg/L.	The 50th percentile of the data is between 1.2 - 1.5 mg/L.
Ammonia (NH_3-N)	The 50th percentile of the data is between ≤ 0.015 mg/L.	The 50th percentile of the data is between 0.012 - 0.015 mg/L.
Other toxics	The 95th percentile of the data is between within the TWQR as stated in DWAF (1996) or the A Category boundary as stated in DWAF (2008).	An impact is expected if the 95th percentile of the data exceeds the TWQR as stated in DWAF (1996) or the upper limit of the A Category boundary as stated in DWAF (2008).

(a) N/A: No data were available for this assessment.

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Table 5.21: PES categories and overall site assessment for Olifants River at J3OLIF-EWR9

RIVER	Olifants River	**WATER QUALITY MONITORING POINTS**	
WQRU		**RC**	Information available to the water quality specialist on water quality conditions and land-use were available and the A Category benchmark tables in DWAF (2008) were considered unsuitable.
EWR SITE	J3OLIF-EWR9	**PES**	Data were sourced from DWS gauging weir J3H021Q01 (WMS code 102192) was used for the present state assessment located downstream of the EWR site and upstream of Stompdrift Dam. (Data record: 1982 – 1993; n = 127).
Confidence assessment	**Confidence: 2.5**		

Water Quality Constituents		**PES Value**	**Category/Comment**
Inorganic salts (mg/L)	SO_4	1 353.4	No guideline but concentrations are high.
	Na	1 774.5	Exceeds the ≤ 70 mg/L (TWQR) for Agricultural Use: Irrigation.
	Mg	336.0	No guideline
	Ca	284.4	No guideline
	Cl	3 113	Exceeds the ≤ 100 mg/L (TWQR) for Agricultural Use: Irrigation.
	K	30.16	No guideline.
Nutrients (mg/L)	SRP	0.019	B/C
	TIN	0.11	A
Physical Variables	pH (5^{th} – 95^{th} %)	7.3 and 9.0	B/C but assumed to be linked to the groundwater signature.
	Temperature (°C)	N/A	C. Impact expected when little surface flow.
	Dissolved oxygen	N/A	
	Turbidity (NTU)	N/A	B/C. Impact expected due to extensive livestock farming and erosion in the area.
	Electrical conductivity (mS/m)	1 078.7	Natural salinity expected to be high due to the geology of the area
Response variables	Chl a: phytoplankton	N/A	N/A
	Macroinvertebrates	69.0%	C
	Diatoms	6.0 (average)	D/E
	Fish community score	N/A	
Toxics	Ammonia (as N)	0.038	B
	Fluoride (as F)	0.678	A
OVERALL SITE CLASSIFICATION		***C Category***	

(a) N/A: No data were available for this assessment.

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Table 5.22: Water quality EcoSpecs and TPCs (Category C) for Olifants River at J3OLIF-EWR9

Metrics	Eco Specs	TPCs
Inorganic salt ions		
Sulphate as SO_4	The 95th percentile of the data is between ≤ 1350 mg/L.	The 95th percentile of the data is between 1080 - 1350 mg/L.
Sodium as Na	The 95th percentile of the data is between ≤ 1775 mg/L.	The 95th percentile of the data is between 1420 - 1775 mg/L.
Magnesium as Mg	The 95th percentile of the data is between ≤ 335 mg/L.	The 95th percentile of the data is between 270 - 335 mg/L.
Calcium as Ca	The 95th percentile of the data is between ≤ 285 mg/L.	The 95th percentile of the data is between 230 - 285 mg/L.
Chloride as Cl	The 95th percentile of the data is between ≤ 3000 mg/L.	The 95th percentile of the data is between 2400 - 3000 mg/L.
Potassium as K	The 95th percentile of the data is between ≤ 30 mg/L.	The 95th percentile of the data is between 24 - 30 mg/L.
Physical variables		
Electrical conductivity (mS/m)	The 95th percentile of the data is between ≤ 1100 mS/m.	The 95th percentile of the data is between 880 - 1100 mS/m.
pH	The 5th percentile of the data is between 5.9 - 6.5, and the 95th percentile 8.8 - 9.2.	The 5th percentile of the data is ≤ 5.7 and the 95th percentile is ≥ 9.0.
Temperature	The upper Olifants mostly runs underground, with water appearing in places. This is not groundwater from a deep aquifer, but water from the vadose zone. Elevated temperatures and low DO levels would be expected under these conditions. EcoSpecs and TPCs are therefore difficult to set for these variables, and should rather be linked to meeting biotic requirements and monitoring biotic responses.	Initiate baseline monitoring for this variable.
Dissolved oxygen		Initiate baseline monitoring for this variable where and if possible.
Turbidity	Changes in turbidity are related to minor man-made modifications. Some silting of habitats and temporary high turbidity levels are expected.	Initiate baseline monitoring for this variable.
Nutrients		
TIN-N	The 50th percentile of the data is between ≤ 0.25 mg/L.	The 50th percentile of the data is between 0.2 - 0.25 mg/L.
PO_4-P	The 50th percentile of the data is between ≤ 0.025 mg/L.	The 50th percentile of the data is between 0.02 - 0.025 mg/L.
Response variables[(a)]		
Chl-a phytoplankton	The 50th percentile of the data is between < 15 µg/L.	The 50th percentile of the data is between 12 - 15 µg/L.
Chl-a periphyton	The 50th percentile of the data is between ≤ 21 mg/m^2.	The 50th percentile of the data is between 17 - 21 mg/m^2.
Toxics		
Fluoride	The 50th percentile of the data is between ≤ 1.5 mg/L.	The 50th percentile of the data is between 1.2 - 1.5 mg/L.
Ammonia (NH_3-N)	The 50th percentile of the data is between ≤ 0.044 mg/L.	The 50th percentile of the data is between 0.035 - 0.044 mg/L.
Other toxics	The 95th percentile of the data is between within the TWQR as stated in DWAF (1996) or the A Category boundary as stated in DWAF (2008).	An impact is expected if the 95th percentile of the data exceeds the TWQR as stated in DWAF (1996) or the upper limit of the A Category boundary as stated in DWAF (2008).

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Table 5.23: PES categories and overall site assessment for Kammanassie River at J3KAMM-EWR10

RIVER	Kammanassie River	**WATER QUALITY MONITORING POINTS**	
WQRU		**RC**	No data were available for the water quality assessment. Land use and available information, diatom data, *in situ* water quality data and survey notes were used to provide an expert opinion and generate a PAI model and integrated water quality category for the site.
EWR SITE	J3KAMM-EWR10	**PES**	N/A
Confidence assessment	Confidence: 2		

Water Quality Constituents		**PES Value**	**Category/Comment**
Inorganic salts (mg/L)	SO_4	N/A	N/A
	Na	N/A	N/A
	Mg	N/A	N/A
	Ca	N/A	N/A
	Cl	N/A	N/A
	K	N/A	N/A
Nutrients (mg/L)	SRP	N/A	N/A
	TIN	N/A	N/A
Physical Variables	pH (5^{th} – 95^{th} %)	N/A	N/A
	Temperature (°C)	N/A	N/A
	Dissolved oxygen	N/A	N/A
	Turbidity (NTU)	N/A	N/A
	Electrical conductivity (mS/m)	N/A	N/A
Response variables	Chl a: phytoplankton	N/A	N/A
	Macroinvertebrates	C/D	
	Diatoms	C/D	The biological water quality at this site was Moderate. Nutrient levels, organic pollution and salinity were elevated with salinity and organic pollution levels becoming problematic. The improvement in diatom-based water quality could mainly be ascribed to higher flows during July 2014 which allowed for the flushing of pollutants as diatom species associated with elevated flows were abundant.
	Fish community score	D	
Toxics	Ammonia (as N)		
	Fluoride (as F)		
OVERALL SITE CLASSIFICATION		***C Category***	

a) N/A: No data were available for this assessment.
Note that limited water quality data exists for the Kammanassie River system. The water quality assessment is therefore based on available information and expert judgement.

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Table 5.24: PES categories and overall site assessment for Groot Brak WQSU 1 & 2. (expert judgment)

RIVER	Groot Brak River		**WATER QUALITY MONITORING POINTS**	
WQSU	WQSU 1 + 2		**RC**	Default boundary tables for "A" category river
EWR SITE	None		**PES**	Groot Brak R. at Ernest Robertson dam - K2H005-Q01 (1983 – 1996; n = 29)
Confidence assessment	Very low because extrapolated from outflow from a dam, and not current data.			
Water Quality Constituents			**Value**	**Category/Comment**
Inorganic salts (mg/L)	$MgSO_4$			No data
	Na_2SO_4			
	$MgCl_2$			
	$CaCl_2$			
	NaCl			
	$CaSO_4$			
Nutrients (mg/L)	SRP (mg/l)		0.042	Unreliable data used
	TIN (mg/l)		<0.25	A category
Physical Variables	pH (5^{th} – 95^{th} %)		4.62	Naturally acidic
	Temperature			No data
	Dissolved oxygen			Expected to be high
	Turbidity (NTU)			Expected to be low
	Electrical conductivity (mS/m)		<30	A category
Response variables	Chl a: periphyton			No data
	Chl a: phytoplankton			No data
	Macroinvertebrates (ASPT)			No data
	Fish community score			No data
Toxics				No data – expected to be minimal
OVERALL SITE CLASSIFICATION			**A/B** (from expert judgment)	

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Table 5.25: Water quality Ecospecs and TPC's (Category A/B) for Groot Brak River at WQSU 1&2

RIVER		Groot Brak River	**WATER QUALITY MONITORING POINTS**			
WQSU		WQSU 1&2	**DWAF WQ WMS**	Currently, no monitoring station		
EWR SITE		GB 1	**RHP**	Currently, no monitoring site		
Confidence in PES assessment		Very Low because extrapolated from WQSU 3				
Water Quality Constituents		**PES Category**	**WQ Ecospecs**	**Improvement required?**	**TPC**	**Monitoring frequency**
Inorganic salts (mg/L)	$MgSO_4$	Not available	≤23 mg/L	N/A	95th percentile to be < 23 mg/L	Monthly
	Na_2SO_4		≤33 mg/L		95th percentile to be < 33 mg/L	
	$MgCl_2$		≤30 mg/L		95th percentile to be < 30 mg/L	
	$CaCl_2$		≤57 mg/L		95th percentile to be < 57 mg/L	
	NaCl		≤191 mg/L		95th percentile to be < 191 mg/L	
Nutrients (mg/L)	SRP	Category = C.	≤0.012 mg/L	Yes to A	50th percentile to be < 0.012 mg/L	Monthly
	TIN	Category = A	≤0.25 mg/L	No	50th percentile to be < 0.25 mg/L	Monthly
Physical Variables	pH	Naturally acidic river	< 7.9	No	95th percentile to be < 7.9	Monthly
	Temperature	No data, but not considered to be problem in this river.	Maintain range	N/A	Maintain natural range	Monthly
	Dissolved oxygen		7 – 8 mg/L	N/A	5th percentile to be > 7 mg/L	Monthly
	Turbidity (NTU)		Moderate change	N/A	Moderate change allowed	Monthly
	Electrical conductivity (mS/m)	Category = A	≤30 mS/m	No	95th percentile to be < 30 mS/m	Monthly
Response variables	Chl a: periphyton	No data. Visual inspection March & June. No obvious sign of algae.	≤12 mg/m^2 (B category)	N/A	50th percentile to be < 12 mg/ m^2	Quarterly
	Chl a: phytoplankton		≤ 15 µg/L (B category)		50th percentile to be < 15 µg/L	
	Macroinvertebrates (ASPT)	A (this study)	See Ecospecs for fish and invertebrates respectively			
	Fish community score	C (this study				
	Instream toxicity	No data	Assess only if the biomonitoring results indicate that there is a serious problem and the cause is unknown.			
Toxics		No data. Possibly some pesticides				

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Table 5.26: PES categories and overall site assessment for Groot Brak Water at WQSU 3

RIVER	Groot Brak River		**1.1.1 WATER QUALITY MONITORING POINTS**	
WQSU	WQSU 3		**RC**	Moordkuil R. at Banff - K1H005 (1979 – 1982 n = 91)
EWR SITE	GB 1		**PES**	K1H005 (2002 – 2006 n = 51)
Confidence assessment	Medium. NB: Because extrapolated from another catchment. Biological data support inferred water quality			
Water Quality Constituents		**RC value**	**PES Value**	**Category/Comment**
Inorganic salts (mg/L)	$MgSO_4$			No data
	Na_2SO_4			
	$MgCl_2$			
	$CaCl_2$			
	NaCl			
	$CaSO_4$			
Nutrients (mg/L)	SRP	0.006*	0.029	Category = C. Increase in trend
	TIN	0.04	0.06	Category = A. Trend stable
Physical Variables	pH (5^{th} – 95^{th} %)	Not calculated	6.6 – 7.9	
	Temperature			No data, but not considered to be problem variables, as not downstream of a major dam.
	Dissolved oxygen			
	Turbidity (NTU)			Slightly turbid on site visits in March and June 2007 (but after heavy rains).
	Electrical conductivity (mS/m)	40	30	Slight decrease in trend
Response variables	Chl a: periphyton			No data. Visual inspection March and June – no obvious signs of algae.
	Chl a: phytoplankton			
	Macroinvertebrates (ASPT)	-	A	Natural; ASPT = 8.0; SASS = 192 (this study)
	Fish community score	-	C	This study
Toxics				No data. Possibly some pesticides from agriculture.
OVERALL SITE CLASSIFICATION		**B** (from PAI model)		

Table 5.27: Water quality Ecospecs and TPC's (Category B) for Groot Brak River at WQSU 3

RIVER		Groot Brak River	**WATER QUALITY MONITORING POINTS**			
WQSU		3	**DWAF WQ WMS**	Currently, no monitoring station		
EWR SITE		GB 1	**RHP**	Currently, no monitoring site		
Confidence in PES assessment		Low – medium, because extrapolated from Moordkuil R. Biological data supports inferred PES for water quality.				
Water Quality Constituents		**PES Category**	**WQ Ecospecs**	**Improvement required?**	**TPC**	**Monitoring frequency**
Inorganic salts (mg/L)	$MgSO_4$	Not available	≤23 mg/L	N/A	95th percentile to be < 23 mg/L	Monthly
	Na_2SO_4		≤33 mg/L		95th percentile to be < 33 mg/L	
	$MgCl_2$		≤30 mg/L		95th percentile to be < 30 mg/L	
	$CaCl_2$		≤57 mg/L		95th percentile to be < 57 mg/L	
	NaCl		≤191 mg/L		95th percentile to be < 191 mg/L	
Nutrients (mg/L)	SRP	Category = C.	≤0.02 mg/L	Yes to B	50th percentile to be < 0.02 mg/L	Monthly
	TIN	Category = A	≤0.25 mg/L	No	50th percentile to be < 0.25 mg/L	Monthly
Physical Variables	pH	Naturally acidic river	< 7.9	No	95th percentile to be < 7.9	Monthly
	Temperature	No data, but not considered to be problem in this river.	Maintain range	N/A	Maintain natural range	Monthly
	Dissolved oxygen		7 – 8 mg/L	N/A	5th percentile to be > 7 mg/L	Monthly
	Turbidity (NTU)		Moderate change	N/A	Moderate change allowed	Monthly
	Electrical conductivity (mS/m)	Category = A	≤30 mS/m	No	95th percentile to be < 30 mS/m	Monthly
Response variables	Chl a: periphyton	No data. Visual inspection March & June. No obvious sign of algae.	≤12 mg/m^2 (B category)	N/A	50th percentile to be < 12 mg/ m^2	Quarterly
	Chl a: phytoplankton		≤ 15 µg/L (B category)		50th percentile to be < 15 µg/L	
	Macroinvertebrates (ASPT)	A (this study)	See Ecospecs for fish and invertebrates respectively			
	Fish community score	C (this study				
	Instream toxicity	No data	Assess only if the biomonitoring results indicate that there is a serious problem and the cause is unknown.			
Toxics		No data. Possibly some pesticides				

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Table 5.28: PES categories and overall site assessment for Groot Brak WQSU 4 (*boundary value recalibrated) (expert judgment)

RIVER	Groot Brak		**WATER QUALITY MONITORING POINTS**	
WQSU	4		**RC**	Groot Brak R. at Wolwedans - K2H002-Q01 (1976 – 1978; n = 68)
EWR SITE	None		**PES**	K2H002 (2002 – 2006; n = 57)
Confidence assessment	**Very good. Monitoring station located in WQSU, above point source of village. Data collected from > 15 years before dam construction**			
Water Quality Constituents		**RC Value**	**PES Value**	**Category/Comment**
Inorganic salts (mg/L)	$MgSO_4$			No data
	Na_2SO_4			
	$MgCl_2$			
	$CaCl_2$			
	NaCl			
	$CaSO_4$			
Nutrients (mg/L)	SRP	0.016*	0.037	Category = C. Trend increasing
	TIN	0.04	0.075	Category = A. Trend increasing
Physical Variables	pH (5^{th} – 95^{th} %)		6.8 – 8.1	Based on Monitoring station located in WQSU, above point source of village
	Temperature		No data	May be a problem considering downstream of dam. Requires monitoring
	Dissolved oxygen		No data	
	Turbidity (NTU)		No data	
	Electrical conductivity (mS/m)	30	52	Category = B. Trend increasing
Response variables	Chl a: periphyton			No data
	Chl a: phytoplankton			No data
	Macroinvertebrates (ASPT)			No data
	Fish community score			No data
Toxics				No data
OVERALL SITE CLASSIFICATION		**B/C** (expert judgment)		

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Table 5.29: Water quality Ecospecs and TPC's (Category B/C) for Groot Brak River at WQSU 4

RIVER		Groot Brak River	**WATER QUALITY MONITORING POINTS**			
WQSU		4	**DWAF WQ WMS**	Currently, no monitoring station		
EWR SITE		GB 1	**RHP**	Currently, no monitoring site		
Confidence in PES assessment		Very Low, because extrapolated from WQSU 3.				
Water Quality Constituents		**PES Category**	**WQ Ecospecs**	**Improvement required?**	**TPC**	**Monitoring frequency**
Inorganic salts (mg/L)	$MgSO_4$	Not available	≤23 mg/L	N/A	95th percentile to be < 23 mg/L	Monthly
	Na_2SO_4		≤33 mg/L		95th percentile to be < 33 mg/L	
	$MgCl_2$		≤30 mg/L		95th percentile to be < 30 mg/L	
	$CaCl_2$		≤57 mg/L		95th percentile to be < 57 mg/L	
	NaCl		≤191 mg/L		95th percentile to be < 191 mg/L	
Nutrients (mg/L)	SRP	Category = C.	≤0.025 mg/L	Yes to B/C	50th percentile to be < 0.025 mg/L	Monthly
	TIN	Category = A	≤0.25 mg/L	No	50th percentile to be < 0.25 mg/L	Monthly
Physical Variables	pH	Naturally acidic river	< 7.9	No	95th percentile to be < 7.9	Monthly
	Temperature	No data, but not considered to be problem in this river.	Maintain range	N/A	Maintain natural range	Monthly
	Dissolved oxygen		7 – 8 mg/L	N/A	5th percentile to be > 7 mg/L	Monthly
	Turbidity (NTU)		Moderate change	N/A	Moderate change allowed	Monthly
	Electrical conductivity (mS/m)	Category = A	≤30 mS/m	No	95th percentile to be < 30 mS/m	Monthly
Response variables	Chl a: periphyton	No data. Visual inspection March & June. No obvious sign of algae.	≤12 mg/m^2 (B category)	N/A	50th percentile to be < 12 mg/ m^2	Quarterly
	Chl a: phytoplankton		≤ 15 µg/L (B category)		50th percentile to be < 15 µg/L	
	Macroinvertebrates (ASPT)	A (this study)	See Ecospecs for fish and invertebrates respectively			
	Fish community score	C (this study				
	Instream toxicity	No data	Assess only if the biomonitoring results indicate that there is a serious problem and the cause is unknown.			
Toxics		No data. Possibly some pesticides				

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Table 5.30: Water quality Ecospecs and TPC's for Malgas River at WQSU2

RIVER	Malgas River		**WATER QUALITY MONITORING POINTS**		
WQSU	WQSU 2	**RC**	Default values		
EWR SITE	Mal 1	**PES**	Malgas R. at Blanco - K3H004-Q01 ('01 – '06 n = 53)		
Confidence assessment	Good for the overall WQSU. Low for the EWR Site.				
Water Quality Constituents		**RC Value**	**PES Value**	**Category/Comment**	**G-power (Confidence)**
Inorganic salts (mg/L)	$MgSO_4$				No data
	Na_2SO_4				
	$MgCl_2$				
	$CaCl_2$				
	NaCl				
	$CaSO_4$				
Nutrients (mg/L)	SRP	≤0.005	0.038	Category = C. Trend increasing.	0.116 (Low)
	TIN	≤0.25	0.413	Category = A/B. Trend increasing	
Physical Variables	pH (5^{th} + 95^{th} %ile)		4.3 + 7.2	Naturally acidic.	0.84 (High)
	Temperature	16.3 (50%ile)	-	No PES data. Not expected to be a problem since no dam upstream	
	Dissolved oxygen				
	Turbidity (NTU)			No data. Could be a problem due to quarry	
	Electrical conductivity (mS/m)	<30	15	Category = A. Trend = slight increase	0.64 (Medium)
Response variables	Chl a: periphyton			No data	No data (but visual inspection at EWR site indicated localised problem).
	Chl a: phytoplankton			No data	
	Macroinvertebrates			**A** category; ASPT = 8.2, SASS = 164 (this study)	
	Fish community score			**C/D** (this study)	
Toxics				No data. Possible toxicity from quarry/cement/asphalt works, outflows from village and agricultural return flows	
OVERALL SITE CLASSIFICATION		**B Category** (from PAI model)			

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Table 5.31: PES categories and overall site assessment for Maalgate River

RIVER	Moeras/Maalgate River	**WATER QUALITY MONITORING POINTS**	
WQSU	N/A	RC	Default boundary tables for A category river
EWR SITE	Moe 1 & Maa 2	PES	Maalgate R. @ Noetze Kamma K3H003 ('02 – '06; n = 52)
Confidence assessment	Good.		

Water Quality Constituents		**Value**	**Category/Comment**
Nutrients (mg/L)	SRP	0.019	Category = B (TP = 0.015 mg/L)
	TIN	0.1	Category = A
Physical Variables	pH (5^{th} – 95^{th} %)	5.7 – 7.7	Naturally acidic
	Temperature		No data. May be impacted (by abstraction)
	Dissolved oxygen		No data. May be impacted (due to excessive abstraction)
	Turbidity (NTU)		No data. Site visit indicated not elevated.
	Electrical conductivity (mS/m)	63	Category = C
Response variables	Chl a: periphyton		No data. Site visit indicated extensive periphyton
	Chl a: phytoplankton		No data
	Macroinvertebrates (ASPT)		D (present study) Fair (RHP)
	Fish community score		D (present study)
Toxics			No data – expected to be pesticides from intensive agricultural activity
OVERALL SITE CLASSIFICATION		**C Category (from expert judgement)**	

Boundary values		
Determinant	**Lower boundary value**	**Upper boundary value**
TIN (mg/L) – 50^{th} %ile		2.0
PHYTOPLANKTON Chl a (µg/L) – 50^{th} %ile	15	20
SRP or PO4 (mg/L) – 50^{th} %ile		0.058
PERIPHYTON Chl a (mg/m^2) – 50^{th} %ile	12	21
pH – 5^{th} %ile and 95^{th} %ile	5^{th} percentile: 5.00 – 5.23	
TEMPERATURE (°C) – 10 th %ile and 90 th %ile	Vary by no more than 2°C from natural range	
Dissolved oxygen (mg/L) - 5^{th} %ile	6	
BIOLOGICAL INDICATOR (ASPT)	5.67	

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Table 5.32: PES categories and overall site assessment for Gwaing (Malgas/Keur River) at WQSU1

RIVER	Malgas River (Keur River)		**WATER QUALITY MONITORING POINTS**	
WQSU	WQSU 1		**RC**	Rooi R. @ George K3H002-Q01 ('77 – '79 n = 84)
EWR SITE	None		**PES**	K3H002-Q01 ('01 – '06 n = 65)
Confidence assessment	Low. NB: extrapolated from an adjacent catchment			
Water Quality Constituents		**RC Value**	**PES Value**	**Category/Comment**
Inorganic salts (mg/L)	$MgSO_4$			No data
	Na_2SO_4			
	$MgCl_2$			
	$CaCl_2$			
	NaCl			
	$CaSO_4$			
Nutrients (mg/L)	SRP	0.014	≤0.014*	Category = A
	TIN	0.04	≤0.25*	Category = A
Physical Variables	pH (5^{th} – 95^{th} %)		3.7 – 6.7	Naturally acidic
	Temperature			No data but expected to be natural as little development in upstream catchment.
	Dissolved oxygen			
	Turbidity (NTU)			
	Electrical conductivity (mS/m)	16	17	Category = A
Response variables	Chl a: periphyton			No data
	Chl a: phytoplankton			
	Macroinvertebrates			Good (RHP)
	Fish community score			Natural (RHP)
Toxics				No data
OVERALL SITE CLASSIFICATION		**A Category** (from expert judgement)		

Boundary values		
Determinant	**Lower boundary value**	**Upper boundary value**
TIN (mg/L) – 50^{th} %ile		≤ 0.25
PHYTOPLANKTON Chl a (µg/L) – 50^{th} %ile		<10
SRP or PO4 (mg/L) – 50^{th} %ile		≤ 0.005
PERIPHYTON Chl a (mg/m^2) – 50^{th} %ile		< 1.7
pH – 5^{th} %ile and 95^{th} %ile	6.5 – 8.00	
TEMPERATURE (°C) – 10^{th} %ile and 90^{th} %ile	Nat temp range	
Dissolved oxygen (mg/L) - 5^{th} %ile	>8	
BIOLOGICAL INDICATOR (ASPT)	7	

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Table 5.33: PES categories and overall site assessment for Gwaing (Malgas River) at WQSU2

RIVER	Malgas River	**WATER QUALITY MONITORING POINTS**	
WQSU	WQSU 2	**RC**	Default values
EWR SITE	Mal 1	**PES**	Malgas R. @ Blanco - K3H004-Q01 ('01 – '06 n = 53)
Confidence assessment	Good for the overall WQSU. Low for the EWR Site.		

Water Quality Constituents		**RC Value**	**PES Value**	**Category/Comment**	**G-power (Confidence)**
Inorganic salts (mg/L)	$MgSO_4$				No data
	Na_2SO_4				
	$MgCl_2$				
	$CaCl_2$				
	NaCl				
	$CaSO_4$				
Nutrients (mg/L)	SRP	≤0.005	0.038	Category = C. Trend increasing.	0.116 (Low)
	TIN	≤0.25	0.413	Category = A/B. Trend increasing	
Physical Variables	pH (5^{th} – 95^{th} %)		4.3 – 7.2	Naturally acidic.	0.84 (High)
	Temperature	16.3 (50%ile)	-	No PES data. Not expected to be a problem since no dam upstream	
	Dissolved oxygen				
	Turbidity (NTU)			No data. Could be a problem due to quarry	
	Electrical conductivity (mS/m)	<30	15	Category = A. Trend = slight increase	0.64 (Medium)
Response variables	Chl a: periphyton			No data	No data (but visual inspection indicated localised problem).
	Chl a: phytoplankton			No data	
	Macroinvertebrates			**A** category; ASPT = 8.2, SASS = 164 (this study)	
	Fish community score			**C/D** (this study)	
Toxics				No data. Possible toxicity from quarry/cement/asphalt works, outflows from village and return flows	
OVERALL SITE CLASSIFICATION		**B Category** (from PAI model). **Likely to be better at EWR site itself.**			

Boundary values		
Determinant	**Lower boundary value**	**Upper boundary value**
TIN (mg/L) – 50^{th} %ile		0.75
PHYTOPLANKTON Chl a (µg/L) – 50^{th} %ile	5	10
SRP or PO4 (mg/L) – 50^{th} %ile		0.02
PERIPHYTON Chl a (mg/m^2) – 50^{th} %ile	1.7	12
pH – 5^{th} %ile and 95^{th} %ile	5^{th} percentile: 6.00 – 6.24 95^{th} percentile: 8.37 – 8.69	
TEMPERATURE (°C) – 10^{th} %ile and 90^{th} %ile	Nat temp range	
Dissolved oxygen (mg/L) - 5^{th} %ile	7	
BIOLOGICAL INDICATOR (ASPT)	6.34	

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Table 5.34: PES categories and overall site assessment for Gwaing (Gwaing River) at WQSU3

RIVER	Gwaing River	**WATER QUALITY MONITORING POINTS**		
WQSU	WQSU 3	**RC**	Default values	
EWR SITE	None	**PES**	No DWAF monitoring station	
Confidence assessment	Low for RC as default values used. Medium for the PES as no monitoring station, but supported by biomonitoring data and (limited) supplementary data.			
Water Quality Constituents		**RC Value**	**PES Value**	**Category/Comment**
Inorganic salts (mg/L)	$MgSO_4$			No data
	Na_2SO_4			
	$MgCl_2$			
	$CaCl_2$			
	NaCl			
	$CaSO_4$			
Nutrients (mg/L)	SRP	≤0.005	1.4 mg/L	Category = F
	TIN	≤0.25		Category = D
Physical Variables	pH (5^{th} – 95^{th} %)			
	Temperature			No data. Likely to be a problem with low DO and elevated turbidity
	Dissolved oxygen			
	Turbidity (NTU)			
	Electrical conductivity (mS/m)	<30	49	
Response variables	Chl a: periphyton			No data
	Chl a: phytoplankton			
	Macroinvertebrates (ASPT)			RHP = “Poor water quality”
	Fish community score			
Toxics				No data, but likely to be a problem
OVERALL SITE CLASSIFICATION		**D/E Category** (expert judgement)		

Boundary values		
Determinant	**Lower boundary value**	**Upper boundary value**
TIN (mg/L) – 50^{th} %ile		4.0
PHYTOPLANKTON Chl a (µg/L) – 50^{th} %ile	20	30
SRP or PO4 (mg/L) – 50^{th} %ile		0.125
PERIPHYTON Chl a (mg/m^2) – 50^{th} %ile	21	84
pH – 5^{th} %ile and 95^{th} %ile	5^{th} percentile: 5.46 – 5.7 95^{th} percentile: 8.56 – 10.00	
TEMPERATURE (°C) – 10^{th} %ile and 90^{th} %ile	Vary by no more than 4°C from natural range	
Dissolved oxygen (mg/L) - 5^{th} %ile	4	
BIOLOGICAL INDICATOR (ASPT)	5	

Where a difference in the water quality values for the Ecological Reserve and Basic Human Needs Reserve was found, the stricter or more protective value was selected for the water quality component of the Reserve.

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Table 5.35: PES categories and overall site assessment for the Kaaimans River at WQSU 2

RIVER	Kaaimans River	**WATER QUALITY MONITORING POINTS**	
WQSU	WQSU 2	**RC**	Kaaimans R. @ Barbierskraal - K3H001-Q01 ('77 – '81; n = 175)
EWR SITE	Ka1	**PES**	K3H001-Q01 ('01 – '06; n = 56)
Confidence assessment	High for both the RC and PES, because the monitoring station is in the WQSU, has a good length of data, and because there is little land transformation in the catchment.		

Water Quality Constituents		**RC Value**	**PES Value**	**Category/Comment**	**G-power (Confidence)**
Inorganic salts (mg/L)	$MgSO_4$				No data
	Na_2SO_4				
	$MgCl_2$				
	$CaCl_2$				
	NaCl				
	$CaSO_4$				
Nutrients (mg/L)	SRP	0.011	0.028*	Category = B. Trend = slight increase	0.122 (Low)
	TIN	0.04	0.061	Category = A. Very slight increase in trend	
Physical Variables	pH (5^{th} – 95^{th} %)		4.4 – 7.4	Naturally acidic waters	0.87 (High)
	Temperature			No data. Unlikely to be a problem	
	Dissolved oxygen				
	Turbidity (NTU)			No data. Visual inspection = low turbidity. Unlikely to be a problem	
	Electrical conductivity (mS/m)	16	17	A Category. Trend = stable	0.87 (High)
Response variables	Chl a: periphyton			No data. Visual inspection = no excessive algal growth	
	Chl a: phytoplankton				
	Macroinvertebrates			A category; ASPT = 8.0, SASS = 175 (this study). Natural (RHP)	
	Fish community score			B	
Toxics				No data, but unlikely to be a problem	
OVERALL SITE CLASSIFICATION		**A Category** (calculated from PAI model)			

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Table 5.36: Water Ecospecs for the Kaaimans River in K30C

Quality Constituent	Parameter	Ecological Reserve Requirements	Basic Human Needs Requirement[5]	Reserve Requirement: water quality
General chemistry – major inorganic salts	$MgSO_4$ (mg/l) [1]	< 16	N/A	< 16
	Na_2SO_4 (mg/)l [1]	< 20	N/A	< 20
	$MgCl_2$ (mg/l) [1]	< 15	N/A	< 15
	$CaCl_2$ (mg/l) [1]	< 21	N/A	< 21
	NaCl (mg/l) [1]	< 45	N/A	< 45
General chemistry – Major Ions	Sodium (mg/l)	N/A	<200	<200
	Magnesium (mg/l)	N/A	<100	<100
	Chloride (mg/l)	N/A	<200	<200
	Calcium (mg/l)	N/A	<80	<80
	Sulphate (mg/l)	N/A	<400	<400
Nutrients	Phosphate (PO_4) (mg/l) [2]	<0.02mg/L	N/A	<0.02mg/L
	Total Inorganic Nitrogen (mgN/l) [2]	<0.25mg/L	N/A	<0.25mg/L
Physical water quality	pH (range) 5th percentile 95th percentile	6.7 7.4	5 9.5	5 7.4
	Dissolved Oxygen (mg/l)[1]	>1.7 mg/L	N/A	**>1.7 mg/L**
	Temperature[1]	Small change from natural		Small change from natural
	Electrical conductivity (mS/m) – USE ONLY IF AGGREGATED SALTS CANNOT BE PRODUCED	≤30mS/m	0-70	≤30mS/m
Biological water quality	Chl-a: periphyton[3]	<1.7 mg/m^2	N/A	
	Chl-a: phytoplankton[3]	< 10 µg/L (A category)	N/A	
	Biotic community composition - macroinvertebrates	ASPT: 8 (A category)		
	In-stream toxicity	In-stream toxicity should not occur		
Toxics and complex mixtures	Toxics (as listed in DWAF, 1996 [6])	≤ TWQR	≤ TWQR	≤ TWQR

NOTES:
[1] : 95th percentile compliance. [2]: 50th percentile compliance. [3] Chl-a is not applicable to Desktop Reserve studies. [4] 90th percentile compliance
[5] ref: *South African Water Quality Guidelines, Volume 1: Domestic Water Use*, *2nd Ed.* 1996. Department of Water Affairs and Forestry. Pretoria, South Africa.
[6] ref: *South African Water Quality Guidelines, Volume 7: Aquatic Ecosystems*, *2nd Ed.* 1996. Department of Water Affairs and Forestry. Pretoria, South Africa.

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Table 5.37: PES categories and overall site assessment for the Diep River at WQSU 3

RIVER	Diep River		**WATER QUALITY MONITORING POINTS**	
WQSU	WQSU 3 (start of level II Ecoregion 20.02 to the beginning of the mountain stream zone)		**RC**	Diep R. @ Woodville Forest Reserve K4H003Q01 ('77 – '80; n = 58)
EWR SITE	3		**PES**	K4H003Q01 ('03 – '07; n = 36)
Confidence assessment	Moderate to high confidence			
Water Quality Constituents		**RC Value**	**PES Value**	**Category/Comment**
Inorganic salts (mg/L)	$MgSO_4$	8.86	15.87	TEACHA was used for data assessment. Salts = an A category
	Na_2SO_4	0.00	0.00	
	$MgCl_2$	14.83	14.52	
	$CaCl_2$	7.18	9.89	
	NaCl	102.10*	94.31	
	$CaSO_4$	0.66	0.59	
Nutrients (mg/L)	SRP	0.003	0.018	B/C category.
	TIN	0.04	0.07	A category.
Physical Variables	pH (5^{th} + 95^{th} %ile)	4.8 + 6.2	4.8 + 7.5	B category.
	Temperature	-	-	No data but no impacts expected.
	Dissolved oxygen	-	-	
	Turbidity (NTU)	-	-	No data. Slight evidence of sedimentation.
	Electrical conductivity (mS/m)		18.0	A category
Response variables	Chl a: periphyton	-	21.25	Some nutrient elevations shown by periphyton data (C/D category; n=1)
	Chl a: phytoplankton	-	0.18	
	Macroinvertebrates	ASPT[$]: mean of 6.58	ASPT: 7.3 MIRAI**: 86.1%	B category for the present state.
	Fish community score	-	FRAI[♦]: 86.1%	B category for the present state.
	Diatoms	-	SPI[#]=17.6	High quality water
Toxics		-	-	No data, but some impact expected due to farming-related pesticides and fertilizer use.
OVERALL SITE CLASSIFICATION		**B** (PAI model)		

*: boundary value recalibrated
-: no data
[#]: Specific Pollution Index
[♦]: FRAI = Fish Response Assessment Index
**: MIRAI = Macro Invertebrate Response Assessment Index
[$]: ASPT = Average Score Per Taxon

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Table 5.38: Water quality Ecospecs for Diep River (WQSU 3, K40A)

River: Diep		EWR Site: 3	Monitoring site: K4H003Q01
Water quality metrics		**ECOSPEC**	
Inorganic salts*	$MgSO_4$	The 95th percentile of the data must be ≤ 16 mg/L.	
	Na_2SO_4	The 95th percentile of the data must be ≤ 20 mg/L.	
	$MgCl_2$	The 95th percentile of the data must be ≤ 15 mg/L.	
	$CaCl_2$	The 95th percentile of the data must be ≤ 21 mg/L.	
	NaCl	The 95th percentile of the data must be ≤ 191 mg/L.	
	$CaSO_4$	The 95th percentile of the data must be ≤ 351 mg/L.	
Physical variables	EC	The 95th percentile of the data must be ≤ 30 mS/m.	
	pH	The 5th and 95th percentiles of the data must range from 4.5 to 7.5.	
	Temperature	Small deviation from the natural temperature range.	
	Dissolved oxygen	The 5th percentile of the data must be ≥ 7.5 mg/L.	
	Turbidity	Vary by a small amount from the natural turbidity range; minor silting of instream habitats acceptable.	
Nutrients	TIN	The 50th percentile of the data must be ≤ 0.25 mg/L.	
	PO_4-P	The 50th percentile of the data must be ≤ 0.025 mg/L.	
Response variables	Chl-a phytoplankton	The 50th percentile of the data must be <15 µg/L.	
	Chl-a periphyton	The 50th percentile of the data must be ≤ 52.5 mg/m^2.**	
Toxics		The 95th percentile of the data must be within the Target Water Quality Range (TWQR) as stated in DWAF (1996).	

* To be generated using TEACHA when the TPC for EC is exceeded or salt pollution expected.
** Periphyton (21.25 mg/m^2) is actually in a C/D category (C = 12 - 21 and D = 21 - 84 mg/m^2; DWAF, 2008), so have defined the upper boundary of a C/D as the EcoSpec.

Table 5.39: Water quality TPC's for Diep River (WQSU 3, K40A)

River: Diep		EWR Site: 3	Monitoring site: K4H003Q01
Water quality metrics		**TPC**	
Inorganic salts*	$MgSO_4$	The 95th percentile of the data must be 13 – 16 mg/L.	
	Na_2SO_4	The 95th percentile of the data must be 16 – 20 mg/L.	
	$MgCl_2$	The 95th percentile of the data must be 12 – 15 mg/L.	
	$CaCl_2$	The 95th percentile of the data must be 17 – 21 mg/L.	
	NaCl	The 95th percentile of the data must be 36 – 45 mg/L.	
	$CaSO_4$	The 95th percentile of the data must be 153 – 191 mg/L.	
Physical variables	EC	The 95th percentile of the data must be 24 – 30 mS/m.	
	pH	The 5th and 95th percentiles of the data must be <4.7 and >7.3.	
	Temperature	Small to moderate deviation from the natural temperature range. Some highly temperature sensitive species in lower abundances and frequency of occurrence than expected for reference.	
	Dissolved oxygen	The 5th percentile of the data must be 7.8 – 7.5 mg/L.	
	Turbidity	Moderate changes to the catchment land-use resulting in temporary unnaturally high sediment loads and high turbidities.	
Nutrients	TIN	The 50th percentile of the data must be 0.2 – 0.25 mg/L.	
	PO_4-P	The 50th percentile of the data must be 0.02 – 0.025 mg/L.	
Response variables	Chl-a phytoplankton	The 50th percentile of the data must be 12 – 15 µg/L.	
	Chl-a periphyton	The 50th percentile of the data must be 42 – 52.5 mg/m^2.	
Toxics		The 95th percentile of the data must be within the Target Water Quality Range (TWQR) as stated in DWAF (1996).	

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Table 5.40: PES categories and overall site assessment for the Karatara River at WQSU 5

RIVER	Karatara River		**WATER QUALITY MONITORING POINTS**		
WQSU	WQSU 5 (source to Swartvlei)		**RC**	Karatara R. @ Karatara Forest Reserve K4H002Q01 ('76 – '79; n = 115)	
EWR SITE	4		**PES**	K4H002Q01 ('03 – '07; n = 36)	
Confidence assessment	Moderate as adequate data to assess reference and present states				
Water Quality Constituents			**RC Value**	**PES Value**	**Category/Comment**
Inorganic salts (mg/L)	$MgSO_4$		7.62	12.63	TEACHA was used for data assessment. Salts = an A category.
	Na_2SO_4		2.05	3.01	
	$MgCl_2$		4.43	4.16	
	$CaCl_2$		9.89	9.16	
	NaCl		35.59	36.15	
	$CaSO_4$		0.73	0.73	
Nutrients (mg/L)	SRP		0.022 *	0.047	B category.
	TIN		0.07	0.128	A category.
Physical Variables	pH (5^{th} + 95^{th} %ile)		3.7 + 7.7	3.8 + 6.6	A category.
	Temperature		-	-	No data but no impacts expected
	Dissolved oxygen		-	-	
	Turbidity (NTU)		-	-	No data. Slight evidence of sedimentation.
	Electrical conductivity (mS/m)		-	7.0	A category.
Response variables	Chl a: periphyton		-	9.91	B category for periphyton.
	Chl a: phytoplankton		-	0.09	
	Macroinvertebrates		ASPT: 7.3	ASPT: 8.1 MIRAI: 92.3%	A/B category for the present state.
	Fish community score		-	FRAI: 82.4%	B category for the present state.
	Diatoms		-	SPI=19.9	High quality water
Toxics			-	-	No data, but some impact from timber processing at Geelhoutvlei.
OVERALL SITE CLASSIFICATION			**B for WQSU 5**, although an A category for upstream river stretch (PAI model)		

*: boundary value recalibrated
-: no data

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Table 5.41: Water quality Ecospecs for Karatara River at WQSU 5

River: Karatara		EWR Site: 4	Monitoring site: K4H002Q01
Water quality metrics		**ECOSPEC**	
Inorganic salts*	$MgSO_4$	The 95th percentile of the data must be ≤ 16 mg/L.	
	Na_2SO_4	The 95th percentile of the data must be ≤ 20 mg/L.	
	$MgCl_2$	The 95th percentile of the data must be ≤ 15 mg/L.	
	$CaCl_2$	The 95th percentile of the data must be ≤ 21 mg/L.	
	NaCl	The 95th percentile of the data must be ≤ 191 mg/L.	
	$CaSO_4$	The 95th percentile of the data must be ≤ 351 mg/L.	
Physical variables	EC	The 95th percentile of the data must be ≤ 30 mS/m.	
	pH	The 5th and 95th percentiles of the data must range from 4.5 to 7.5.	
	Temperature	Natural temperature range.	
	Dissolved oxygen	The 5th percentile of the data must be ≥ 8.0 mg/L.	
	Turbidity	Vary by a small amount from the natural turbidity range; minor silting of instream habitats acceptable.	
Nutrients	TIN	The 50th percentile of the data must be ≤ 0.25 mg/L.	
	PO_4-P	The 50th percentile of the data must be ≤ 0.075 mg/L.	
Response variables	Chl-a phytoplankton	The 50th percentile of the data must be < 10 µg/L.	
	Chl-a periphyton	The 50th percentile of the data must be ≤ 12 mg/m^2.	
Toxics		The 95th percentile of the data must be within the Target Water Quality Range (TWQR) as stated in DWAF (1996).	

* To be generated using TEACHA when the TPC for EC is exceeded or salt pollution expected.

Table 5.42: Water quality TPC's for Karatara River at WQSU 5

River: Karatara		EWR Site: 4	Monitoring site: K4H002Q01
Water quality metrics		**TPC**	
Inorganic salts*	$MgSO_4$	The 95th percentile of the data must be 13 – 16 mg/L.	
	Na_2SO_4	The 95th percentile of the data must be 16 – 20 mg/L.	
	$MgCl_2$	The 95th percentile of the data must be 12 – 15 mg/L.	
	$CaCl_2$	The 95th percentile of the data must be 17 – 21 mg/L.	
	NaCl	The 95th percentile of the data must be 36 – 45 mg/L.	
	$CaSO_4$	The 95th percentile of the data must be 153 – 191 mg/L.	
Physical variables	EC	The 95th percentile of the data must be 24 – 30 mS/m.	
	pH	The 5th and 95th percentiles of the data must be <4.7 and >7.3.	
	Temperature	Small deviation from the natural temperature range.	
	Dissolved oxygen	The 5th percentile of the data must be 8.2 – 8.0 mg/L.	
	Turbidity	Small to moderate changes to the catchment land-use resulting in minor and temporary effects of silting of habitats.	
Nutrients	TIN	The 50th percentile of the data must be 0.2 – 0.25 mg/L.	
	PO_4-P	The 50th percentile of the data must be 0.06 – 0.075 mg/L.**	
Response variables	Chl-a phytoplankton	The 50th percentile of the data must be 8 – 10 µg/L.	
	Chl-a periphyton	The 50th percentile of the data must be 10 – 12 mg/m^2.	
Toxics		The 95th percentile of the data must be within the Target Water Quality Range (TWQR) as stated in DWAF (1996).	

* To be generated using TEACHA when the TPC for EC is exceeded or salt pollution expected.
**** Although the upper boundary for the relevant phosphate category is 0.125 mg/L, the TPC has been set at 0.075 mg/L as PES levels for phosphate were 0.046 mg/L.**

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Table 5.43: PES categories and overall site assessment for the Hoëkraal River at WQSU 4

RIVER	Hoëkraal River		**WATER QUALITY MONITORING POINTS**	
WQSU	WQSU 4 (source to beginning of lower foothills)		**RC**	Hoëkraal R. @ Eastbrook K4H001Q01 ('77 – '80; n = 83)
EWR SITE	-		**PES**	K4H001Q01 ('03 – '07; n = 28)
Confidence assessment	Low - Moderate as limited data for the present state assessment. Lower section in the backup zone from Swartvlei lake. Note that the gauging weir is located on the lower Hoëkraal River.			
Water Quality Constituents		**RC Value**	**PES Value**	**Category/Comment**
Inorganic salts (mg/L)	$MgSO_4$	35.87	153.20	TEACHA was used for the analysis of WMS data. Results should be disregarded as data shows salt intrusion from the saline Swartvlei lake.
	Na_2SO_4	9.95	159.5	
	$MgCl_2$	35.92	100.33	
	$CaCl_2$	24.80	45.24	
	NaCl	399.69	1560.41	
	$CaSO_4$	0.59	0.73	
Nutrients (mg/L)	SRP	0.014 *	0.034	B category.
	TIN	0.06	0.088	A category.
Physical Variables	pH (5^{th} + 95^{th} %ile)	4.4 + 7.2	4.5 + 7.8	A category.
	Temperature	-	-	No data but no impacts expected, although the river is deep and wide above the lower site, which may result in lowering oxygen levels.
	Dissolved oxygen	-	-	
	Turbidity (NTU)	-	-	No data, but some evidence of sedimentation.
	Electrical conductivity (mS/m)		4.2: Upper site	A category
Response variables	Chl a: periphyton	-	4.81: Upper site 152.93: Lower site	Lower site shows some nutrient build-up in the water.
	Chl a: phytoplankton	-	0.14: Upper site 0.47: Lower site	
	Macroinvertebrates	-	-	Not assessed as not an EWR site.
	Fish community score	-	-	
	Diatoms	-	SPI=19.8: Upper river. SPI=16.2: Lower river.	Upper site: High quality water. Lower site: Good quality water.
Toxics		-	-	No data, but no impacts expected.
OVERALL SITE CLASSIFICATION		**C Category** (PAI model)		

* boundary value recalibrates

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Table 5.44: Water quality Ecospecs for Hoëkraal River at WQSU 4

River: Hoëkraal		EWR Site: -	Monitoring site: K4H001Q01, although located in the lower section of the river and salt water intrusion detected due to back-up from Swartvlei Lake.
Water quality metrics		**ECOSPEC**	
Inorganic salts*	$MgSO_4$	The 95th percentile of the data must be ≤ 16 mg/L.	
	Na_2SO_4	The 95th percentile of the data must be ≤ 20 mg/L.	
	$MgCl_2$	The 95th percentile of the data must be ≤ 15 mg/L.	
	$CaCl_2$	The 95th percentile of the data must be ≤ 21 mg/L.	
	NaCl	The 95th percentile of the data must be ≤ 191 mg/L.	
	$CaSO_4$	The 95th percentile of the data must be ≤ 351 mg/L.	
Physical variables	EC	The 95th percentile of the data must be ≤ 30 mS/m.	
	pH	The 5th and 95th percentiles of the data must range from 4.5 to 7.5.	
	Temperature	Small deviation from the natural temperature range.	
	Dissolved oxygen	The 5th percentile of the data must be ≥ 7.5 mg/L.	
	Turbidity	Vary by a small amount from the natural turbidity range; minor silting of instream habitats acceptable.	
Nutrients	TIN	The 50th percentile of the data must be ≤ 0.25 mg/L.	
	PO_4-P	The 50th percentile of the data must be ≤ 0.125 mg/L.	
Response variables	Chl-a phytoplankton	The 50th percentile of the data must be <10 µg/L.	
	Chl-a periphyton	The 50th percentile of the data must be ≤ 12 mg/m^2.	
Toxics		The 95th percentile of the data must be within the Target Water Quality Range (TWQR) as stated in DWAF (1996).	

* To be generated using TEACHA when the TPC for EC is exceeded or salt pollution expected.

Table 5.45: Water quality TPC's for Hoëkraal River at WQSU 4

River: Hoekraal		EWR Site: -	Monitoring site: K4H001Q01
Water quality metrics		**TPC**	
Inorganic salts*	$MgSO_4$	The 95th percentile of the data must be 13 – 16 mg/L.	
	Na_2SO_4	The 95th percentile of the data must be 16 – 20 mg/L.	
	$MgCl_2$	The 95th percentile of the data must be 12 – 15 mg/L.	
	$CaCl_2$	The 95th percentile of the data must be 17 – 21 mg/L.	
	NaCl	The 95th percentile of the data must be 36 – 45 mg/L.	
	$CaSO_4$	The 95th percentile of the data must be 153 – 191 mg/L.	
Physical variables	EC	The 95th percentile of the data must be 24 – 30 mS/m.	
	pH	The 5th and 95th percentiles of the data must be <4.7 and >7.3.	
	Temperature	Small to moderate changes to the catchment land-use resulting in minor and temporary effects of silting of habitats.	
	Dissolved oxygen	The 5th percentile of the data must be 7.8 – 7.5 mg/L.	
	Turbidity	Moderate changes to the catchment land-use resulting in temporary unnaturally high sediment loads and high turbidities.	
Nutrients	TIN	The 50th percentile of the data must be 0.2 – 0.25 mg/L.	
	PO_4-P	The 50th percentile of the data must be 0.1 – 0.125 mg/L.	
Response variables	Chl-a phytoplankton	The 50th percentile of the data must be 8 – 10 µg/L.	
	Chl-a periphyton	The 50th percentile of the data must be 10 – 12 mg/m^2.	
Toxics		The 95th percentile of the data must be within the Target Water Quality Range (TWQR) as stated in DWAF (1996).	

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Table 5.46: PES categories and overall site assessment for Goukamma River at WQSU 1

RIVER	Goukamma River	**WATER QUALITY MONITORING POINTS**	
WQSU	WQSU 1 (source to the end of the mountainous area)	**RC**	Rooi R. @ George K3H002-Q01 ('77 – '79 n = 84)
EWR SITE	None	**PES**	K3H002-Q01 ('01 – '06 n = 65)
Confidence assessment	Low to medium because no DWAF monitoring station. However unimpacted catchment and likely to be similar to other mountain streams.		

Water Quality Constituents		**RC Value**	**PES Value**	**Category/Comment**
Inorganic salts (mg/L)	$MgSO_4$			No data
	Na_2SO_4			
	$MgCl_2$			
	$CaCl_2$			
	NaCl			
	$CaSO_4$			
Nutrients (mg/L)	SRP	0.014	≤0.014*	A category.
	TIN	0.04	≤0.25*	A category.
Physical Variables	pH (5^{th} – 95^{th} %)		3.7 – 6.7	Naturally acidic.
	Temperature			No data but expected to be natural as little development in upstream catchment.
	Dissolved oxygen			
	Turbidity (NTU)			
	Electrical conductivity (mS/m)	16	17	A category.
Response variables	Chl a: periphyton			No data
	Chl a: phytoplankton			No data
	Macroinvertebrates			No data
	Fish community score			No data
Toxics				No data.
OVERALL SITE CLASSIFICATION		**A**		

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Table 5.47: Water quality Ecospecs and TPCs for the Goukamma River at WQSU 2

RIVER		Goukamma River	**WATER QUALITY MONITORING POINTS**			
WQSU		2	**DWAF WQ WMS**	None		
EWR SITE		none	**RHP**	Currently a RHP site higher up in catchment		
Confidence in PES assessment		Low because extrapolated from another catchment (Karatara R) and WQSU (Goukamma WQSU 2). Biological data (from current project and RHP upper catchment) support inferred PES for water quality.				
Water Quality Constituents		**PES Category**	**WQ Eco specs**	**Improvement required?**	**TPC**	**Monitoring frequency**
Inorganic salts (mg/L)	$MgSO_4$	Not available	≤16 mg/L	N/A	95th percentile to be < 16 mg/L	Every 2 months
	Na_2SO_4		≤20 mg/L		95th percentile to be < 20 mg/L	
	$MgCl_2$		≤15 mg/L		95th percentile to be < 15 mg/L	
	$CaCl_2$		≤21 mg/L		95th percentile to be < 21 mg/L	
	NaCl		≤45 mg/L		95th percentile to be < 45 mg/L	
Nutrients (mg/L)	**SRP**	**A**	**≤0.012 mg/L**	Yes - B/C	50th percentile to be < 0.025 mg/L	Every 2 months
	TIN	A	≤0.25 mg/L	No	50th percentile to be < 0.25 mg/L	Every 2 months
Physical Variables	pH	Naturally acidic river	< 6.4	No	95th percentile to be < 6.4	Every 2 months
	Temperature	No data. Visual inspection did not reveal a turbidity problem.	Natural range	N/A	Natural temp. range	Every 2 months
	Dissolved oxygen		8 mg/L	N/A	5th percentile to be > 8 mg/L	Every 2 months
	Turbidity (NTU)		No change	N/A	No change allowed	Every 2 months
	Electrical conductivity (mS/m)	A – Stable	≤30 mS/m	No	95th percentile to be < 30 mS/m	Every 2 months
Response variables	Chl a: periphyton	No data. Visual inspection did not reveal a problem.	≤ 1.7 mg/m² (A category)	N/A	50th percentile to be < 1.7 mg/m²	Quarterly
	Chl a: phytoplankton		≤ 10 µg/L (B category)		50th percentile to be < 10 µg/L	
	Macroinvertebrates (ASPT)	B (this study)	See Ecospecs for fish and invertebrates respectively			
	Fish community score	C (this study				
	Instream toxicity	No data	Unlikely to be a problem. Assess only if the biomonitoring results indicate there is a serious problem and the cause is unknown.			
Toxics		No data.				

Table 5.48: PES categories and overall site assessment for Goukamma River at WQSU 2

RIVER	Goukamma River	**WATER QUALITY MONITORING POINTS**	
WQSU	WQSU 2 (edge of mountainous/forested area to the upper limit of tidal influence - at approximately the N2 Bridge)	**RC**	Karatara R. @ Karatara State Forest K4H002-Q01 ('71 – '76; n = 107)
EWR SITE	Gou 1	**PES**	K4H002-Q01 ('01 – '06; n = 51)
Confidence assessment	Low, the monitoring station is in an adjacent catchment.		

Water Quality Constituents		**RC Value**	**PES Value**	**Category/Comment**	**G-power (Confidence)**
Inorganic salts (mg/L)	$MgSO_4$				No data
	Na_2SO_4				
	$MgCl_2$				
	$CaCl_2$				
	NaCl				
	$CaSO_4$				
Nutrients (mg/L)	SRP	0.018	0.048*	Category = C. Trend = increasing	0.232 (Low)
	TIN	0.11	0.11	Category = A. Trend = stable	
Physical Variables	pH (5^{th} – 95^{th} %)		3.8 – 6.4	Naturally acidic waters	0.781 (Medium)
	Temperature			No data. Unlikely to be a problem	
	Dissolved oxygen				
	Turbidity (NTU)			No data. Visual inspection = low turbidity	
	Electrical conductivity (mS/m)	10	12	Category = A. Trend = stable	0.997 (High)
Response variables	Chl a: periphyton			No data. Visual inspection = no excessive algal growth	
	Chl a: phytoplankton				
	Macroinvertebrates			B category; ASPT = 7.2, SASS = 143 (this study). Natural (RHP)	
	Fish community score			C (this study)	
Toxics				No data, but unlikely to be a problem	
OVERALL SITE CLASSIFICATION		**A Category** (PAI model)			

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Table 5.49: Water quality Ecospecs and TPCs for the Goukamma River at WQSU 2

RIVER		Goukamma River	**WATER QUALITY MONITORING POINTS**			
WQSU		2	**DWAF WQ WMS**	None		
EWR SITE		Gou 1	**RHP**	Currently a RHP site higher up in catchment		
Confidence in PES assessment		Low - medium because extrapolated from another catchment (Karatara R). Biological data (from current project and RHP upper catchment) support inferred PES for water quality.				
Water Quality Constituents		**PES Category**	**WQ Eco specs**	**Improvement required?**	**TPC**	**Monitoring frequency**
Inorganic salts (mg/L)	$MgSO_4$	Not available	≤16 mg/L	N/A	95th percentile to be < 16 mg/L	Every 2 months
	Na_2SO_4		≤20 mg/L		95th percentile to be < 20 mg/L	
	$MgCl_2$		≤15 mg/L		95th percentile to be < 15 mg/L	
	$CaCl_2$		≤21 mg/L		95th percentile to be < 21 mg/L	
	NaCl		≤45 mg/L		95th percentile to be < 45 mg/L	
Nutrients (mg/L)	**SRP**	**C**	**≤0.025 mg/L**	Yes - B/C	50th percentile to be < 0.025 mg/L	Every 2 months
	TIN	A	≤0.25 mg/L	No	50th percentile to be < 0.25 mg/L	Every 2 months
Physical Variables	pH	Naturally acidic river	< 6.4	No	95th percentile to be < 6.4	Every 2 months
	Temperature	No data. Visual inspection did not reveal a turbidity problem.	Natural range	N/A	Natural temp. range	Every 2 months
	Dissolved oxygen		8 mg/L	N/A	5th percentile to be > 8 mg/L	Every 2 months
	Turbidity (NTU)		No change	N/A	No change allowed	Every 2 months
	Electrical conductivity (mS/m)	A – Stable	≤30 mS/m	No	95th percentile to be < 30 mS/m	Every 2 months
Response variables	Chl a: periphyton	No data. Visual inspection did not reveal a problem.	≤ 1.7 mg/m² (A category)	N/A	50th percentile to be < 1.7 mg/m²	Quarterly
	Chl a: phytoplankton		≤ 10 µg/L (B category)		50th percentile to be < 10 µg/L	
	Macroinvertebrates (ASPT)	B (this study)	See Ecospecs for fish and invertebrates respectively			
	Fish community score	C (this study				
	Instream toxicity	No data	Unlikely to be a problem. Assess only if the biomonitoring results indicate there is a serious problem and the cause is unknown.			
Toxics		No data.				

Table 5.50: PES categories and overall site assessment for the Knysna River ay WQSU 1

RIVER	Knynsa River	**WATER QUALITY MONITORING POINTS**		
WQSU	WQSU 1	**RC**	Knysna R. @ Millwood K5H002Q01 ('77 – '80; n = 75)	
EWR SITE	1	**PES**	K5H002Q01 ('04 – '07; n = 26)	
Confidence assessment	Moderate as adequate data to assess reference and present states			
Water Quality Constituents		**RC Value**	**PES Value**	**Category/Comment**
Inorganic salts (mg/L)	$MgSO_4$	7.18	7.19	TEACHA was used for data assessment. Salts = A category
	Na_2SO_4	1.49	4.20	
	$MgCl_2$	2.60	2.73	
	$CaCl_2$	11.50	3.92	
	NaCl	50.83*	39.54	
	$CaSO_4$	0.53	0.38	
Nutrients (mg/L)	SRP	0.011*	0.021	B category
	TIN	0.06	0.112	A category
Physical Variables	pH (5^{th} + 95^{th} %ile)	4.0 + 6.9	4.5 + 7.2	A category
	Temperature	-	-	No data but no impacts expected, although less shading may result in a slight increase in instream temperature.
	Dissolved oxygen	-	-	
	Turbidity (NTU)	-	-	No data. Some evidence of slight sedimentation seen.
	Electrical conductivity (mS/m)		9.0	A category.
Response variables	Chl a: periphyton	-	4.08	Some nutrient elevation indicated by periphyton values (B category; n=1).
	Chl a: phytoplankton	-	0.12	
	Macroinvertebrates	ASPT: mean of 8.1	ASPT: 6.9 MIRAI: 86.92%	B category for the present state.
	Fish community score	-	FRAI: 86.4%	B category for the present state.
	Diatoms	-	SPI=18.9	High quality water.
Toxics		-	-	No data but no impacts expected.
OVERALL SITE CLASSIFICATION		**A/B for WQSU 1**, although an A category for EWR 1 and upstream of the site (PAI model)		

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Table 5.51: Water quality Ecospecs for Knysna River at WQSU 1

River: Knysna		EWR: 1	Monitoring site: K5H002Q01
Water quality metrics		**ECOSPEC**	
Inorganic salts*	$MgSO_4$	The 95th percentile of the data must be ≤ 16 mg/L.	
	Na_2SO_4	The 95th percentile of the data must be ≤ 20 mg/L.	
	$MgCl_2$	The 95th percentile of the data must be ≤ 15 mg/L.	
	$CaCl_2$	The 95th percentile of the data must be ≤ 21 mg/L.	
	NaCl	The 95th percentile of the data must be ≤ 45 mg/L.	
	$CaSO_4$	The 95th percentile of the data must be ≤ 351 mg/L.	
Physical variables	EC	The 95th percentile of the data must be ≤ 30 mS/m.	
	pH	The 5th and 95th percentiles of the data must range from 4.5 to 7.5.	
	Temperature	Natural temperature range.	
	Dissolved oxygen	The 5th percentile of the data must be ≥ 8.0 mg/L.	
	Turbidity	Vary by a small amount from the natural turbidity range; minor silting of instream habitats acceptable.	
Nutrients	TIN	The 50th percentile of the data must be ≤ 0.25 mg/L.	
	PO_4-P	The 50th percentile of the data must be ≤0.025 mg/L.	
Response variables	Chl-a phytoplankton	The 50th percentile of the data must be <15 µg/L.	
	Chl-a periphyton	The 50th percentile of the data must be ≤ 12 mg/m^2.	
Toxics		The 95th percentile of the data must be within the Target Water Quality Range (TWQR) as stated in DWAF (1996).	

* To be generated using TEACHA when the TPC for EC is exceeded or salt pollution expected.

Table 5.52: Water quality TPC's for Knysna River at WQSU 1

River: Knysna		EWR: 1	Monitoring site: K5H002Q01
Water quality metrics		**TPC**	
Inorganic salts*	$MgSO_4$	The 95th percentile of the data must be 13 – 16 mg/L.	
	Na_2SO_4	The 95th percentile of the data must be 16 – 20 mg/L.	
	$MgCl_2$	The 95th percentile of the data must be 12 – 15 mg/L.	
	$CaCl_2$	The 95th percentile of the data must be 17 – 21 mg/L.	
	NaCl	The 95th percentile of the data must be 36 – 45 mg/L.	
	$CaSO_4$	The 95th percentile of the data must be 280 – 351 mg/L.	
Physical variables	EC	The 95th percentile of the data must be 24 – 30 mS/m.	
	pH	The 5th and 95th percentiles of the data must be <4.7 and >7.3.	
	Temperature	Small deviation from the natural temperature range.	
	Dissolved oxygen	The 5th percentile of the data must be 8.2 – 8.0 mg/L.	
	Turbidity	Moderate changes to the catchment land-use resulting in temporary unnaturally high sediment loads and high turbidities.	
Nutrients	TIN	The 50th percentile of the data must be 0.2 – 0.25 mg/L.	
	PO_4-P	The 50th percentile of the data must be 0.02 – 0.025 mg/L.	
Response variables	Chl-a phytoplankton	The 50th percentile of the data must be 12 – 15 µg/L.	
	Chl-a periphyton	The 50th percentile of the data must be 10 – 12 mg/m^2.	
Toxics		The 95th percentile of the data must be within the Target Water Quality Range (TWQR) as stated in DWAF (1996).	

* To be generated using TEACHA when the TPC for EC is exceeded or salt pollution expected.

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Table 5.53: PES categories and overall site assessment for the Gouna River at WQSU 2

RIVER	Gouna River	**WATER QUALITY MONITORING POINTS**	
WQSU	WQSU 2	**RC**	Gouna R. @ Gouna Commonage K5H001Q01 ('77 – '80; n = 76)
EWR SITE	2	**PES**	K5H001Q01 ('81 – '84; n = 30)
Confidence assessment	Low confidence due to limited data, particularly for present state		

Water Quality Constituents		**RC Value**	**PES Value**	**Category/Comment**
Inorganic salts (mg/L)	$MgSO_4$	14.45	23.19	TEACHA was used for data assessment. Slight elevation in salts seen, i.e. an A/B category
	Na_2SO_4	3.78	0.30	
	$MgCl_2$	10.75	12.11	
	$CaCl_2$	10.59	9.35	
	NaCl	95.29*	102.20	
	$CaSO_4$	0.54	0.72	
Nutrients (mg/L)	SRP	0.009*	0.011	A category.
	TIN	0.070	0.120	A category.
Physical Variables	pH (5^{th} + 95^{th} %ile)	4.0 + 6.8	4.0 + 5.6	A category as little change from natural.
	Temperature	-	-	No data but no impacts expected.
	Dissolved oxygen	-	-	
	Turbidity (NTU)	-	-	No data. Sedimentation seen in lower section of the WQSU, i.e. below the pump station.
	Electrical conductivity (mS/m)		15.0	A category.
Response variables	Chl a: periphyton	-	43.70	Nutrient elevations indicated by periphyton value (D category; n=1).
	Chl a: phytoplankton	-	0.09	
	Macroinvertebrates	ASPT: 6.9 – 7.6	ASPT: 7.6 MIRAI: 92.8%	A category for the present state.
	Fish community score	-	FRAI: 93.8%	A category for the present state.
	Diatoms	-	SPI=19.8	High quality water.
Toxics		-	-	No data but no toxics expected.
OVERALL SITE CLASSIFICATION		**B for WQSU 2**, although an A category for river stretch upstream of the pump station (PAI model)		

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Table 5.54: Water quality EcoSpecs for Gouna River at WQSU 2

River: Gouna		EWR: 2	Monitoring site: K5H001Q01
Water quality metrics		**ECOSPEC**	
Inorganic salts*	$MgSO_4$	The 95th percentile of the data must be ≤ 23 mg/L.	
	Na_2SO_4	The 95th percentile of the data must be ≤ 20 mg/L.	
	$MgCl_2$	The 95th percentile of the data must be ≤ 15 mg/L.	
	$CaCl_2$	The 95th percentile of the data must be ≤ 21 mg/L.	
	NaCl	The 95th percentile of the data must be ≤ 191 mg/L.	
	$CaSO_4$	The 95th percentile of the data must be ≤ 351 mg/L.	
Physical variables	EC	The 95th percentile of the data must be ≤ 43 mS/m.	
	pH	The 5th and 95th percentiles of the data must range from 4.5 to 7.5.	
	Temperature	Largely natural to small deviation from the natural temperature range.	
	Dissolved oxygen	The 5th percentile of the data must be ≥ 7.5 mg/L.	
	Turbidity	Vary by a small amount from the natural turbidity range; minor silting of instream habitats acceptable.	
Nutrients	TIN	The 50th percentile of the data must be ≤ 0.15 mg/L.	
	PO_4-P	The 50th percentile of the data must be ≤0.025 mg/L.	
Response variables	Chl-a phytoplankton	The 50th percentile of the data must be <15 µg/L.	
	Chl-a periphyton	The 50th percentile of the data must be ≤ 84 mg/m^2.	
Toxics		The 95th percentile of the data must be within the Target Water Quality Range (TWQR) as stated in DWAF (1996).	

* To be generated using TEACHA when the TPC for EC is exceeded or salt pollution expected.

Table 5.55: Water quality TPC's for Gouna River at WQSU 2

River: Gouna		EWR: 2	Monitoring site: K5H001Q01
Water quality metrics		**TPC**	
Inorganic salts*	$MgSO_4$	The 95th percentile of the data must be 18 – 23 mg/L.	
	Na_2SO_4	The 95th percentile of the data must be 16 – 20 mg/L.	
	$MgCl_2$	The 95th percentile of the data must be 12 – 15 mg/L.	
	$CaCl_2$	The 95th percentile of the data must be 17 – 21 mg/L.	
	NaCl	The 95th percentile of the data must be 36 – 45 mg/L.	
	$CaSO_4$	The 95th percentile of the data must be 153 – 191 mg/L.	
Physical variables	EC	The 95th percentile of the data must be 35 – 43 mS/m.	
	pH	The 5th and 95th percentiles of the data must be <4.7 and >7.3.	
	Temperature	Small to moderate deviation from the natural temperature range. Some highly temperature sensitive species in lower abundances and frequency of occurrence than expected for reference.	
	Dissolved oxygen	The 5th percentile of the data must be 7.8 – 7.5 mg/L.	
	Turbidity	Moderate changes to the catchment land-use resulting in temporary unnaturally high sediment loads and high turbidities.	
Nutrients	TIN	The 50th percentile of the data must be 0.2 – 0.25 mg/L.	
	PO_4-P	The 50th percentile of the data must be 0.012 – 0.015 mg/L.	
Response variables	Chl-a phytoplankton	The 50th percentile of the data must be 12 – 15 µg/L.	
	Chl-a periphyton	The 50th percentile of the data must be 67 – 84 mg/m^2.	
Toxics		The 95th percentile of the data must be within the Target Water Quality Range (TWQR) as stated in DWAF (1996).	

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6. GROUNDWATER - QUANTITY COMPONENT

The groundwater quantity component was determined using values (recharge and groundwater baseflow) obtained during the determination of water resource classes and associated resource quality objectives in the Breede-Gouritz WMA, (DWS 2017), shown in Table 6.1.

Population values were obtained from the Water Services dataset of 2011 for the Breede catchment and from the Gouritz Catchment Intermediate Reserve study for the Gouritz catchment. The Basic Human Needs Reserve provides for the essential needs of individuals served by the water resource in question and includes water for drinking, food preparation and for personal hygiene. A life-line amount of 25 litres per person per day was used.

Table 6.1: Breede-Gouritz Groundwater Reserve

Quaternary Catchment	Recharge (Mm^3/a)	Population	Basic Human Needs (Mm^3/a)	Groundwater Baseflow (Mm^3/a)	Reserve (Mm3/a)	Reserve as % of Recharge
G40A	13.06	15963	0.15	3.17	3.32	25.39
G40B	19.19	4612	0.04	5.33	5.37	27.99
G40C	45.16	38379	0.35	6.25	6.60	14.62
G40D	59.72	15963	0.15	14.45	14.60	24.44
G40E	13.19	7670	0.07	4.41	4.48	33.97
G40F	11.28	28422	0.26	2.12	2.38	21.09
G40G	16.02	17112	0.16	3.72	3.88	24.20
G40H	6.53	32767	0.30	1.58	1.88	28.77
G40J	6.92	1574	0.01	2.53	2.54	36.77
G40K	9.13	15963	0.15	4.67	4.82	52.75
G40L	13.96	15963	0.15	1.63	1.78	12.72
G40M	10.57	355	0.003	5.17	5.17	48.94
G50A	7.37	1370	0.01	2.61	2.62	35.58
G50B	6.59	1507	0.01	3.47	3.48	52.86
G50C	8.56	1748	0.02	2.05	2.07	24.13
G50D	5.39	9430	0.09	2.55	2.64	48.91
G50E	4.92	14355	0.13	1.37	1.50	30.51
G50F	6.64	1989	0.02	1.27	1.29	19.40
G50G	2.40	844	0.01	1.43	1.44	59.90
G50H	5.75	736	0.01	3.28	3.29	57.16
G50J	6.07	3325	0.03	1.90	1.93	31.80
G50K	2.72	1748	0.02	0.76	0.78	28.53
H10A	13.15	12494	0.11	0.76	0.87	6.65
H10B	12.20	12494	0.11	0.48	0.59	4.87
H10C	21.28	57300	0.52	2.00	2.52	11.86
H10D	14.89	12494	0.11	2.05	2.16	14.53
H10E	20.35	12494	0.11	3.20	3.31	16.29
H10F	25.24	20720	0.19	1.39	1.58	6.26
H10G	31.82	12494	0.11	0.44	0.55	1.74
H10H	28.48	12494	0.11	2.80	2.91	10.23
H10J	61.45	1035	0.01	7.94	7.95	12.94
H10K	43.17	12494	0.11	7.40	7.51	17.41
H10L	2.76	4268	0.04	0.00	0.04	1.41

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Quaternary Catchment	Recharge (Mm^3/a)	Population	Basic Human Needs (Mm^3/a)	Groundwater Baseflow (Mm^3/a)	Reserve (Mm3/a)	Reserve as % of Recharge
H20A	2.42	427	0.00	0.47	0.47	19.58
H20B	5.37	17136	0.16	0.17	0.33	6.08
H20C	2.84	1266	0.01	0.05	0.06	2.17
H20D	8.74	1266	0.01	2.11	2.12	24.27
H20E	14.68	1266	0.01	2.01	2.02	13.77
H20F	8.65	875	0.01	0.32	0.33	3.79
H20G	4.83	1266	0.01	0.47	0.48	9.97
H20H	1.56	140420	1.28	0.07	1.35	86.62
H30A	5.17	1102	0.01	0.33	0.34	6.58
H30B	6.04	39573	0.36	0.16	0.52	8.63
H30C	10.59	1317	0.01	0.07	0.08	0.77
H30D	3.18	926	0.01	0.06	0.07	2.15
H30E	2.95	9784	0.09	0.31	0.40	13.53
H40A	3.74	2233	0.02	0.87	0.89	23.81
H40B	12.26	2152	0.02	0.87	0.89	7.26
H40C	4.90	2233	0.02	0.86	0.88	17.97
H40D	4.18	2233	0.02	1.85	1.87	44.75
H40E	10.91	2233	0.02	0.20	0.22	2.02
H40F	1.07	1798	0.02	0.58	0.60	55.74
H40G	3.22	2233	0.02	0.23	0.25	7.78
H40H	4.71	1217	0.01	0.13	0.14	3.00
H40J	4.44	26455	0.24	0.18	0.42	9.49
H40K	2.99	3916	0.04	0.24	0.28	9.22
H40L	2.47	2290	0.02	0.42	0.44	17.85
H50A	1.42	3842	0.04	0.26	0.30	20.78
H50B	5.04	5825	0.05	0.78	0.83	16.53
H60A	30.87	10083	0.09	2.49	2.58	8.36
H60B	42.43	7900	0.07	7.28	7.35	17.33
H60C	30.89	15284	0.14	1.64	1.78	5.76
H60D	14.76	511	0.00	0.95	0.95	6.47
H60E	9.73	10305	0.09	0.71	0.80	8.26
H60F	7.65	3321	0.03	0.66	0.69	9.02
H60G	4.11	10083	0.09	0.64	0.73	17.81
H60H	7.49	10083	0.09	1.14	1.23	16.45
H60J	8.17	10083	0.09	1.31	1.40	17.16
H60K	3.59	10083	0.09	1.04	1.13	31.53
H60L	2.88	10083	0.09	0.87	0.96	33.40
H70A	5.55	4786	0.04	1.47	1.51	27.27
H70B	22.83	19350	0.18	4.17	4.35	19.04
H70C	3.99	4915	0.04	0.23	0.27	6.89
H70D	20.70	4786	0.04	5.53	5.57	26.93
H70E	26.55	6729	0.06	5.16	5.22	19.67
H70F	15.50	2721	0.02	2.31	2.33	15.06

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Quaternary Catchment	Recharge (Mm^3/a)	Population	Basic Human Needs (Mm^3/a)	Groundwater Baseflow (Mm^3/a)	Reserve (Mm3/a)	Reserve as % of Recharge
H70G	3.92	4786	0.04	1.26	1.30	33.26
H70H	2.80	746	0.01	1.89	1.90	67.74
H70J	3.95	4786	0.04	1.43	1.47	37.31
H70K	3.03	772	0.01	1.21	1.22	40.17
H80A	16.34	0	0.00	7.21	7.21	44.12
H80B	24.01	0	0.00	6.45	6.45	26.86
H80C	5.75	10 110	0.09	0.61	0.70	12.21
H80D	2.57	0	0.00	1.23	1.23	47.86
H80E	7.66	392	0.00	2.11	2.11	27.59
H80F	5.96	585	0.01	2.72	2.73	45.73
H90A	19.62	0	0.00	9.04	9.04	46.08
H90B	12.96	0	0.00	6.02	6.02	46.45
H90C	5.51	18 526	0.17	1.93	2.10	38.10
H90D	10.38	1 697	0.02	3.29	3.31	31.84
H90E	9.70	6 253	0.06	4.88	4.94	50.90
J11A	2.98	0	0.00	0.00	0.00	0.00
J11B	3.11	0	0.00	0.00	0.00	0.00
J11C	0.22	192	0.00	0.00	0.00	0.80
J11D	3.74	48	0.00	0.00	0.00	0.01
J11E	1.40	4 773	0.04	0.00	0.04	3.11
J11F	0.43	734	0.01	0.00	0.01	1.56
J11G	0.12	84	0.00	0.00	0.00	0.64
J11H	4.01	885	0.01	0.00	0.01	0.20
J11J	6.02	1 333	0.01	0.00	0.01	0.20
J11K	2.52	11 732	0.11	0.00	0.11	4.25
J12A	3.15	0	0.00	0.02	0.02	0.63
J12B	1.55	7 857	0.07	0.00	0.07	4.63
J12C	1.59	152	0.00	0.01	0.01	0.72
J12D	6.32	535	0.00	0.02	0.02	0.39
J12E	1.93	507	0.00	0.02	0.02	1.28
J12F	6.15	336	0.00	0.03	0.03	0.54
J12G	5.66	294	0.00	0.01	0.01	0.22
J12H	4.53	0	0.00	0.02	0.02	0.44
J12J	4.59	0	0.00	0.01	0.01	0.22
J12K	2.44	0	0.00	0.01	0.01	0.41
J12L	6.59	681	0.01	0.05	0.06	0.85
J12M	3.04	0	0.00	0.06	0.06	1.97
J13A	4.10	0	0.00	0.02	0.02	0.49
J13B	2.86	660	0.01	0.03	0.04	1.26
J13C	2.91	0	0.00	0.03	0.03	1.03
J21A	4.28	34 661	0.32	0.00	0.32	7.39
J21B	0.56	389	0.00	0.00	0.00	0.63
J21C	0.12	406	0.00	0.00	0.00	3.09

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Quaternary Catchment	Recharge (Mm^3/a)	Population	Basic Human Needs (Mm^3/a)	Groundwater Baseflow (Mm^3/a)	Reserve (Mm3/a)	Reserve as % of Recharge
J21D	0.24	0	0.00	0.00	0.00	0.00
J21E	0.26	0	0.00	0.00	0.00	0.00
J22A	3.04	0	0.00	0.00	0.00	0.00
J22B	1.12	0	0.00	0.00	0.00	0.00
J22C	1.27	241	0.00	0.00	0.00	0.17
J22D	1.22	133	0.00	0.00	0.00	0.10
J22E	1.31	0	0.00	0.00	0.00	0.00
J22F	0.12	1 237	0.01	0.00	0.01	9.41
J22G	2.92	0	0.00	0.00	0.00	0.00
J22H	4.19	919	0.01	0.00	0.01	0.20
J22J	0.90	0	0.00	0.00	0.00	0.00
J22K	0.35	0	0.00	0.00	0.00	0.00
J23A	0.28	2 080	0.02	0.00	0.02	6.78
J23B	0.50	47	0.00	0.00	0.00	0.09
J23C	0.25	12	0.00	0.00	0.00	0.04
J23D	0.70	12	0.00	0.00	0.00	0.02
J23E	2.03	674	0.01	0.18	0.19	9.17
J23F	1.33	6 901	0.06	0.00	0.06	4.73
J23G	0.00	0	0.00	0.00	0.00	0.00
J23H	1.11	0	0.00	0.00	0.00	0.00
J23J	1.82	0	0.00	0.97	0.97	53.30
J24A	2.58	193	0.00	0.00	0.00	0.07
J24B	0.51	1 521	0.01	0.00	0.01	2.72
J24C	0.21	0	0.00	0.00	0.00	0.00
J24D	0.08	314	0.00	0.00	0.00	3.58
J24E	0.39	0	0.00	0.00	0.00	0.00
J24F	1.37	0	0.00	0.00	0.00	0.00
J25A	2.42	200	0.00	1.02	1.02	42.22
J25B	4.45	4 135	0.04	1.23	1.27	28.49
J25C	1.04	1 342	0.01	0.02	0.03	3.10
J25D	2.94	5 170	0.05	0.61	0.66	22.35
J25E	1.12	402	0.00	0.04	0.04	3.90
J31A	7.88	0	0.00	1.13	1.13	14.34
J31B	1.57	0	0.00	0.48	0.48	30.57
J31C	1.87	0	0.00	0.35	0.35	18.72
J31D	2.07	266	0.00	0.38	0.38	18.47
J32A	0.08	50	0.00	0.00	0.00	0.57
J32B	0.01	881	0.01	0.00	0.01	80.39
J32C	0.01	77	0.00	0.00	0.00	7.03
J32D	0.00	0	0.00	0.00	0.00	0.00
J32E	1.76	719	0.01	0.00	0.01	0.37
J33A	4.81	130	0.00	1.44	1.44	29.96
J33B	8.98	680	0.01	1.47	1.48	16.44

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Quaternary Catchment	Recharge (Mm^3/a)	Population	Basic Human Needs (Mm^3/a)	Groundwater Baseflow (Mm^3/a)	Reserve (Mm3/a)	Reserve as % of Recharge
J33C	2.83	76	0.00	0.01	0.01	0.38
J33D	3.82	255	0.00	1.24	1.24	32.52
J33E	8.22	13 522	0.12	1.98	2.10	25.59
J33F	4.50	34 154	0.31	2.19	2.50	55.59
J34A	3.08	7 465	0.07	1.48	1.55	50.26
J34B	6.44	1 850	0.02	2.85	2.87	44.52
J34C	9.60	669	0.01	3.51	3.52	36.63
J34D	4.06	1 915	0.02	1.80	1.82	44.77
J34E	2.29	1 321	0.01	1.13	1.14	49.87
J34F	3.44	2 928	0.03	0.47	0.50	14.44
J35A	8.47	31 018	0.28	1.20	1.48	17.51
J35B	8.12	5 831	0.05	1.24	1.29	15.93
J35C	1.98	3 633	0.03	0.88	0.91	46.12
J35D	9.82	5 284	0.05	3.65	3.70	37.66
J35E	1.33	1 224	0.01	0.21	0.22	16.63
J35F	6.67	2 796	0.03	2.02	2.05	30.67
J40A	9.73	970	0.01	5.03	5.04	51.79
J40B	5.45	0	0.00	2.71	2.71	49.72
J40C	15.81	1 076	0.01	6.58	6.59	41.68
J40D	10.21	8 056	0.07	4.20	4.27	41.86
J40E	7.48	1 908	0.02	3.45	3.47	46.36
K10A	2.34	53 970	0.49	1.16	1.65	70.62
K10B	1.96	4 727	0.04	1.20	1.24	63.43
K10C	4.43	0	0.00	2.33	2.33	52.60
K10D	2.53	1 579	0.01	1.10	1.11	44.05
K10E	13.70	4 122	0.04	4.30	4.34	31.66
K10F	2.82	7 002	0.06	0.99	1.05	37.37
K20A	19.85	9 650	0.09	6.15	6.24	31.43
K30A	28.06	6 994	0.06	7.15	7.21	25.71
K30B	21.52	6 334	0.06	5.03	5.09	23.64
K30C	27.80	146 970	1.34	7.83	9.17	32.99
K30D	18.44	9 839	0.09	7.43	7.52	40.78
K40A	8.99	512	0.00	3.79	3.79	42.21
K40B	13.52	0	0.00	4.85	4.85	35.87
K40C	17.00	6 256	0.06	4.32	4.38	25.75
K40D	17.74	20 130	0.18	3.71	3.89	21.95
K40E	26.56	13 515	0.12	10.61	10.73	40.41
K50A	27.43	49	0.00	10.09	10.09	36.79
K50B	24.71	14 745	0.13	8.58	8.71	35.27
K60A	6.43	154	0.00	4.20	4.20	65.34
K60B	8.43	43	0.00	5.70	5.70	67.62
K60C	10.95	1 668	0.02	6.60	6.62	60.41
K60D	23.54	681	0.01	12.43	12.44	52.83

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Quaternary Catchment	Recharge (Mm^3/a)	Population	Basic Human Needs (Mm^3/a)	Groundwater Baseflow (Mm^3/a)	Reserve (Mm3/a)	Reserve as % of Recharge
K60E	6.39	2 392	0.02	3.95	3.97	62.16
K60F	14.35	10 113	0.09	9.35	9.44	65.80
K60G	11.31	23 053	0.21	5.02	5.23	46.25
K70A	14.30	5 364	0.05	6.84	6.89	48.17
K70B	20.46	852	0.01	4.46	4.47	21.84

PROPOSED GROUNDWATER RESERVE – WATER QUALITY COMPONENT

The groundwater quality of quaternary catchments with available hydrochemistry data was assessed against the domestic water target water quality ranges as shown in Table 6.2. A summary of the results for the groundwater quality classification at quaternary level in the terms of basic human needs requirements is included in the tables that follow.

Table 6.2: Physical and chemical water quality

Parameter	Target Water Quality Ranges [1)]				
	Units	Class 0	Class I	Class II	Class III
pH	pH units	6 – 9	5 – 6 & 9 – 9.5	4 – 5 & > 9.5 – 10	<4 & > 10
Electrical Conductivity	mS/m	< 70	70 - 150	150 – 370	> 370
Calcium as Ca	mg/l	< 80	80 - 150	150 – 300	> 300
Magnesium as Mg	mg/l	< 70	70 - 100	100 – 200	> 200
Sodium as Na	mg/l	< 100	100 - 200	200 – 400	> 400
Chloride as Cl	mg/l	< 100	100 - 200	200 – 600	> 600
Sulphate as SO_4	mg/l	< 200	200 - 400	400 – 600	> 600
Nitrate as NO_x-N	mg/l	< 6	6 - 10	10 – 20	> 20
Fluoride as F	mg/l	<0.7	0.7 – 1.0	1.0 – 1.5	> 1.5

1) Reference: Classification Systems in terms of – Water Research Commission: Quality of Domestic Water Supplies – Volume 1. Report No. TT 101/98, Second Edition, 1998.

The water quality for the following quaternary catchments were not assessed due to insufficient information (lack of representative groundwater quality data):

- G40B; G40D; G40E; G40G; G40K
- G50A; G50B; G50C; G50D; G50G; G50J
- H10D; H10E; H10J; H10K
- H20C; H20G; H20H
- H30B; H30E
- H40C; H40D; H40E; H40G; H40J; H40K; H40L
- H50A; H50B
- H60A; H60B; H60C; H60D; H60E; H60F; H60G; H60H; H60J; H60K; H60L
- H70A; H70C; H70D; H70E; H70F; H70G; H70H; H70J
- J11A; J11C; J11D; J11F; J11H; J11J; J11K
- J12A; J12C; J12E; J12J; J12M
- J13A; J13C, J22A; J22G; J22K, J23B; J23E; J23J, J24, J25B; J25D; J25E
- J31A; J31B; J31C, J32D, J33A; J33B; J33C, J34C; J34E, J35C; J35E; J35F
- J40A; J40B; J40C
- K10C; K10E; K10F
- K20A
- K30A; K30C; K30D
- K40A; K40B; K40C; K40D; K40E
- K50A
- K60A; K60B; K60C; K60D; K60E; K60F; K60G
- K70A; K70B

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Table 6.3. Groundwater Quality Reserve: Breede Gouritz Water Management Area

Chemical Parameter	Unit	Quaternary Catchments G40C, G40F, G40J, G40L												
		No. of Samples				Ambient GW quality or median[1)]				BHN Reserve[2)]	Groundwater Quality Reserve[3)]			
		G40C	G40F	G40J	G40L	G40C	G40F	G40J	G40L		G40C	G40F	G40J	G40L
pH		39	61	45	43	7.09	7.26	7.01	8.16	5.0 – 9.5	6.38–7.80	6.53–7.99	6.31–7.71	7.34–8.97
Electrical Conductivity	mS/m	39	61	45	43	20.70	20.90	21.20	208.00	<150	22.77	22.99	23.32	228.80
Calcium as Ca	mg/l	36	57	42	40	7.94	7.67	7.68	105.32	<150	8.73	8.43	8.45	115.85
Magnesium as Mg	mg/l	36	57	42	40	3.30	3.30	3.40	33.40	<100	3.63	3.63	3.74	36.74
Sodium as Na	mg/l	36	55	42	38	18.08	18.40	18.32	**253.05**	<200	19.89	20.24	20.16	**253.05**
Chloride as Cl	mg/l	36	58	42	40	31.94	32.69	32.57	**391.39**	<200	35.13	35.96	35.83	**391.39**
Sulphate as SO_4	mg/l	36	58	42	40	5.71	5.35	5.81	78.14	<400	6.28	5.89	6.39	85.95
Nitrate as NO_x-N	mg/l	36	57	42	38	0.04	0.05	0.06	5.17	<10	0.04	0.06	0.07	5.68
Fluoride as F	mg/l	36	54	42	35	0.30	0.31	0.29	0.28	<1.0	0.33	0.34	0.32	0.31
Chemical Parameter	**Unit**	**Quaternary Catchments G40M, G50E, G50F, G50H**												
		No. of Samples				Ambient GW quality or median[1)]				BHN Reserve[2)]	Groundwater Quality Reserve[3)]			
		G40M	G50E	G50F	G50H	G40M	G50E	G50F	G50H		G40M	G50E	G50F	G50H
pH		37	49	45	23	8.17	6.21	8.17	8.02	5.0 – 9.5	7.35–8.99	5.59–6.83	7.35–8.99	7.22–8.82
Electrical Conductivity	mS/m	37	49	45	23	109.10	54.90	91.90	**1630.00**	<150	120.01	60.39	101.09	**1630.00**
Calcium as Ca	mg/l	37	44	42	23	88.34	4.37	84.20	**182.00**	<150	97.18	4.81	92.62	**182.00**
Magnesium as Mg	mg/l	37	44	42	23	15.03	8.91	12.37	**358.00**	<100	16.54	9.81	13.61	**358.00**
Sodium as Na	mg/l	37	42	40	23	113.15	80.39	85.23	**3107.18**	<200	124.47	88.43	93.76	**3107.18**
Chloride as Cl	mg/l	37	44	42	23	**203.98**	143.85	153.44	**5302.10**	<200	**203.98**	158.24	168.79	**5302.10**
Sulphate as SO_4	mg/l	37	44	41	23	31.52	20.58	25.59	**742.40**	<400	34.67	22.64	28.15	**742.40**
Nitrate as NO_x-N	mg/l	37	43	40	23	1.70	0.06	0.26	0.13	<10	1.87	0.07	0.29	0.14
Fluoride as F	mg/l	37	40	39	23	0.18	0.11	0.22	1.35	<1.0	0.20	0.12	0.25	1.49
Chemical Parameter	**Unit**	**Quaternary Catchments G50J, H10A, H10B, H10C**												
		No. of Samples				Ambient GW quality or median[1)]				BHN Reserve[2)]	Groundwater Quality Reserve[3)]			
		G50J	H10A	H10B	H10C	G50J	H10A	H10B	H10C		G50J	H10A	H10B	H10C
pH		9	34	73	60	7.58	7.69	7.88	7.33	5.0 – 9.5	6.82–8.34	6.92–8.46	7.09–8.67	6.60–8.06
Electrical Conductivity	mS/m	9	34	73	60	**142.90**	**180.00**	49.00	45.60	<150	**157.19**	**180.00**	53.90	50.16
Calcium as Ca	mg/l	9	34	70	60	92.00	65.00	46.98	20.35	<150	101.20	71.50	51.67	22.39
Magnesium as Mg	mg/l	9	34	70	60	23.40	54.25	6.72	12.85	<100	25.74	59.68	7.39	14.14
Sodium as Na	mg/l	9	34	68	60	194.60	219.35	36.21	49.80	<200	**200.00**	241.29	39.83	54.78
Chloride as Cl	mg/l	9	34	70	60	**338.90**	380.55	80.09	106.25	<200	**338.90**	418.61	88.10	116.88
Sulphate as SO_4	mg/l	9	34	70	60	38.70	153.60	21.75	22.30	<400	42.57	168.96	23.92	24.53
Nitrate as NO_x-N	mg/l	9	34	70	60	1.04	0.42	0.17	0.44	<10	1.14	0.46	0.19	0.48
Fluoride as F	mg/l	9	34	68	60	0.16	0.34	0.18	0.17	<1.0	0.18	0.37	0.20	0.19

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Chemical Parameter	Unit	Quaternary Catchments H10F, H10G, H10H, H10L												
		No. of Samples				Ambient GW quality or median[1)]				BHN Reserve[2)]	Groundwater Quality Reserve[3)]			
		H10F	H10G	H10H	H10L	H10F	H10G	H10H	H10L		H10F	H10G	H10H	H10L
pH		15	117	54	82	7.29	7.05	7.59	6.98	5.0 – 9.5	6.56–8.02	6.35–7.76	6.83–8.35	6.28–7.68
Electrical Conductivity	mS/m	15	117	54	82	24.70	13.40	117.70	9.87	<150	27.17	14.74	129.47	10.85
Calcium as Ca	mg/l	15	111	53	78	6.10	7.49	28.50	3.70	<150	6.71	8.24	31.35	4.07
Magnesium as Mg	mg/l	15	112	53	78	12.00	2.80	28.30	2.12	<100	13.20	3.08	31.13	2.34
Sodium as Na	mg/l	12	107	52	76	18.85	12.10	176.10	8.60	<200	20.74	13.31	193.71	9.46
Chloride as Cl	mg/l	15	114	54	79	30.50	18.45	**308.75**	14.80	<200	33.55	20.30	**308.75**	16.28
Sulphate as SO_4	mg/l	12	109	52	79	4.15	5.50	53.65	3.00	<400	4.57	6.05	59.02	3.30
Nitrate as NO_x-N	mg/l	15	112	54	78	0.06	0.25	0.03	0.18	<10	0.07	0.28	0.03	0.20
Fluoride as F	mg/l	15	110	54	75	0.31	0.16	0.57	0.12	<1.0	0.34	0.17	0.62	0.13
Chemical Parameter	**Unit**	**Quaternary Catchments H20A, H20B, H20D, H20E**												
		No. of Samples				Ambient GW quality or median[1)]				BHN Reserve[2)]	Groundwater Quality Reserve[3)]			
		H20A	H20B	H20D	H20E	H20A	H20B	H20D	H20E		H20A	H20B	H20D	H20E
pH		85	344	12	15	7.20	7.09	6.77	6.46	5.0 – 9.5	6.48–7.92	6.38–7.79	6.09–7.44	5.81–7.11
Electrical Conductivity	mS/m	85	344	12	15	50.60	40.75	12.75	2.30	<150	55.66	44.83	14.03	2.53
Calcium as Ca	mg/l	85	344	12	15	34.80	23.45	9.70	0.50	<150	38.28	25.80	10.67	0.55
Magnesium as Mg	mg/l	85	344	12	15	5.60	9.15	2.15	0.50	<100	6.16	10.07	2.37	0.55
Sodium as Na	mg/l	85	344	11	15	25.70	31.80	7.70	2.60	<200	28.27	34.98	8.47	2.86
Chloride as Cl	mg/l	85	344	12	15	55.00	50.55	13.90	1.50	<200	60.50	55.61	15.29	1.65
Sulphate as SO_4	mg/l	85	344	11	15	81.20	39.65	4.00	2.00	<400	89.32	43.62	4.40	2.20
Nitrate as NO_x-N	mg/l	85	344	12	15	0.05	0.90	0.33	0.05	<10	0.06	0.99	0.36	0.06
Fluoride as F	mg/l	85	344	12	15	0.11	0.13	0.05	0.05	<1.0	0.12	0.14	0.06	0.06
Chemical Parameter	**Unit**	**Quaternary Catchments H20F, H30A, H30C, H30D**												
		No. of Samples				Ambient GW quality or median[1)]				BHN Reserve[2)]	Groundwater Quality Reserve[3)]			
		H20F	H30A	H30C	H30D	H20F	H30A	H30C	H30D		H20F	H30A	H30C	H30D
pH		302	9	21	45	7.10	7.95	7.70	7.81	5.0 – 9.5	6.39–7.80	7.16–8.75	6.93–8.47	7.03–8.59
Electrical Conductivity	mS/m	302	9	21	45	29.00	**142.00**	41.70	19.50	<150	31.90	**156.20**	45.87	21.45
Calcium as Ca	mg/l	302	9	21	42	22.80	63.80	36.40	17.10	<150	25.08	70.18	40.04	18.81
Magnesium as Mg	mg/l	302	9	21	42	4.70	32.50	6.00	3.31	<100	5.17	35.75	6.60	3.64
Sodium as Na	mg/l	302	9	21	40	24.90	191.90	37.00	10.94	<200	27.39	**200.00**	40.70	12.04
Chloride as Cl	mg/l	302	9	21	43	28.30	**273.50**	82.00	18.08	<200	31.13	**300.85**	90.20	19.89
Sulphate as SO_4	mg/l	302	9	21	43	28.00	121.90	48.00	4.30	<400	30.80	134.09	52.80	4.73
Nitrate as NO_x-N	mg/l	302	9	21	42	0.11	0.02	0.02	0.13	<10	0.12	0.02	0.02	0.14
Fluoride as F	mg/l	302	9	16	40	0.10	0.55	0.23	0.16	<1.0	0.11	0.61	0.25	0.18

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Chemical Parameter	Unit	Quaternary Catchments H40A, H40B, H40F, H70B												
		No. of Samples				Ambient GW quality or median[1]				BHN Reserve[2]	Groundwater Quality Reserve[3]			
		H40A	H40B	H40F	H70B	H40A	H40B	H40F	H70B		H40A	H40B	H40F	H70B
pH		54	14	17	9	7.86	7.35	6.54	8.21	5.0 – 9.5	7.07–8.65	6.62–8.09	5.89–7.19	7.39–9.03
Electrical Conductivity	mS/m	55	14	17	9	112.50	10.88	28.90	**925.00**	<150	123.75	11.97	31.79	**925.00**
Calcium as Ca	mg/l	48	14	17	9	92.38	2.24	14.80	98.9	<150	101.62	2.47	16.28	108.79
Magnesium as Mg	mg/l	49	14	17	9	44.90	0.93	7.00	**259.10**	<100	49.39	1.02	7.70	**259.10**
Sodium as Na	mg/l	47	12	17	9	88.94	21.43	26.30	**1722.90**	<200	97.83	23.57	28.93	**1722.90**
Chloride as Cl	mg/l	50	14	17	9	127.45	21.15	35.90	**2741.20**	<200	140.20	23.27	39.49	**2741.20**
Sulphate as SO_4	mg/l	50	14	17	9	229.91	3.50	20.70	338.60	<400	252.90	3.85	22.77	372.46
Nitrate as NO_x-N	mg/l	50	14	17	9	0.06	0.18	4.70	0.02	<10	0.06	0.20	5.27	0.02
Fluoride as F	mg/l	46	13	17	9	0.43	0.36	0.05	**1.75**	<1.0	0.47	0.39	0.06	**1.75**

Chemical Parameter	Unit	Quaternary Catchments H70K, H90D, H90E, J11B												
		No. of Samples				Ambient GW quality or median[1]				BHN Reserve[2]	Groundwater Quality Reserve[3]			
		H70K	H90D	H90E	J11B	H70K	H90D	H90E	J11B		H70K	H90D	H90E	J11B
pH		29	21	85	37	7.50	8.12	8.09	7.80	5.0 – 9.5	6.75–8.25	7.31–8.94	7.28–8.90	7.02–8.58
Electrical Conductivity	mS/m	29	21	85	37	121.00	102.70	**179.00**	81.30	<150	133.10	112.97	**179.00**	89.43
Calcium as Ca	mg/l	26	21	81	37	46.20	53.66	87.18	60.50	<150	50.82	59.02	95.89	66.55
Magnesium as Mg	mg/l	26	21	82	37	19.20	17.40	28.50	18.40	<100	21.12	19.14	31.35	20.24
Sodium as Na	mg/l	26	21	80	37	166.95	144.96	**208.48**	79.20	<200	183.65	159.45	**208.48**	87.12
Chloride as Cl	mg/l	26	20	81	37	**273.10**	**247.79**	**358.72**	94.70	<200	**273.10**	**247.79**	**358.72**	104.17
Sulphate as SO_4	mg/l	26	21	82	37	29.88	33.16	36.65	68.60	<400	32.87	36.47	40.31	75.46
Nitrate as NO_x-N	mg/l	26	20	79	37	0.02	0.83	3.40	1.41	<10	0.02	0.91	3.74	1.55
Fluoride as F	mg/l	26	20	77	37	0.52	0.14	0.18	0.82	<1.0	0.57	0.15	0.19	0.90

Chemical Parameter	Unit	Quaternary Catchments J11E, J11G, J12B, J12D												
		No. of Samples				Ambient GW quality or median[1]				BHN Reserve[2]	Groundwater Quality Reserve[3]			
		J11E	J11G	J12B	J12D	J11E	J11G	J12B	J12D		J11E	J11G	J12B	J12D
pH		81	20	17	11	8.19	8.18	7.73	8.23	5.0 – 9.5	7.37–9.01	7.36–9.00	6.96–8.50	7.41–9.05
Electrical Conductivity	mS/m	81	20	17	11	**174.30**	**164.50**	**368.00**	**195.00**	<150	**174.30**	**164.50**	**368.00**	**195.00**
Calcium as Ca	mg/l	77	20	17	11	98.70	115.05	117.10	68.30	<150	108.57	126.56	128.81	75.13
Magnesium as Mg	mg/l	77	20	17	11	45.00	44.65	**129.30**	50.60	<100	49.50	49.12	**129.30**	55.66
Sodium as Na	mg/l	73	20	17	11	197.89	190.65	**335.70**	**252.80**	<200	217.68	**200.00**	**335.70**	**252.80**
Chloride as Cl	mg/l	75	20	17	11	**250.10**	**294.70**	**726.10**	**415.00**	<200	**250.10**	**294.70**	**726.10**	**415.00**
Sulphate as SO_4	mg/l	77	20	17	11	179.50	120.45	144.20	104.80	<400	197.45	132.50	158.62	115.28
Nitrate as NO_x-N	mg/l	71	20	17	11	0.30	1.18	0.06	0.02	<10	0.33	1.29	0.07	0.02
Fluoride as F	mg/l	67	20	17	11	0.88	0.92	0.80	0.53	<1.0	0.96	0.92	0.88	0.58

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Chemical Parameter	Unit	Quaternary Catchments J12F, J12G, J12H, J12K												
		No. of Samples				Ambient GW quality or median[1)]				BHN Reserve[2)]	Groundwater Quality Reserve[3)]			
		J12F	J12G	J12H	J12K	J12F	J12G	J12H	J12K		J12F	J12G	J12H	J12K
pH		10	11	13	10	8.23	8.20	7.75	8.13	5.0 – 9.5	7.41–9.05	7.38–9.02	6.98–8.53	7.32–8.94
Electrical Conductivity	mS/m	10	11	13	10	**306.50**	**323.00**	**157.00**	**462.00**	<150	**306.50**	**323.00**	**157.00**	**462.00**
Calcium as Ca	mg/l	10	11	13	10	79.65	103.10	121.90	**212.95**	<150	87.62	113.41	134.09	**212.95**
Magnesium as Mg	mg/l	10	11	13	10	81.35	91.80	26.00	112.55	<100	89.49	100.98	28.60	123.81
Sodium as Na	mg/l	10	11	13	10	**406.70**	**262.30**	151.50	**703.25**	<200	**406.70**	**262.30**	166.65	**703.25**
Chloride as Cl	mg/l	10	11	13	10	**691.30**	**795.60**	**258.70**	**1168.85**	<200	**691.30**	**795.60**	**258.70**	**1168.85**
Sulphate as SO_4	mg/l	10	11	13	10	241.45	107.20	156.00	**459.80**	<400	265.60	117.92	171.60	**459.80**
Nitrate as NO_x-N	mg/l	10	11	13	10	0.02	0.02	0.02	0.02	<10	0.02	0.02	0.02	0.02
Fluoride as F	mg/l	10	11	13	10	0.56	0.50	0.39	0.55	<1.0	0.61	0.55	0.43	0.61
Chemical Parameter	**Unit**	**Quaternary Catchments J12L, J13B, J21A, J21B**												
		No. of Samples				**Ambient GW quality or median[1)]**				**BHN Reserve[2)]**	**Groundwater Quality Reserve[3)]**			
		J12L	**J13B**	**J21A**	**J21B**	**J12L**	**J13B**	**J21A**	**J21B**		**J12L**	**J13B**	**J21A**	**J21B**
pH		57	15	64	56	7.54	7.98	7.97	7.60	5.0 – 9.5	6.79–8.29	7.18–8.78	7.17–8.76	6.84–8.35
Electrical Conductivity	mS/m	57	15	64	56	25.50	**418.00**	61.40	100.50	<150	28.05	**418.00**	67.54	110.55
Calcium as Ca	mg/l	54	14	60	56	16.11	94.90	58.18	60.10	<150	17.72	104.39	64.00	66.11
Magnesium as Mg	mg/l	54	15	59	56	2.89	93.80	18.81	19.45	<100	3.18	103.18	20.69	21.40
Sodium as Na	mg/l	52	15	60	54	21.85	**623.60**	43.23	116.95	<200	24.03	**623.60**	47.55	128.65
Chloride as Cl	mg/l	53	15	58	56	30.71	**906.39**	18.77	104.70	<200	33.78	**906.39**	20.64	115.17
Sulphate as SO_4	mg/l	54	15	57	54	7.55	253.60	75.14	113.80	<400	8.31	278.96	82.65	125.18
Nitrate as NO_x-N	mg/l	52	15	54	56	0.03	0.35	0.09	2.56	<10	0.03	0.39	0.09	2.81
Fluoride as F	mg/l	51	15	54	56	0.21	0.72	0.46	0.87	<1.0	0.23	0.79	0.51	0.96
Chemical Parameter	**Unit**	**Quaternary Catchments J21C, J21D, J21E, J22B**												
		No. of Samples				**Ambient GW quality or median[1)]**				**BHN Reserve[2)]**	**Groundwater Quality Reserve[3)]**			
		J21C	**J21D**	**J21E**	**J22B**	**J21C**	**J21D**	**J21E**	**J22B**		**J21C**	**J21D**	**J21E**	**J22B**
pH		107	40	26	21	7.75	7.66	7.96	8.00	5.0 – 9.5	6.98–8.53	6.89–8.42	7.16–8.76	7.20–8.80
Electrical Conductivity	mS/m	107	40	26	21	76.40	85.20	78.80	74.20	<150	84.04	93.72	86.68	81.62
Calcium as Ca	mg/l	107	40	26	21	56.90	43.30	61.00	60.30	<150	62.59	47.63	67.10	66.33
Magnesium as Mg	mg/l	107	40	26	21	16.40	17.70	16.00	24.80	<100	18.04	19.47	17.60	27.28
Sodium as Na	mg/l	107	38	26	21	83.80	107.90	83.40	67.90	<200	92.18	118.69	91.74	74.69
Chloride as Cl	mg/l	107	40	26	21	76.90	102.60	93.00	57.20	<200	84.59	112.86	102.30	62.92
Sulphate as SO_4	mg/l	107	38	26	21	83.50	95.70	53.05	63.40	<400	91.85	105.27	58.36	69.74
Nitrate as NO_x-N	mg/l	107	39	26	21	3.13	3.55	2.23	1.95	<10	3.44	3.91	2.45	2.15
Fluoride as F	mg/l	107	40	26	21	0.68	**1.00**	0.95	0.91	<1.0	0.75	**1.00**	0.95	1.00

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Chemical Parameter	Unit	Quaternary Catchments J22C, J22D, J22E, J22F												
		No. of Samples				Ambient GW quality or median[1]				BHN Reserve[2]	Groundwater Quality Reserve[3]			
		J22C	J22D	J22E	J22F	J22C	J22D	J22E	J22F		J22C	J22D	J22E	J22F
pH		26	46	80	24	8.00	7.94	7.79	7.80	5.0 – 9.5	7.20–8.80	7.15–8.73	7.01–8.57	7.02–8.58
Electrical Conductivity	mS/m	26	46	80	24	97.10	89.85	88.70	103.45	<150	106.81	98.84	97.57	113.80
Calcium as Ca	mg/l	26	46	80	24	50.15	44.95	61.80	82.10	<150	55.17	49.45	67.98	90.31
Magnesium as Mg	mg/l	26	46	80	24	27.00	24.80	21.00	18.95	<100	29.70	27.28	23.10	20.85
Sodium as Na	mg/l	26	46	80	24	102.75	118.25	95.95	86.35	<200	113.03	130.08	105.55	94.99
Chloride as Cl	mg/l	26	46	80	24	94.00	102.75	92.40	109.40	<200	103.40	113.03	101.64	120.34
Sulphate as SO_4	mg/l	26	46	80	24	123.80	121.30	90.80	110.70	<400	136.18	133.43	99.88	121.77
Nitrate as NO_x-N	mg/l	26	46	80	24	1.78	1.47	4.12	3.82	<10	1.95	1.61	4.53	4.20
Fluoride as F	mg/l	26	46	80	24	**1.03**	**1.10**	**1.05**	0.89	<1.0	**1.03**	**1.10**	**1.05**	0.97
Chemical Parameter	**Unit**	**Quaternary Catchments J22H, J22J, J23A, J23C**												
		No. of Samples				Ambient GW quality or median[1]				BHN Reserve[2]	Groundwater Quality Reserve[3]			
		J22H	J22J	J23A	J23C	J22H	J22J	J23A	J23C		J22H	J22J	J23A	J23C
pH		32	26	39	10	7.79	7.83	7.93	7.78	5.0 – 9.5	7.01–8.56	7.05–8.61	7.14–8.72	7.00–8.56
Electrical Conductivity	mS/m	32	26	39	10	145.05	83.20	**238.00**	136.00	<150	145.05	91.52	**238.00**	149.60
Calcium as Ca	mg/l	32	26	36	10	105.60	50.75	125.25	126.75	<150	116.16	55.83	137.78	139.43
Magnesium as Mg	mg/l	32	26	36	10	38.25	20.45	16.26	32.70	<100	42.08	22.50	17.89	35.97
Sodium as Na	mg/l	32	26	35	10	158.05	86.90	**342.80**	143.70	<200	173.86	95.59	**342.80**	158.07
Chloride as Cl	mg/l	32	26	35	10	**208.55**	82.15	**265.46**	159.05	<200	229.41	90.37	**265.46**	174.96
Sulphate as SO_4	mg/l	32	26	36	10	225.10	117.50	**497.01**	112.50	<400	247.61	129.25	**497.01**	123.75
Nitrate as NO_x-N	mg/l	32	26	35	10	3.31	3.02	0.04	1.10	<10	3.64	3.32	0.04	1.21
Fluoride as F	mg/l	32	26	33	10	1.09	0.90	**2.14**	0.69	<1.0	1.19	0.99	**2.14**	0.76
Chemical Parameter	**Unit**	**Quaternary Catchments J23D, J23F, J24A, J24B**												
		No. of Samples				Ambient GW quality or median[1]				BHN Reserve[2]	Groundwater Quality Reserve[3]			
		J23D	J23F	J24A	J24B	J23D	J23F	J24A	J24B		J23D	J23F	J24A	J24B
pH		26	85	168	220	8.10	7.97	7.77	7.79	5.0 – 9.5	7.29–8.91	7.17–8.76	6.99–8.54	7.01–8.56
Electrical Conductivity	mS/m	26	85	168	220	**155.00**	126.70	86.30	86.54	<150	**155.00**	139.37	94.93	95.19
Calcium as Ca	mg/l	26	83	168	213	98.95	51.07	70.60	76.59	<150	108.85	56.17	77.66	84.24
Magnesium as Mg	mg/l	26	83	168	214	40.65	28.60	18.55	17.15	<100	44.72	31.46	20.41	18.87
Sodium as Na	mg/l	26	80	168	210	166.55	120.85	91.25	83.50	<200	183.21	132.94	100.38	91.85
Chloride as Cl	mg/l	26	83	168	214	**208.95**	140.10	78.80	78.20	<200	**208.95**	154.11	86.68	86.02
Sulphate as SO_4	mg/l	26	83	168	214	151.40	157.15	103.40	69.00	<400	166.54	172.86	113.74	75.90
Nitrate as NO_x-N	mg/l	26	83	168	212	1.89	0.12	1.85	3.45	<10	2.08	0.13	2.04	3.80
Fluoride as F	mg/l	26	81	168	209	0.79	0.48	0.92	0.81	<1.0	0.86	0.52	1.01	0.89

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Chemical Parameter	Unit	Quaternary Catchments J24C, J24D, J24E, J25A												
		No. of Samples				Ambient GW quality or median[1]				BHN Reserve[2]	Groundwater Quality Reserve[3]			
		J24C	J24D	J24E	J25A	J24C	J24D	J24E	J25A		J24C	J24D	J24E	J25A
pH		112	97	18	33	7.70	7.90	7.94	7.11	5.0 – 9.5	6.93–8.47	7.11–8.69	7.15–8.73	6.40–7.83
Electrical Conductivity	mS/m	112	97	18	33	96.70	146.70	**161.50**	50.90	<150	106.37	146.70	**161.50**	55.99
Calcium as Ca	mg/l	112	93	18	33	68.45	94.20	106.00	14.80	<150	75.30	103.62	116.60	16.28
Magnesium as Mg	mg/l	112	93	18	33	18.00	28.80	30.95	10.90	<100	19.80	31.68	34.05	11.99
Sodium as Na	mg/l	112	86	18	33	103.40	162.40	198.65	50.40	<200	113.74	178.64	198.65	55.44
Chloride as Cl	mg/l	112	95	18	33	120.20	194.50	**213.80**	96.50	<200	132.22	194.50	**213.80**	106.15
Sulphate as SO_4	mg/l	112	89	18	33	78.40	114.00	105.70	26.40	<400	86.24	125.40	116.27	29.04
Nitrate as NO_x-N	mg/l	112	95	18	32	3.90	1.76	0.82	0.02	<10	4.28	1.94	0.90	0.02
Fluoride as F	mg/l	112	93	18	32	0.79	0.81	1.05	0.31	<1.0	0.87	0.89	1.05	0.34

Chemical Parameter	Unit	Quaternary Catchments J25C, J31D, J32A, J32B												
		No. of Samples				Ambient GW quality or median[1]				BHN Reserve[2]	Groundwater Quality Reserve[3]			
		J25C	J31D	J32A	J32B	J25C	J31D	J32A	J32B		J25C	J31D	J32A	J32B
pH		31	48	19	15	7.11	6.54	7.68	7.86	5.0 – 9.5	6.40–7.83	5.89–7.19	6.91–8.45	7.07–8.65
Electrical Conductivity	mS/m	31	48	19	15	50.90	14.06	**165.80**	**187.00**	<150	55.99	15.46	**165.80**	**187.00**
Calcium as Ca	mg/l	31	43	19	15	14.80	4.92	85.60	99.50	<150	16.28	5.41	94.16	109.45
Magnesium as Mg	mg/l	31	43	19	15	10.90	2.86	42.50	44.50	<100	11.99	3.14	46.75	48.95
Sodium as Na	mg/l	31	41	19	15	50.40	9.30	172.20	175.10	<200	55.44	10.23	189.42	192.61
Chloride as Cl	mg/l	31	43	19	15	96.50	23.80	**203.20**	**242.60**	<200	106.15	26.18	**203.20**	**242.60**
Sulphate as SO_4	mg/l	31	43	19	15	26.40	9.90	180.30	170.80	<400	29.04	10.89	198.33	187.88
Nitrate as NO_x-N	mg/l	31	41	19	15	0.02	0.03	3.80	0.88	<10	0.02	0.03	4.18	0.96
Fluoride as F	mg/l	31	39	19	15	0.31	0.29	1.06	0.99	<1.0	0.34	0.32	1.06	0.99

Chemical Parameter	Unit	Quaternary Catchments J32C, J32E, J33D, J33E												
		No. of Samples				Ambient GW quality or median[1]				BHN Reserve[2]	Groundwater Quality Reserve[3]			
		J32C	J32E	J33D	J33E	J32C	J32E	J33D	J33E		J32C	J32E	J33D	J33E
pH		29	41	40	149	7.76	7.55	7.53	6.64	5.0 – 9.5	6.98–8.54	6.80–8.30	6.78–8.29	6.98–7.30
Electrical Conductivity	mS/m	29	41	40	149	127.40	19.80	19.80	12.10	<150	140.14	21.78	21.78	13.31
Calcium as Ca	mg/l	29	40	39	148	80.80	11.07	11.00	2.76	<150	88.88	12.17	12.10	3.04
Magnesium as Mg	mg/l	29	40	39	148	30.90	3.50	3.50	2.07	<100	33.99	3.85	3.85	2.27
Sodium as Na	mg/l	29	39	38	146	143.90	12.40	12.39	13.40	<200	158.29	13.64	13.63	14.74
Chloride as Cl	mg/l	29	40	38	147	170.70	23.87	23.64	22.99	<200	187.77	26.26	26.01	25.29
Sulphate as SO_4	mg/l	29	39	38	146	121.00	5.72	5.58	6.34	<400	133.10	6.29	6.14	6.97
Nitrate as NO_x-N	mg/l	29	39	38	147	2.15	0.04	0.04	0.19	<10	2.37	0.04	0.04	0.20
Fluoride as F	mg/l	29	37	36	146	0.90	0.27	0.27	0.11	<1.0	0.99	0.30	0.30	0.12

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Chemical Parameter	Unit	Quaternary Catchments J33F, J34A, J34B, J34D												
		No. of Samples				Ambient GW quality or median[1)]				BHN Reserve[2)]	Groundwater Quality Reserve[3)]			
		J33F	J34A	J34B	J34D	J33F	J34A	J34B	J34D		J33F	J34A	J34B	J34D
pH		70	36	11	22	6.82	6.33	6.77	6.56	5.0 – 9.5	6.14–7.50	5.70–6.96	6.09–7.45	5.90–7.22
Electrical Conductivity	mS/m	70	36	11	22	44.60	19.55	114.50	12.54	<150	49.06	21.51	125.95	13.79
Calcium as Ca	mg/l	70	36	11	22	11.95	3.26	46.30	2.39	<150	13.15	3.58	50.93	2.63
Magnesium as Mg	mg/l	70	36	11	22	7.05	3.44	21.80	1.73	<100	7.76	3.78	23.98	1.91
Sodium as Na	mg/l	70	36	11	22	34.25	25.95	136.70	15.40	<200	37.68	28.55	150.37	16.94
Chloride as Cl	mg/l	70	36	11	22	61.74	40.85	**252.50**	27.36	<200	67.92	44.94	**252.50**	30.10
Sulphate as SO_4	mg/l	70	36	11	22	27.50	5.22	42.20	2.50	<400	30.25	5.74	46.42	2.75
Nitrate as NO_x-N	mg/l	68	36	11	22	0.08	0.17	0.37	0.22	<10	0.09	0.19	0.41	0.24
Fluoride as F	mg/l	69	36	11	22	0.22	0.11	0.29	0.08	<1.0	0.24	0.12	0.32	0.08
Chemical Parameter	**Unit**	**Quaternary Catchments J34F, J35A, J35B, J35D**												
		No. of Samples				**Ambient GW quality or median[1)]**				**BHN Reserve[2)]**	**Groundwater Quality Reserve[3)]**			
		J34F	**J35A**	**J35B**	**J35D**	**J34F**	**J35A**	**J35B**	**J35D**		**J34F**	**J35A**	**J35B**	**J35D**
pH		9	17	49	49	7.66	8.07	7.01	7.64	5.0 – 9.5	6.89–8.43	7.26–8.88	6.31–7.71	6.88–8.40
Electrical Conductivity	mS/m	9	17	49	49	46.60	42.00	46.20	**173.10**	<150	51.26	46.20	50.82	**173.10**
Calcium as Ca	mg/l	9	17	47	48	6.87	62.70	6.23	86.30	<150	7.55	68.97	6.85	94.93
Magnesium as Mg	mg/l	9	17	47	48	7.70	6.30	8.70	35.65	<100	8.47	6.93	9.57	39.22
Sodium as Na	mg/l	9	17	45	48	61.80	11.10	57.30	145.70	<200	67.98	12.21	63.03	160.27
Chloride as Cl	mg/l	9	17	45	48	101.64	19.10	108.70	**239.50**	<200	111.81	21.01	119.57	**239.50**
Sulphate as SO_4	mg/l	9	17	47	48	27.90	11.50	4.85	95.95	<400	30.69	12.65	5.34	105.55
Nitrate as NO_x-N	mg/l	9	17	45	48	0.05	0.16	4.51	0.64	<10	0.06	0.18	4.96	0.70
Fluoride as F	mg/l	9	17	43	47	0.48	0.16	0.10	0.52	<1.0	0.53	0.18	0.11	0.57
Chemical Parameter	**Unit**	**Quaternary Catchments J40D, J40E, K10A, K10B**												
		No. of Samples				**Ambient GW quality or median[1)]**				**BHN Reserve[2)]**	**Groundwater Quality Reserve[3)]**			
		J40D	**J40E**	**K10A**	**K10B**	**J40D**	**J40E**	**K10A**	**K10B**		**J40D**	**J40E**	**K10A**	**K10B**
pH		48	63	20	14	7.30	7.52	7.88	7.51	5.0 – 9.5	6.57–8.03	6.77–8.28	7.09–8.67	6.76–8.26
Electrical Conductivity	mS/m	48	63	20	14	83.15	**219.00**	**276.00**	**214.50**	<150	91.47	**219.00**	**276.00**	**214.50**
Calcium as Ca	mg/l	48	63	20	14	12.41	59.40	52.50	32.87	<150	13.65	65.34	57.75	36.15
Magnesium as Mg	mg/l	48	63	20	14	14.72	31.97	44.17	35.74	<100	16.19	35.17	48.58	39.32
Sodium as Na	mg/l	45	63	20	14	131.41	**288.45**	**399.60**	**288.65**	<200	144.55	**288.45**	**399.60**	**288.65**
Chloride as Cl	mg/l	48	63	20	13	**213.26**	**492.38**	**698.45**	**545.73**	<200	**213.26**	**492.38**	**698.45**	**545.73**
Sulphate as SO_4	mg/l	45	63	20	14	31.69	65.21	97.08	59.60	<400	34.86	71.73	106.79	65.56
Nitrate as NO_x-N	mg/l	47	62	20	12	0.09	0.04	0.05	0.27	<10	0.10	0.04	0.06	0.29
Fluoride as F	mg/l	48	63	20	13	0.14	0.22	0.22	0.25	<1.0	0.16	0.24	0.24	0.28

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Chemical Parameter	Unit	Quaternary Catchments K10D, K30B, K50B												
		No. of Samples				Ambient GW quality or median[1)]				BHN Reserve[2)]	Groundwater Quality Reserve[3)]			
		K10D	K30B	K50B		K10D	K30B	K50B			K10D	K30B	K50B	
pH		11	47	9		7.85	6.83	7.48		5.0 – 9.5	7.07–8.64	6.15–7.51	6.73–8.22	
Electrical Conductivity	mS/m	11	47	9		**257.00**	27.72	61.90		<150	**257.00**	30.49	68.09	
Calcium as Ca	mg/l	11	43	9		30.82	4.27	15.08		<150	33.90	4.70	16.58	
Magnesium as Mg	mg/l	11	43	9		28.10	7.49	9.80		<100	30.91	8.24	10.78	
Sodium as Na	mg/l	11	41	9		**426.18**	28.35	85.57		<200	**426.18**	31.19	94.13	
Chloride as Cl	mg/l	11	42	9		**533.12**	41.92	139.99		<200	**533.12**	46.11	153.98	
Sulphate as SO_4	mg/l	11	44	9		66.60	7.95	17.54		<400	73.26	8.74	19.29	
Nitrate as NO_x-N	mg/l	10	43	9		0.09	7.99	0.48		<10	0.10	8.79	0.52	
Fluoride as F	mg/l	10	23	9		0.84	0.16	0.34		<1.0	0.93	1.49	0.18	

[1)] Based on long term groundwater quality datasets (DWS Water Management System). Minimum number of analyses used for the statistical evaluation is nine (9).
[2)] Upper limit of Class I water quality [Drinking] (WRC *et al.* 2nd Edition, 1998, Volume 1: Assessment Guide); and
[3)] Median value plus 10%. Where a difference in the water quality values for the ambient groundwater quality and basic human needs was found, the lesser or more protective value was selected for the groundwater quality Reserve. Where the ambient groundwater quality was selected as the groundwater quality Reserve, the value was scaled up by 10 per cent provided that the value does not exceed the BHN Reserve.

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Table 6.4: Summary of the water quality class and parameters of concern

Quaternary catchment	Water quality class (WRC, 1998)	Water quality parameters of concern
G40C	0	None
G40F	0	None
G40J	0	None
G40L	II	Sodium, Chloride
G40M	II	Chloride
G50E	I	Chloride
G50F	I	Chloride
G50H	III	Electrical Conductivity, Magnesium, Sodium, Chloride, Sulphate
G50J	II	Chloride, Sodium, Electrical Conductivity
H10A	II	Sodium, Chloride, Electrical Conductivity
H10B	0	None
H10C	I	Chloride
H10F	0	None
H10G	0	None
H10H	II	Chloride
H10L	0	None
H20A	0	None
H20B	0	None
H20D	0	None
H20E	0	None
H20F	0	None
H30A	II	Chloride
H30C	0	None
H30D	0	None
H40A	I	Electrical Conductivity, Calcium, Chloride
H40B	0	None
H40F	0	None
H70B	III	Electrical Conductivity, Magnesium, Sodium, Chloride
H70K	II	Chloride
H90D	II	Chloride
H90E	II	Electrical Conductivity, Sodium, Chloride
J11B	I	Electrical Conductivity
J11E	II	Electrical Conductivity, Chloride
J11G	II	Electrical Conductivity, Chloride
J12B	III	Electrical Conductivity, Magnesium, Sodium, Chloride
J12D	II	Electrical Conductivity, Sodium, Chloride
J12F	III	Electrical Conductivity, Sodium, Chloride
J12G	III	Electrical Conductivity, Sodium, Chloride
J12H	II	Electrical Conductivity, Chloride
J12K	III	Electrical Conductivity, Calcium, Sodium, Chloride, Sulphate
J12L	0	None
J13B	III	Electrical Conductivity, Sodium, Chloride
J21A	0	None
J21B	I	Electrical Conductivity, Sodium, Chloride
J21C	I	Electrical Conductivity
J21D	I	Electrical Conductivity, Sodium, Chloride
J21E	I	Electrical Conductivity
J22B	I	Electrical Conductivity
J22C	I	Electrical Conductivity, Sodium
J22D	I	Electrical Conductivity, Sodium, Chloride
J22E	I	Electrical Conductivity
J22F	I	Electrical Conductivity, Calcium, Chloride
J22H	II	Electrical Conductivity, Calcium, Sodium, Chloride
J22J	I	Electrical Conductivity
J23A	II	Electrical Conductivity, Sodium, Chloride, Sulphate
J23C	I	Electrical Conductivity, Calcium, Sodium, Chloride
J23D	II	Electrical Conductivity, Chloride
J23F	I	Electrical Conductivity, Sodium, Chloride
J24A	I	Electrical Conductivity
J24B	I	Electrical Conductivity
J24C	I	Electrical Conductivity, Sodium, Chloride
J24D	II	Electrical Conductivity, Chloride

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Quaternary catchment	Water quality class (WRC, 1998)	Water quality parameters of concern
J24E	II	Electrical Conductivity, Chloride
J25A	0	None
J25C	0	None
J31D	0	None
J32A	II	Electrical Conductivity, Chloride
J32B	II	Electrical Conductivity, Chloride
J32C	I	Electrical Conductivity, Calcium, Sodium, Chloride
J32E	0	None
J33D	0	None
J33E	0	None
J33F	0	None
J34A	0	None
J34B	II	Chloride
J34D	0	None
J34F	I	Chloride
J35A	0	None
J35B	I	Chloride
J35D	II	Electrical Conductivity, Chloride
J40D	II	Chloride, Sodium
J40E	II	Electrical Conductivity, Sodium, Chloride
K10A	III	Electrical Conductivity, Sodium, Chloride
K10B	II	Electrical Conductivity, Sodium, Chloride
K10D	III	Electrical Conductivity, Sodium, Chloride
K30B	0	None
K50B	I	Chloride

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Printed by and obtainable from the Government Printer, Bosman Street, Private Bag X85, Pretoria, 0001
Contact Centre Tel: 012-748 6200. eMail: info.egazette@gpw.gov.za
Publications: Tel: (012) 748 6053, 748 6061, 748 6065

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Government Gazette
Staatskoerant

REPUBLIC OF SOUTH AFRICA
REPUBLIEK VAN SUID AFRIKA

Vol. 686 26 August Augustus 2022 No. 46798

PART 3 OF 4

N.B. The Government Printing Works will not be held responsible for the quality of "Hard Copies" or "Electronic Files" submitted for publication purposes

ISSN 1682-5845

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7. ESTUARIES (WATER QUANTITY COMPONENT)

Table 7.1 Water Quantity

Quaternary Catchment	Estuary name	PES	REC	nMAR (MCM)	EWR (MCM nMAR)
G40B	Rooiels	B	B	***9.44**	n/a
G40D	Palmiet	C	B	***177.94**	n/a
G40G	Bot/Kleinmond	C	B	***77.67**	n/a
G40H	Onrus	E	D	***4.74**	n/a
G40L	Klein	C	B	***51.21**	n/a
G40M	Uilkraals	D	C	***6.82**	n/a
G40F	Heuningnes	C	A	29.53	n/a
H70K	Breede	B	B	1785.00	954.00
H80E	Duiwenhoks	B	A	89.29	73.01
H90C	Goukou	C	B	115.95	91.73
J40B	Gouritz	C	B	623.52	377.23
K10A	Blinde	C	C	n/a	n/a
K10B	Hartenbos	D	C	n/a	n/a
K10F	Klein Brak	C	C	50.67	37.66
K20A	Groot Brak	D	C	36.79	11.11
K30A	Maalgate	B	C	41.51	24.41
K30B	Gwaing	B	C	35.07	21.7
K30C	Kaaimans	B	B	53.6	41.3

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Quaternary Catchment	Estuary name	PES	REC	nMAR (MCM)	EWR (MCM nMAR)
K30D	Wilderness system: Touws	B	A	29.66	25.15
K40D	Swartvlei	B	B	83.4	56.6
K40E	Goukamma	B	A	57.5	48.8
K50B	Kynsna	B	B	83.2	63.4
K60 E and F	Keurbooms	A/B	A/B	232	214.10
K60G	Noetsie	B	B	4.8	n/a
K60G	Piesang	D	B/C	n/a	n/a
K70A	Groot (Wes)	B	A	n/a	n/a
K70A	Matjie	B	B	5.10	n/a
K70A	Sout	A	A	11.22	n/a
K70B	Bloukrans	A	A	n/a	n/a

***Present Day MAR**

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ESTUARY WATER QUALITY COMPONENT

Table 7.2: EcoSpecs and Thresholds of Potential Concern for the Blinde Estuary

Ecological component	EcoSpecs	Thresholds of Potential Concern
Hydrology	Maintain flow regime (small system needs most flows)	MAR does not vary by more than 10% from present Floods (indicated by 1:10 year event) do not reduce by more than 5% from present Base flows do not differ by more than 5% from present
Hydrodynamics	Maintain mouth state to create the require habitat for birds, fish, macrophytes, microalgae and water quality	Closed mouth state increase/decrease by 10% from present Presence of semi-closed mouth state with continuous outflow to sea. Average water depth <0.5 m (to be confirmed by monitoring) Rate of change in water level > 30% from present
Water quality	Salinity distribution not to cause exceedance of TPCs for fish, invertebrates, macrophytes and microalgae Turbidity and dissolved oxygen not to cause exceedance of TPCs for biota Dissolved inorganic (DIN)/dissolved inorganic phosphate (DIP) concentrations not to cause exceedance of TPCs for macrophytes and microalgae Toxic substances not to cause exceedance of TPCs for biota	Salinity > 20 (expected range 5-15) Dissolved oxygen (DO)< 5 mg/ℓ in estuary Turbidity> 10 NTU in low flow Secchi depth: to bottom DIN >100 µg/ℓ (average) DIP > 20 µg/ℓ (average) Concentrations in water column exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAF, 1995) Concentrations in sediment exceed target values as per Western Indian Ocean (WIO) Region guidelines (UNEP/Nairobi Convention Secretariat and CSIR, 2009)
Sediment dynamics	Flood regime to maintain the sediment distribution patterns and aquatic habitat (in stream physical habitat) so as not to exceed TPCs for biota Changes in sediment grain-size distribution patterns not to cause exceedance of TPCs in benthic invertebrates Change in average sediment composition and characteristics Change in average bathymetry	Average sediment composition (% fractions) along estuary change from baseline (to be measured) by 30% (per survey) Average depth along main channel change from 30% of baseline (to be determined) (system expected to experience significant fluctuation in bathymetry between flood and extended closed periods)
Microalgae	Maintain low/median phytoplankton/benthic microalgae biomass Prevent formation of phytoplankton blooms	Phytoplankton> 3.5 µg/ℓ (median) Benthic microalgae >23 mg/m^2 (median) Phytoplankton >20 µg/ℓ and/or cell density >10 000 cells/ml (once-off)
Macrophytes	Maintain distribution of macrophyte habitats Prevent the spread of reeds into open water Prevent an increase in nutrients and macro-algal blooms Prevent the spread of invasive trees (e.g. *Acacia* spp.) in the riparian zone	20% change in the macrophyte area. (Reeds currently cover 0.04 ha.) Reeds occupy > 0.5 ha Macro-algal blooms cover > 50% of the open water area Presence of invasive aquatic macrophytes e.g. *Azolla*, water hyacinth etc. Invasive trees cover > 50% of riparian zone
Invertebrates	Establish presence/absence of sand prawn Callichirus kraussi on sand banks in lower estuary Establish presence/absence of the copepod Pseudodiaptomus hessei or estuarine congeneric in the zooplankton of the estuary	If present populations deviate from average baselines (as determined in first three visits) by more 30%
Fish	Fish assemblage should comprise the five estuarine association categories in similar proportions (diversity and abundance) to that under the reference. Numerically, assemblage should comprise: Ia estuarine residents (50-80% of total abundance)	Ia estuarine residents <50% Ib marine and estuarine breeders <10% IIa obligate estuarine-dependent <10% IIb estuarine associated species <5% IIc marine opportunists < 20% III marine vagrants > 5% IV indigenous fish<1%

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Ecological component	EcoSpecs	Thresholds of Potential Concern
	Ib marine and estuarine breeders (5-20%) IIa obligate estuarine-dependent (10-20%) IIb estuarine associated species (5-15%), IIc marine opportunists (20-80%) III marine vagrants (not more than 5%) IV indigenous fish (1-5%) V catadromous species (1-5%) Category Ia species should contain viable populations of at least two species (e.g. G.aestuaria, & Hyporamphus capensis). Category IIa obligate dependents should be well represented by at least two large exploited species (i.e. L. lithognathus, Lichia amia). REI (River Estuary Interface) species dominated by both Myxus capensis and G. aestuaria.	V catadromous species <1%
Birds	Maintain population of original groups of birds present on the estuary	Number of birds in any group, other than species that are increasing regionally such as Egyptian geese, drops below the baseline median (determined by past data and or initial surveys) number of species and/or birds counted for three consecutive summer or winter counts

Table 7.3: EcoSpecs and Thresholds of Potential Concern for the Hartenbos Estuary

Ecological component	EcoSpecs	Thresholds of Potential Concern
Hydrology	Maintain at least present day base flows (to be confirmed)	MAR does not vary by more than 10% Floods (indicated by 1:10 year event) do not reduce by more than 5% from present Base flows do not increase by more than 50% from present
Hydrodynamics	Maintain mouth state to create the required habitat for birds, fish, macrophytes, microalgae and water quality	Closed mouth state does not decrease by 10% from present Average water level in system > 10% from present Tidal amplitude (when open) < 20%
Water quality	Salinity distribution not to cause exceedance of TPCs for fish, invertebrates, macrophytes and microalgae Turbidity and dissolved oxygen not to cause exceedance of TPCs for biota DIN/DIP concentrations not to cause exceedance of TPCs for macrophytes and microalgae Toxic substances not to cause exceedance of TPCs for biota	Average salinity along estuary decreases by 5 below baseline average (to be determined) DO < 5 mg/ℓ in estuary Turbidity> 20 NTU in low flow Secchi in fresher part: <0.5 m DIN >200 µg/ℓ average (to be confirmed) DIP > 50 µg/ℓ average (to be confirmed) Concentrations in water column exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAF, 1995) Concentrations in sediment exceed target values as per WIO Region guidelines (UNEP/Nairobi Convention Secretariat and CSIR, 2009)
Sediment dynamics	Flood regime to maintain the sediment distribution patterns and aquatic habitat (instream physical habitat) so as not to exceed TPCs for biota Changes in sediment grain-size distribution patterns not to cause exceedance of TPCs in benthic invertebrates Change in average sediment composition and characteristics Change in average bathymetry	Average sediment composition (% fractions) along estuary change from baseline (to be measured) by 30% (per survey) Average depth along main channel changes from 30% of baseline (to be determined) (system expected to experience significant fluctuation in bathymetry between flood and extended closed periods)

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Ecological component	EcoSpecs	Thresholds of Potential Concern
Microalgae	Maintain median phytoplankton/benthic microalgae biomass Prevent formation of phytoplankton blooms	Phytoplankton >8 µg/ℓ (median) Benthic microalgae >42 mg/m^2 (median) Phytoplankton >20 µg/ℓ and/or cell density >10 000 cells/ml (once-off) Dinoflagellates, chlorophytes and/or cyanobacteria >10% of relative abundance
Macrophytes	Maintain distribution of macrophyte habitats Prevent the spread of reeds into open water Prevent an increase in nutrients and macroalgal blooms Prevent the spread of invasive trees (e.g. *Acacia* spp.) in the riparian zone. Maintain integrity of salt marsh	20% change in macrophyte area (Reeds currently cover 9 ha, saltmarsh 47 ha.) Macroalgal blooms cover > 50% of the open water area Presence of invasive aquatic macrophytes e.g. *Azolla*, water hyacinth Invasive plants cover > 10% of flood plain Increase in bare areas in salt marsh because of decrease in moisture and increase in salinity >30% of salt marsh
Invertebrates	Establish presence/absence of sand prawn *Callichirus kraussi* on sand banks in lower estuary Establish abundance of the copepod *Pseudodiaptomus hessei* or estuarine congeneric in the zooplankton of the estuary	If present populations deviate from average baselines (as determined in first three visits) by more 30%
Fish	Fish assemblage should comprise the five estuarine association categories in similar proportions (diversity and abundance) to that under the reference. Numerically, assemblage should comprise: Ia estuarine residents (20-60%) Ib marine and estuarine breeders (10-30%) IIa obligate estuarine-dependent (20-40%) IIb estuarine associated species (5-20%) IIc marine opportunists (20-80%) IV indigenous fish (1-5%) V catadromous species (1-5%) Category Ia species should contain viable populations of at least two species (e.g. *G.aestuaria, Hyporamphus capensis, Omobranchus woodii*). Category IIa obligate dependents should be well represented by large exploited species (i.e. *A. japonicus, L. lithognathus, P. commersonnii, Lichia amia*). REI species dominated by both *Myxus capensis* and *G. aestuaria*.	Ia estuarine residents <20% Ib marine and estuarine breeders < 10% IIa obligate estuarine-dependent <20% IIb estuarine associated species <5% IIc marine opportunists < 20% IV indigenous fish<1% V catadromous species <1% Ia represented only by *G. aestuaria*. IIa exploited species in very low numbers or absent REI species represented only by *G. aestuaria*, *Myxus capensis* absent
Birds	Maintain population of original groups of birds present on the estuary	Number of birds in any group, other than species that are increasing regionally such as Egyptian geese, drops below the baseline median (determined by past data and or initial surveys) number of species and/or birds counted for three consecutive summer or winter counts

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Table 7.4: Eco-Specs and Thresholds of Potential Concern for the Piesang Estuary

Ecological component	EcoSpecs	Thresholds of Potential Concern
Hydrology	Maintain present day base flow as a minimum (to be confirmed)	MAR does not vary by more than 10% Floods (indicated by 1:10 year event) do not reduce by more than 5% from present. Base flows do not increase by more than 50% from present
Hydrodynamics	Maintain mouth state to create the required habitat for birds, fish, macrophytes, microalgae and water quality	Closed mouth state increase by 10% from present Average water level in system > 10% from present Tidal amplitude (when open) < 20%
Water quality	Salinity distribution not to cause exceedance of TPCs for fish, invertebrates, macrophytes and microalgae Turbidity and dissolved oxygen not to cause exceedance of TPCs for biota DIN/DIP concentrations not to cause exceedance of TPCs for macro-phytes and microalgae Toxic substances not to cause exceedance of TPCs for biota	Salinity > 20 (expected range 10-20) Salinity < 5 (expected range 10-20) DO < 5 mg/ℓ in estuary Turbidity> 10 NTU in low flow Secchi: to bottom DIN >100 µg/ℓonce-off DIP > 20 µg/ℓonce-off Concentrations in water column exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAF, 1995) Concentrations in sediment exceed target values as per WIO Region guidelines (UNEP/Nairobi Convention Secretariat and CSIR, 2009)
Sediment dynamics	Flood regime to maintain the sediment distribution patterns and aquatic habitat (instream physical habitat) so as not to exceed TPCs for biota Changes in sediment grain-size distribution patterns not to cause exceedance of TPCs in benthic invertebrates Change in average sediment composition and characteristics Change in average bathymetry	Average sediment composition (% fractions) along estuary changes from baseline (to be measured) by 30% (per survey) Average depth along main channel changes from 30% of baseline (to be determine) (system expected to experience significant fluctuation in bathymetry between flood and extended closed periods)
Microalgae	Maintain median phytoplankton/benthic microalgae biomass Prevent formation of phytoplankton blooms	Phytoplankton >3.5 µg/ℓ (median) Benthic microalgae >11 mg/m^2 (median) Phytoplankton >20 µg/ℓ and/or cell density >10 000 cells/ml (once-off)
Macrophytes	Maintain distribution of macrophyte habitats Prevent an increase in nutrient input leading to macroalgal blooms Control the spread of invasive plants in the riparian zone	Greater than 20 % change in the area covered by macrophytes (reeds and sedges currently cover 3.14 ha, submerged macrophytes and salt marsh present) Macroalgal blooms cover > 50% of the open water area during closed mouth conditions Invasive plants cover >5% of total habitat
Invertebrates	Maintain presence of sand prawn *Callichirus kraussi* on sand banks in lower estuary Maintain presence of the copepod *Pseudodiaptomus hessei* or estuarine congeneric in the zooplankton of the estuary	Populations deviate from average baselines (as determined in first three visits) by more 30%

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Ecological component	EcoSpecs	Thresholds of Potential Concern
Fish	Fish assemblage should comprise the five estuarine association categories in similar proportions (diversity and abundance) to that under the reference. Numerically, assemblage should comprise: Ia estuarine residents (50-80% of total abundance) Ib marine and estuarine breeders (5-20%) IIa obligate estuarine-dependent (10-20%) IIb estuarine associated species (5-15%), IIc marine opportunists (20-80%) III marine vagrants (not more than 5%) IV indigenous fish (1-5%) V catadromous species (1-5%) Category Ia species should contain viable populations of at least two species (e.g. *G.aestuaria, & Hyporamphus capensis.* Category IIa obligate dependents should be well represented by at least two large exploited species (i.e. *L. lithognathus, Lichia amia*). REI species dominated by both *Myxus capensis* and *G. aestuaria*.	Ia estuarine residents <50% Ib marine and estuarine breeders <10% IIa obligate estuarine-dependent <10% IIb estuarine associated species <5% IIc marine opportunists < 20% III marine vagrants > 5% IV indigenous fish<1% V catadromous species <1%
Birds	Maintain population of original groups of birds present on the estuary	Number of birds in any group, other than species that are increasing regionally such as Egyptian geese, drops below the baseline median (determined by past data and or initial surveys) number of species and/or birds counted for three consecutive summer or winter counts

Table 7.5: EcoSpecs for the Groot (Wes) Estuary

Ecological component	EcoSpecs	Thresholds of Potential Concern
Hydrology	Maintain present day base flow as a minimum (to be confirmed)	MAR does not vary by more than 10% Floods (indicated by 1:10 year event) do not reduce by more than 5% from present. Base flows do not increase by more than 50% from present
Hydrodynamics	Maintain mouth state to create the required habitat for birds, fish, macrophytes, microalgae and water quality	Closed mouth state increases by 10% from present Average water level in system > 10% from present Tidal amplitude (when open) < 20%
Water quality	Salinity distribution not to cause exceedance of TPCs for fish, invertebrates, macrophytes and microalgae Turbidity and dissolved oxygen not to cause exceedance of TPCs for biota DIN/DIP concentrations not to cause exceedance of TPCs for macrophytes and microalgae Toxic substances not to cause exceedance of TPCs for biota	Average salinity along estuary decreases by 5 below baseline average (to be determined) Average salinity < 10at the head of the estuary (expected average range 5-10 for most of the system) DO < 5 mg/ℓ in estuary Turbidity> 10 NTU in low flow Secchi: to bottom DIN >100 µg/ℓonce-off DIP > 20 µg/ℓonce-off Concentrations in water column exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAF, 1995) Concentrations in sediment exceed target values as per WIO Region guidelines (UNEP/Nairobi Convention Secretariat and CSIR, 2009)

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Ecological component	EcoSpecs	Thresholds of Potential Concern
Sediment dynamics	Flood regime to maintain the sediment distribution patterns and aquatic habitat (instream physical habitat) so as not to exceed TPCs for biota Changes in sediment grain-size distribution patterns not to cause exceedance of TPCs in benthic invertebrates Change in average sediment composition and characteristics Change in average bathymetry	Average sediment composition (% fractions) along estuary changes from baseline (to be measured) by 30% (per survey) Average depth along main channel changes from 30% of baseline (to be determined) (system expected to experience significant fluctuation in bathymetry between flood and extended closed periods)
Microalgae	Maintain median phytoplankton/benthic microalgae biomass Prevent formation of phytoplankton blooms	Phytoplankton >3.5 µg/ℓ (median) Benthic microalgae >11 mg/m^2 (median) Phytoplankton >20 ug/ℓ and/or cell density >10 000 cells/ml (once-off)
Macrophytes	Maintain distribution of macro-phyte habitats. Prevent an increase in nutrient input leading to macroalgal blooms. Control the spread of invasive plants in the riparian zone	Greater than 20 % change in the area covered by macro-phytes (reeds and sedges currently cover 2.54 ha salt marsh 0.76 ha) Macro-algal blooms cover > 50% of the open water area during closed mouth conditions. Invasive plants cover >5% of total habitat
Invertebrates	Establish presence/absence of sand prawn *Callichirus kraussi* on sand banks in lower estuary Establish presence/absence of the copepod *Pseudodiaptomus hessei* or estuarine congeneric in the zooplankton of the estuary	If present populations deviate from average baselines (as determined in first three visits) by more 30%
Fish	Fish assemblage should comprise the five estuarine association categories in similar proportions (diversity and abundance) to that under the reference. Numerically, assemblage should comprise: Ia estuarine residents (50-80% of total abundance) Ib marine and estuarine breeders (5-20%) IIa obligate estuarine-dependent (10-20%) IIb estuarine associated species (5-15%), IIc marine opportunists (20-80%) III marine vagrants (not more than 5%) IV indigenous fish (1-5%) V catadromous species (1-5%) Category Ia species should contain viable populations of at least two species (e.g. *G.aestuaria, & Hyporamphus capensis).* Category IIa obligate dependents should be well represented by at least two large exploited species (i.e. *L. lithognathus, Lichia amia*). REI species dominated by both *Myxus capensis* and *G. aestuaria*.	Ia estuarine residents <50% Ib marine and estuarine breeders < 10% IIa obligate estuarine-dependent <10% IIb estuarine associated species <5% IIc marine opportunists < 20% III marine vagrants > 5% IV indigenous fish<1% V catadromous species <1%
Birds	Maintain population of original groups of birds present on the estuary	Number of birds in any group, other than species that are increasing regionally such as Egyptian geese, drops below the baseline median (determined by past data and or initial surveys) number of species and/or birds counted for three consecutive summer or winter counts

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Table 7.6: EcoSpecs and Thresholds of Potential Concern for the Bloukrans Estuary

Ecological component	EcoSpecs	Thresholds of Potential Concern
Hydrology	Maintain present flow regime	Varies more than 10% of MAR
Hydrodynamics	Maintain mouth state to create the required habitat for birds, fish, macro-phytes, microalgae and water quality	Estuary mouth closes
Water quality	Salinity distribution not to cause exceedance of TPCs for fish, invertebrates, macrophytes and microalgae Turbidity and dissolved oxygen not to cause exceedance of TPCs for biota DIN/DIP concentrations not to cause exceedance of TPCs for macrophytes and microalgae Toxic substances not to cause exceedance of TPCs for biota	Average salinity < 10at the head of the estuary (expected average range >30 for most of the system) DO < 5 mg/ℓ in estuary Turbidity> 10 NTU in low flow Secchi: to bottom DIN >100 µg/ℓonce-off DIP > 20 µg/ℓonce-off Concentrations in water column exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAF, 1995) Concentrations in sediment exceed target values as per WIO Region guidelines (UNEP/Nairobi Convention Secretariat and CSIR, 2009)
Sediment dynamics	Flood regime to maintain the sediment distribution patterns and aquatic habitat (instream physical habitat) so as not to exceed TPCs for biota Changes in sediment grain-size distribution patterns not to cause exceedance of TPCs in benthic invertebrates Change in average sediment composition and characteristics Change in average bathymetry	Average sediment composition (% fractions) along estuary change from baseline (to be measured) by 30% (per survey) Average depth along main channel change from 30% of baseline (to be determine) (system expected to significant fluctuation in bathymetry between flood and extended closed periods)
Microalgae	Maintain median phytoplankton/benthic microalgae biomass Prevent formation of phytoplankton blooms	Phytoplankton >1.0 µg/ℓ (median) Benthic microalgae >11 mg/m^2 (median) Phytoplankton >20 µg/ℓ and/or cell density >10 000 cells/ml (once-off)
Macrophytes	The estuary habitats only consists of sand/mud banks (0.63 ha) and channel (2.88 ha), no macrophytes	N/A
Invertebrates	Establish presence/absence of sand prawn *Callichirus kraussi* on sand banks in lower estuary Establish presence/absence of the copepod *Pseudodiaptomus hessei* or estuarine congeneric in the zooplankton of the estuary	If present populations deviate from average baselines (as determined in first three visits) by more 30%

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Ecological component	EcoSpecs	Thresholds of Potential Concern
Fish	Fish assemblage should comprise the five estuarine association categories in similar proportions (diversity and abundance) to that under the reference. Numerically, assemblage should comprise: Ia estuarine residents (50-80% of total abundance) Ib marine and estuarine breeders (10-20%) IIa obligate estuarine-dependent (10-20%) IIb estuarine associated species (5-15%), IIc marine opportunists (20-80%) III marine vagrants (not more than 5%) IV indigenous fish (1-5%) V catadromous species (1-5%) Category Ia species should contain viable populations of at least 4 species (*G.aestuaria, Hyporamphus capensis, Omobranchus woodii*). Category IIa obligate dependents should be well represented by large exploited species (*A. japonicus, L. lithognathus, P. commersonii, Lichia amia*). REI species dominated by both *Myxus capensis* and *G. aestuaria*.	Ia estuarine residents <50% Ib marine and estuarine breeders < 10% IIa obligate estuarine-dependent < 10% IIb estuarine associated species < 5% IIc marine opportunists < 20% III marine vagrants > 5% IV indigenous fish< 1% V catadromous species <1%
Birds	Maintain population of original groups of birds present on the estuary	Number of birds in any group, other than species that are increasing regionally such as Egyptian geese, drops below the baseline median (determined by past data and or initial surveys) number of species and/or birds counted for three consecutive summer or winter counts

Table 7.7: EcoSpecs and TPCs for the Goukou Estuary

EcoSpecs	TPC
Water quality	
Salinity distribution not to cause exceedance of TPCs for biota.	▪ Salinity > 0 at head of estuary. ▪ Average salinity in Zone D > 5. ▪ Average salinity in Zone C > 20. ▪ Average salinity 5 km upstream from mouth > 20 more than three months of the year.
System variables (pH, dissolved oxygen and turbidity) not to cause exceedance of TPCs for biota.	River inflow: ▪ 6.0 < pH > 7.5. ▪ DO < 5 mg/L. ▪ Suspended solids >5 mg/L (low flow). Estuary: ▪ Average turbidity >10 Nephelometric Turbidity Units (NTU) (low flow). ▪ Average 6.0 < pH > 8.5 (increasing with increase in salinity). ▪ Average DO < 5 mg/L.
Inorganic nutrient concentrations (NO_3-N, NH_3-N and PO_4-P) not to cause in exceedance of TPCs for macrophytes and microalgae.	River inflow: ▪ NO_x-N >150 µg/L over two consecutive months. ▪ NH_3-N > 20 µg/L over two consecutive months. ▪ PO_4-PP > 20 µg/L over two consecutive months. Estuary (except during upwelling or floods): ▪ Average NO_x-N 150 µg/L single concentration > 200 µg/L.

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EcoSpecs	TPC
	▪ Average NH_3-N > 20 µg/L during survey, single concentration > 100 µg/L. ▪ Average PO_4-P > 20 µg/L during survey, single concentration > 50 µg/L.
Presence of toxic substances (e.g. trace metals and pesticides/herbicides) not to cause exceedance of TPCs for biota.	River inflow: ▪ Trace metals (to be refined and confirmed through future monitoring). ▪ Pesticides/herbicides (to be refined and confirmed through future monitoring). Estuary: ▪ Concentrations in water column exceed target values as per SA Water Quality Guidelines for Coastal Marine Waters (DWAF, 1995). ▪ Concentrations in sediment exceed target values as per WIO Region guidelines (UNEP/Nairobi Convention Secretariat and CSIR, 2009)

Table 7.8: Water Quality EcoSpecs and TPCs for the Gouritz Estuary

Component	EcoSpecs	Thresholds of Potential Concern
Water Quality	Salinity distribution not to cause exceedance of TPCs for biota.	▪ Salinity > 0 at head of estuary ▪ Average salinity in Site 11, 1 km upstream of bridge > 5 ▪ Average salinity in Zone C > 20 ▪ Average salinity 11 km upstream from mouth > 20 more than three months of the year ▪ Salinity > 40 in saltmarsh sediments (linked to decrease in moisture and drying of floodplain habitat).
	System variables (pH, dissolved oxygen and turbidity) not to cause exceedance of TPCs for biota.	River inflow: ▪ 7.0 < pH > 8.3 ▪ DO < 5 mg/ℓ ▪ Suspended solids > 5 mg/ℓ (low flow) Estuary: ▪ Average turbidity > 10 NTU (low, calm condition flow, wind mixing can increase turbidity to 20-40 NTU) ▪ Average 7.0 < pH > 8.5 (increasing with increase in salinity) ▪ Average DO < 5 mg/ℓ
	Inorganic nutrient concentrations (NO_3-N, NH_3-N and PO_4-P) not to cause exceedance of TPCs for macrophytes and microalgae.	River inflow: ▪ NOx-N > 100 µg/ℓ over two consecutive months ▪ NH3-N > 20 µg/ℓ over two consecutive months ▪ PO4-P > 20 µg/ℓ over two consecutive months Estuary (except during upwelling or floods): ▪ Average NOx-N > 100 µg/ℓ single concentration > 150 µg/ℓ ▪ Average NH3-N > 20 µg/ℓ during survey, single concentration > 100 µg/ℓ ▪ Average PO4-P > 20 µg/ℓ during survey, single concentration > 50 µg/ℓ
	Presence of toxic substances (e.g. trace metals and pesticides/herbicides) not to cause exceedance of TPCs for biota.	River inflow: ▪ Trace metals (to be confirmed) ▪ Pesticides/herbicides (to be confirmed) Estuary ▪ Concentrations in water column exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAF, 1995) Concentrations in sediment exceed target values as per Western Indian Ocean (WIO) Region guidelines (UNEP/Nairobi Convention Secretariat and CSIR, 2009)

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Table 7.9: Eco Specs and TPCs for the Klein Brak Estuary

Component	EcoSpecs	Thresholds of Potential Concern
Water quality	Salinity distribution not to cause exceedance of TPCs for biota.	▪ No salinity gradient in the upper reaches of the estuary (Zone D and F) ▪ No REI in the upper reaches of the estuary (Zone D and F) ▪ Salinity > 35
	System variables (pH, dissolved oxygen and turbidity) not to cause exceedance of TPCs for biota.	River inflow: ▪ 7.0 < pH > 8.5 ▪ DO < 5 mg/ℓ ▪ Suspended solids > 5 mg/ ℓ (low flow) Estuary: ▪ Average turbidity >10 NTU (low flow) ▪ Average 7.0 < pH > 8.5 (increasing with increase in salinity) ▪ Average DO < 5 mg/ℓ
	Inorganic nutrient concentrations (NO_3-N, NH_3-N and PO_4-P) not to cause in exceedance of TPCs for macro-phytes and microalgae.	River inflow: ▪ NO_x-N >150 µg/ℓ over two consecutive months ▪ NH_3-N> 20 µg/ℓ over two consecutive months ▪ PO_4-P > 20 µg/ℓ over two consecutive months Estuary (except during upwelling or floods): ▪ Average NO_x-N > 150 µg/ℓ during survey, single concentration > 200 µg/ℓ ▪ Average NH_3-N > 20 µg/ℓ during survey, single concentration > 100 µg/ℓ ▪ Average PO_4-P > 20 µg/ℓ during survey, single concentration > 50 µg/ℓ
	Presence of toxic substances (e.g. trace metals and pesticides/herbicides) not to cause exceedance of TPCs for biota.	River inflow: ▪ Trace metals (to be confirmed) ▪ Pesticides/herbicides (to be confirmed) Estuary ▪ Concentrations in water column exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAF, 1995) ▪ Concentrations in sediment exceed target values as per WIO Region guidelines (UNEP/Nairobi Convention Secretariat and CSIR, 2009)

Table 7.10: EcoSpecs and TPCs for the Wilderness System

Component	EcoSpecs	Thresholds of Potential Concern
Water quality	Salinity	Estuary in the closed state: ▪ Average salinity in Zone A < 12, ▪ Average salinity in Zone B: < 10 ▪ Average salinity in Zone C < 5 Lakes average salinity +2 from baseline (2013) and variability do not increase as below: ▪ Serpentine: 12 ± 10 ▪ Eilandvlei: 8 ± 5 ▪ Langvlei: 10 ± 4 ▪ Rondevlei: 10 ± 5

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	System variables (pH, dissolved oxygen and turbidity) not to cause exceedance of TPCs for biota.	River inflow: ▪ 6.0 < pH > 7.0 (Touw) ▪ 7.0 < pH > 8.0 (Duiwe) ▪ DO < 5 mg/ℓ ▪ Suspended solids > 5 mg/ ℓ (low flow) Estuary: ▪ Average turbidity > 5 NTU (low flow) ▪ Average 6.0 < pH > 8.5 (increasing with increase in salinity) ▪ Average DO < 5 mg/ℓ Lakes: ▪ Average turbidity > 5 NTU ▪ Average 7.0 < pH > 8.5 ▪ Average DO < 5 mg/ℓ
	Inorganic nutrient concentrations (NO_3-N, NH_3-N and PO_4-P) not to cause exceedance of TPCs for macro-phytes and microalgae.	River inflow: ▪ NO_x-N > 50 µg/ℓ over two consecutive months ▪ NH_3-N > 10 µg/ℓ over two consecutive months ▪ PO_4-P > 10 µg/ℓ over two consecutive months Estuary (except during upwelling or floods): ▪ Average NO_x-N > 50 µg/ℓ single concentration > 100 µg/ℓ ▪ Average NH_3-N > 10 µg/ℓ during survey, single concentration > 100 µg/ℓ ▪ Average PO_4-P > 10 µg/ℓ during survey, single concentration > 50 µg/ℓ Lakes: ▪ Average NO_x-N > 50 µg/ℓ during survey, single concentration > 100 µg/ℓ ▪ Average NH_3-N > 20 µg/ℓ during survey (to be confirmed) ▪ Average PO_4-P > 20 µg/ℓ during survey (to be confirmed)
	Presence of toxic substances (e.g. trace metals and pesticides/herbicides) not to cause exceedance of TPCs for biota.	River inflow: ▪ Trace metals (to be confirmed) ▪ Pesticides/herbicides (to be confirmed) Estuary: ▪ Concentrations in water column exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAF, 1995) ▪ Concentrations in sediment exceed target values as per WIO Region guidelines (UNEP/Nairobi Convention Secretariat and CSIR, 2009)

Table 7.11: Water quality present state assessment for H8DUIW-EWR1

Water Quality Constituents	PES Value	Category/Comment
Inorganic salt ions (mg/l)		
Sulphate as SO_4	N/A	-
Sodium as Na	382.2	Exceeds the ≤ 70 mg/L (TWQR) for Agricultural Use: Irrigation.
Magnesium as Mg	67.4	No guideline.
Calcium as Ca	55.0	No guideline.
Chloride as Cl	805.4	Exceeds the ≤ 100 mg/L (TWQR) for Agricultural Use: Irrigation.
Potassium as K	9.25	No guideline.
Electrical conductivity (mS/m)		
	272	E/F: RC = 80 mS/m.
Nutrients (mg/l)		
SRP	0.014	A
TIN	0.118	A

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Water Quality Constituents	PES Value	Category/Comment
Physical variables		
pH (5th + 95th %ile)	6.6 and 8.1	B
Temperature (ºC)	N/A	A/B. Impacts expected at low flows.
Dissolved oxygen (mg/L)	N/A	B. Impacts expected at low flows.
Turbidity (NTU)	N/A	B. Changes in turbidity appear to be largely related to natural with minor man-made modifications, e.g. gravel mining upstream
Response variables		
Chl-*a*: phytoplankton (ug/L)	N/A	N/A
Macroinvertebrate score (MIRAI) SASS score ASPT score	50.7% 78 56	D
Diatoms	11.1	C/D (n = 1, Jan 2014)
Fish score (FRAI)	51.6%	D (all estuarine spp. that moved into the freshwater zone and aliens).
Toxics		
Ammonia (as N)	0.003	A
Fluoride (as F)	0.33	A
OVERALL SITE CLASSIFICATION (PAI model)		**C (73.2%)**

(a) N/A- No data were available for this assessment.

Table 7.12: H8DUIW-EWR1: Water quality (C category) EcoSpecs and TPCs

Metrics	EcoSpecs	TPCs
Inorganic salt ions		
Sulphate as SO_4	N/A	N/A
Sodium as Na	The 95th percentile of the data must be ≤ 380 mg/L.	The 95th percentile of the data must be 300 - 380 mg/L.
Magnesium as Mg	The 95th percentile of the data must be ≤ 67 mg/L.	The 95th percentile of the data must be 53.5 - 67 mg/L.
Calcium as Ca	The 95th percentile of the data must be ≤ 55 mg/L.	The 95th percentile of the data must be 44 - 55 mg/L.
Chloride as Cl	The 95th percentile of the data must be ≤ 800 mg/L.	The 95th percentile of the data must be 640 - 800 mg/L.
Potassium as K	The 95th percentile of the data must be ≤ 9 mg/L.	The 95th percentile of the data must be 7 - 9 mg/L.
Physical Variables		
Electrical conductivity (mS/m)	The 95th percentile of the data must be ≤ 270 mS/m.	The 95th percentile of the data must be 210 - 270 mS/m.
pH	The 5th percentile of the data must be 6.5. – 8.0, and the 95th percentile 8.0 - 8.8.	The 5th percentile of the data is ≤ 6.3 and the 95th percentile is ≥ 8.6.
Temperature[(a)]	Natural temperature range.	Initiate baseline monitoring for this variable.
Dissolved oxygen[(a)](DO)	The 5th percentile of the data must be ≥ 7.0 mg/L.	The 5th percentile of the data must be 7.2 - 7.0 mg/L. Initiate baseline monitoring for this variable.
Turbidity[(a)]	Changes in turbidity are related to minor man-made modifications (e.g. gravel mining upstream). Some silting of habitats is expected.	Initiate baseline monitoring for this variable.
Nutrients		

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Metrics	EcoSpecs	TPCs
TIN	The 50th percentile of the data must be ≤ 0.25 mg/L.	The 50th percentile of the data must be 0.2 - 0.25 mg/L.
PO_4-P	The 50th percentile of the data must be ≤ 0.015 mg/L.	The 50th percentile of the data must be 0.012 - 0.015 mg/L.
Response variables		
Chl-a phytoplankton	The 50th percentile of the data must be < 15 µg/L.	The 50th percentile of the data must be 12 - 15 µg/L.
Chl-a periphyton	The 50th percentile of the data must be ≤ 12 mg/m^2.	The 50th percentile of the data must be 10 - 12 mg/m^2.
Toxics		
Fluoride	The 50th percentile of the data must be ≤ 1.5 mg/L.	The 50th percentile of the data must be 1.2 - 1.5 mg/L.
Ammonia (NH_3-N)	The 50th percentile of the data must be ≤ 0.015 mg/L.	The 50th percentile of the data must be 0.012 - 0.015 mg/L.
Other toxics	The 95th percentile of the data must be within the Target Water Quality Range (TWQR) as stated in DWAF (1996) or the A Category boundary as stated in DWAF (2008).	An impact is expected if the 95th percentile of the data exceeds the TWQR as stated in DWAF (1996) or the upper limit of the A Category boundary as stated in DWAF (2008).

(a) N/A- No data were available for this assessment

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Table 7.13: EcoSpecs and TPCs for the Duiwenhoks Estuary

Component	EcoSpecs	Thresholds of Potential Concern
Water quality	Salinity distribution not to cause exceedance of TPCs for biota.	▪ Salinity > 0 at head of estuary ▪ Average salinity in Zone D > 5 ▪ Average salinity in Zone C > 20 ▪ Average salinity 5 km upstream from mouth > 20 more than three months of the year
	System variables (pH, dissolved oxygen and turbidity) not to cause exceedance of TPCs for biota.	River inflow: ▪ 6.0 < pH > 7.5 ▪ DO < 5 mg/ℓ ▪ Suspended solids > 5 mg/ℓ (low flow) Estuary: ▪ Average turbidity > 10 NTU (low flow) ▪ Average 6.0 < pH > 8.5 (increasing with increase in salinity) ▪ Average DO < 5 mg/ℓ
	Inorganic nutrient concentrations (NO_3-N, NH_3-N and PO_4-P) not to cause an exceedance of TPCs for macrophytes and microalgae.	River inflow: ▪ NOx-N >150 µg/ℓ over 2 consecutive months ▪ NH3-N > 20 µg/ℓ over 2 consecutive months ▪ PO4-P > 20 µg/ℓ over 2 consecutive months Estuary (except during upwelling or floods): ▪ Average NOx-N > 150 µg/ℓ single concentration > 200 µg/ℓ ▪ Average NH3-N > 20 µg/ℓ during survey, single concentration > 100 µg/ℓ ▪ Average PO4-P > 20 µg/ℓ during survey, single concentration > 50 µg/ℓ
	Presence of toxic substances (e.g. trace metals and pesticides/herbicides) not to cause exceedance of TPCs for biota.	River inflow: ▪ Trace metals (to be confirmed) ▪ Pesticides/herbicides (to be confirmed) Estuary ▪ Concentrations in water column exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAF, 1995) ▪ Concentrations in sediment exceed target values as per WIO Region guidelines (UNEP/Nairobi Convention Secretariat and CSIR, 2009)

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Table 7.14: EcoSpecs and TPCs for the Goukou Estuary

EcoSpecs	TPC
Water quality	
Salinity distribution not to cause exceedance of TPCs for biota.	▪ Salinity > 0 at head of estuary. ▪ Average salinity in Zone D > 5. ▪ Average salinity in Zone C > 20. ▪ Average salinity 5 km upstream from mouth > 20 more than three months of the year.
System variables (pH, dissolved oxygen and turbidity) not to cause exceedance of TPCs for biota.	River inflow: ▪ 6.0 < pH > 7.5. ▪ DO < 5 mg/L. ▪ Suspended solids >5 mg/L (low flow). Estuary: ▪ Average turbidity >10 Nephelometric Turbidity Units (NTU) (low flow). ▪ Average 6.0 < pH > 8.5 (increasing with increase in salinity). ▪ Average DO < 5 mg/L.
Inorganic nutrient concentrations (NO_3-N, NH_3-N and PO_4-P) not to cause in exceedance of TPCs for macrophytes and microalgae.	River inflow: ▪ NO_x-N >150 µg/L over two consecutive months. ▪ NH_3-N > 20 µg/L over two consecutive months. ▪ PO_4-PP > 20 µg/L over two consecutive months. Estuary (except during upwelling or floods): ▪ Average NO_x-N 150 µg/L single concentration > 200 µg/L. ▪ Average NH_3-N > 20 µg/L during survey, single concentration > 100 µg/L. ▪ Average PO_4-P > 20 µg/L during survey, single concentration > 50 µg/L.
Presence of toxic substances (e.g. trace metals and pesticides/herbicides) not to cause exceedance of TPCs for biota.	River inflow: ▪ Trace metals (to be refined and confirmed through future monitoring). ▪ Pesticides/herbicides (to be refined and confirmed through future monitoring). Estuary: ▪ Concentrations in water column exceed target values as per SA Water Quality Guidelines for Coastal Marine Waters (DWAF, 1995). ▪ Concentrations in sediment exceed target values as per WIO Region guidelines (UNEP/Nairobi Convention Secretariat and CSIR, 2009)

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Table 7.15: Water Quality EcoSpecs and TPCs for the Gouritz Estuary

Component	EcoSpecs	Thresholds of Potential Concern
Water Quality	Salinity distribution not to cause exceedance of TPCs for biota.	▪ Salinity > 0 at head of estuary ▪ Average salinity in Site 11, 1 km upstream of bridge > 5 ▪ Average salinity in Zone C > 20 ▪ Average salinity 11 km upstream from mouth > 20 more than three months of the year ▪ Salinity > 40 in saltmarsh sediments (linked to decrease in moisture and drying of floodplain habitat).
	System variables (pH, dissolved oxygen and turbidity) not to cause exceedance of TPCs for biota.	River inflow: ▪ 7.0 < pH > 8.3 ▪ DO < 5 mg/ℓ ▪ Suspended solids > 5 mg/ℓ (low flow) Estuary: ▪ Average turbidity > 10 NTU (low, calm condition flow, wind mixing can increase turbidity to 20-40 NTU) ▪ Average 7.0 < pH > 8.5 (increasing with increase in salinity) ▪ Average DO < 5 mg/ℓ
	Inorganic nutrient concentrations (NO_3-N, NH_3-N and PO_4-P) not to cause exceedance of TPCs for macrophytes and microalgae.	River inflow: ▪ NOx-N > 100 µg/ℓ over two consecutive months ▪ NH3-N > 20 µg/ℓ over two consecutive months ▪ PO4-P > 20 µg/ℓ over two consecutive months Estuary (except during upwelling or floods): ▪ Average NOx-N > 100 µg/ℓ single concentration > 150 µg/ℓ ▪ Average NH3-N > 20 µg/ℓ during survey, single concentration > 100 µg/ℓ ▪ Average PO4-P > 20 µg/ℓ during survey, single concentration > 50 µg/ℓ
	Presence of toxic substances (e.g. trace metals and pesticides/herbicides) not to cause exceedance of TPCs for biota.	River inflow: ▪ Trace metals (to be confirmed) ▪ Pesticides/herbicides (to be confirmed) Estuary ▪ Concentrations in water column exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAF, 1995) ▪ Concentrations in sediment exceed target values as per Western Indian Ocean (WIO) Region guidelines (UNEP/Nairobi Convention Secretariat and CSIR, 2009)

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Table 7.16: EcoSpecs and TPCs for the Wilderness System

Component	EcoSpecs	Thresholds of Potential Concern
Water quality	Salinity	Estuary in the closed state: ▪ Average salinity in Zone A < 12, ▪ Average salinity in Zone B: < 10 ▪ Average salinity in Zone C < 5 Lakes average salinity +2 from baseline (2013) and variability do not increase as below: ▪ Serpentine: 12 ± 10 ▪ Eilandvlei: 8 ± 5 ▪ Langvlei: 10 ± 4 ▪ Rondevlei: 10 ± 5
	System variables (pH, dissolved oxygen and turbidity) not to cause exceedance of TPCs for biota.	River inflow: ▪ 6.0 < pH > 7.0 (Touw) ▪ 7.0 < pH > 8.0 (Duiwe) ▪ DO < 5 mg/ℓ ▪ Suspended solids > 5 mg/ ℓ (low flow) Estuary: ▪ Average turbidity > 5 NTU (low flow) ▪ Average 6.0 < pH > 8.5 (increasing with increase in salinity) ▪ Average DO < 5 mg/ℓ Lakes: ▪ Average turbidity > 5 NTU ▪ Average 7.0 < pH > 8.5 ▪ Average DO < 5 mg/ℓ
	Inorganic nutrient concentrations (NO_3-N, NH_3-N and PO_4-P) not to cause exceedance of TPCs for macro-phytes and microalgae.	River inflow: ▪ NO_x-N > 50 µg/ℓ over two consecutive months ▪ NH_3-N > 10 µg/ℓ over two consecutive months ▪ PO_4-P > 10 µg/ℓ over two consecutive months Estuary (except during upwelling or floods): ▪ Average NO_x-N > 50 µg/ℓ single concentration > 100 µg/ℓ ▪ Average NH_3-N > 10 µg/ℓ during survey, single concentration > 100 µg/ℓ ▪ Average PO_4-P > 10 µg/ℓ during survey, single concentration > 50 µg/ℓ Lakes: ▪ Average NO_x-N > 50 µg/ℓ during survey, single concentration > 100 µg/ℓ ▪ Average NH_3-N > 20 µg/ℓ during survey (to be confirmed) ▪ Average PO_4-P > 20 µg/ℓ during survey (to be confirmed)
	Presence of toxic substances (e.g. trace metals and pesticides/herbicides) not to cause exceedance of TPCs for biota.	River inflow: ▪ Trace metals (to be confirmed) ▪ Pesticides/herbicides (to be confirmed) Estuary: ▪ Concentrations in water column exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAF, 1995) ▪ Concentrations in sediment exceed target values as per WIO Region guidelines (UNEP/Nairobi Convention Secretariat and CSIR, 2009)

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8. WETLANDS

Table 8.1: Wetlands - Quaternary Protection Specification

Quaternary catchment	EIS	PES	REC	How to achieve the REC
K10A	Moderate	C	C	Control invasive alien vegetation, erosion and land-use encroachment.
K10B	Moderate	C	C	
K10C	Moderate	B/C	B/C	
K10D	Moderate	B/C	B/C	
K10E	Moderate	B/C	B/C	
K10F	Moderate	C	C	
K20A	Moderate	C	C	
K30A	High	C	C	
K30B	High	D	C/D	Buffers in urban and agricultural areas, manage water quality, erosion and invasive vegetation.
K30C	Moderate	D	D	Control invasive alien vegetation, erosion and land-use encroachment.
K30D	Very High	B	B	
K40A	Moderate	D	D	
K40B	Moderate	C	C	
K40C	Moderate	C	C	
K40D	Very High	B	B	
K40E	Moderate	B/C	B/C	
K50A	Moderate	B/C	B/C	
K50B	High	C/D	C	Protect and improve the condition of remaining wetland patches, control invasive vegetation.
K60A	Moderate	B	B	Control invasive alien vegetation, erosion and land-use encroachment.
K60B	Moderate	B	B	
K60C	Moderate	B	B	
K60D	High	A	A	
K60E	High	C	C	
K60F	High	C	C	
K60G	Moderate	C	C	
K70A	Moderate	C	C	
K70B	Low	A	A	
H80A	HIGH	C/D	C	
H80B	Moderate	C	C	
H80C	Moderate	D	D	
H80D	Moderate	D	D	
H80E	Moderate	C/D	C/D	
H90A	Moderate	C	C	

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Quaternary catchment	EIS	PES	REC	How to achieve the REC
H90B	Moderate	D	D	Control invasive alien vegetation, erosion and land-use encroachment.
H90C	Moderate	D	D	
H90D	Moderate	C	C	
H90E	Moderate	C/D	C/D	
J11D	Low	C	C	
J11F	Moderate	C	C	
J11G	Moderate	B	B	
J12A	Moderate	B	B	
J12B	Moderate	B	B	
J12J	Moderate	B	B	
J12K	Moderate	B	B	
J12L	Moderate	C	C	
J21A	Moderate	B/C	B/C	
J21B	Moderate	B	B	
J22B	Moderate	B	B	
J22G	Moderate	B	B	
J22K	Low	B/C	B/C	
J23E	Low	C	C	
J23J	Moderate	B	B	
J24F	Low	C	C	
J25A	Low	B	B	
J33B	Low	C	C	
J33E	Low	C	C	
J34C	Low	C	C	
J34D	Low	C	C	
J34E	Low	C/D	C/D	
J34F	Low	D	D	
J40B	Low	B	B	
J40C	Moderate	C/D	C/D	
J40D	Moderate	D	D	
J40E	High	C	C	

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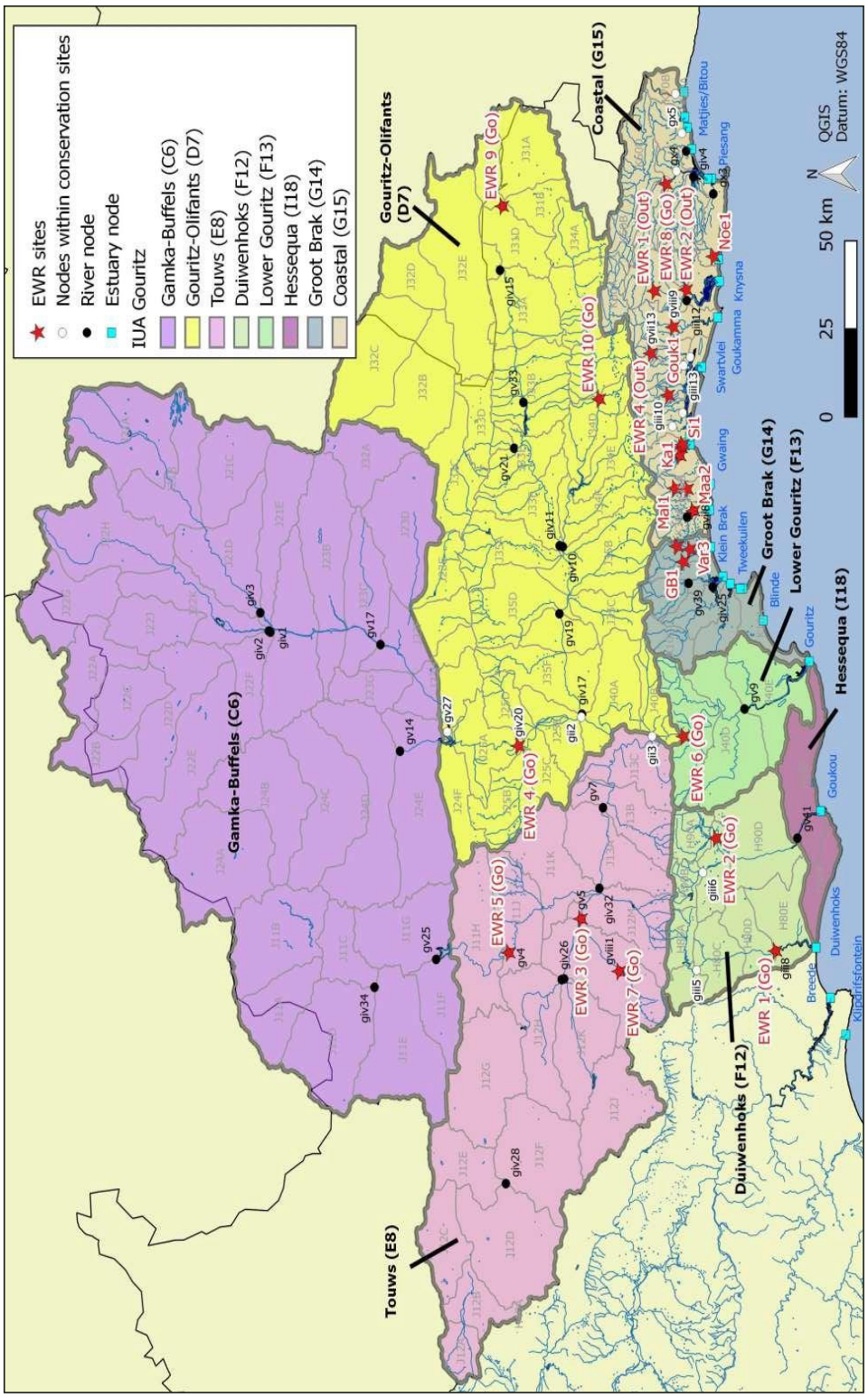


Figure 1: Locations of Gouritz region river/estuary nodes and EWR sites

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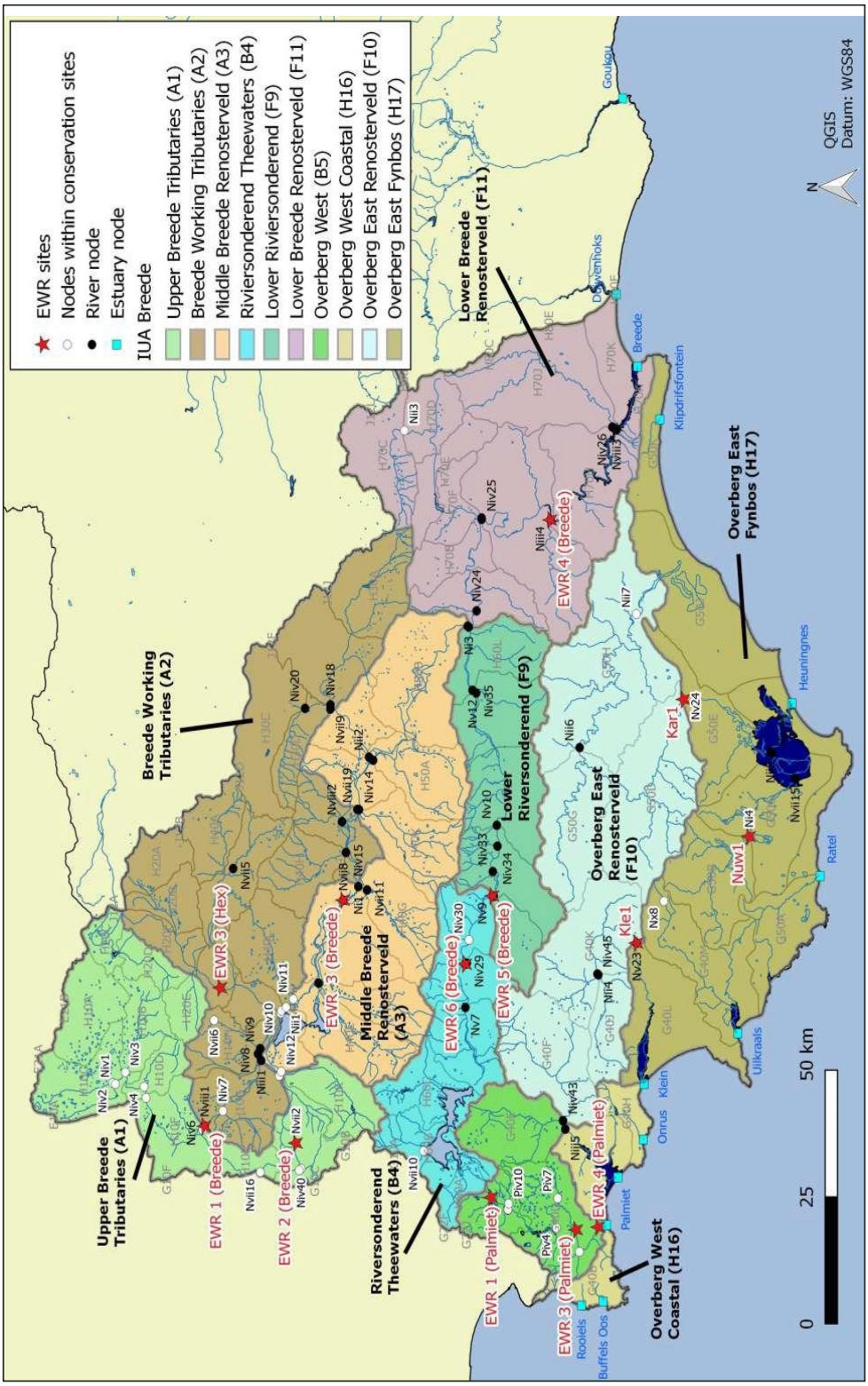


Figure 2: Locations of Breede-Overberg region river/estuary nodes and EWR sites

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ISAZISO SIKARHULUMENTE

ISAZISO _____ SIKA2022

ISEBE LEZAMANZI NOGUTYULO

UMTHETHO WEZAMANZI WESIZWE, KA1998
(UMTHETHO NO. 36 KA1998)

UHLELO LWEMIJELO YAMANZI KWIMILAMBO YOMMANDLA WOLAWULO LWAMANZI I- BREEDE-GOURITZ

Mna, Senzo Mchunu, kwisikhundla sam njengoMphathiswa weSebe lezaManzi noGutyulo, ndigunyaziswa yimiqathango yesiqendu 16 (1) soMthetho wezaManzi weSizwe, ka1998 (Umthetho No. 36 ka1998), ukuba ndibhengeze amahlelo emijelo yamanzi ekuMmandla woLawulo lwaManzi i-Breede-Gouritz njengoko kubonisiwe kwiShedyuli yesi Saziso.

Silungiswe nguMphathi: weCandelo lokuHlelwa kweMijelo yaManzi
Makubhalelwe ku: Mnu Yakeen Atwaru
WeSebe lezaManzi noGutyulo
Ndinaye Building 185 Francis Baard Street
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0001
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NISIPHATHELWA NGUSENZO MCHUNU (MP)
UMPHATHISWA WESEBE LEZAMANZI NOGUTYULO
UMHLA: 15/07

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UHLELO LWEMIJELO YAMANZI KWIMILAMBO YOMMANDLA WOLAWULO LWAMANZI I-BREEDE-GOURITZ NGOKWEMIQATHANGO YESIQENDU 6(1) NO (2) SOMTHETHO WEZAMANZI WESIZWE, KA1998 (UMTHETHO NO. 36 KA1998)

ISHEDULI

1. **INKCAZO NGOMJELO WAMANZI**

1.1 Xa sithetha ngomjelo sixela yonke into engumlambo ekuMmandla woLawulo lwaManzi i Breede-Gouritz, ngolu hlobo lubonisiweyo apha ngezantsi:

UMmandla woLawulo lwaManzi:	iBreede-Gouritz
IiNgingqi zoFunxo:	INgingqi ePhakamileyo yoFunxo enguG40-G50, uH10- H90, uJ11-J40, noK10-K70
Imilambo:	EkuMmandla iBreede Overberg: Umlambo iBreede, umlambo iRiviersonderend, umlambo i-Overberg, neminye ke imilanjana eselunxwemeni. EkuMmandla wonxweme iGouritz: Umlambo iGouritz, umlambo iBuffels, umlambo iTouws, umlambo iGroot, umlambo iGamka, umlambo i-Olifants, umlambo iKammanassie, neminye ke imilanjana eselunxwemeni.

1.2 UMphathiswa, ngokwesiqendu 12 soMthetho waManzi weSizwe, ka1998 (UMthetho No.36 ka 1998) ("uMthetho"), uxele indlela yokuhlela imijelo yamanzi ngokuthi akhuphe iSaziso sikaRhulumente esingu- No. R. 810, esithe sabhengezwa kwincwadi yeZaziso zikaRhulumente engu- No. 33541 neshicilelwe ngomhla we-17 kweyoMsintsi ku2010. Ngokwemiqathango yesiqendu 6(1) soMthetho, uMphathiswa – kanye nje emva kokuba ihlelo lawo onke amanqanaba (okanye lezo ndawana nje) z/omjelo wamanzi ngamnye liqingqiwe – makabhengenze ezo mpawu ziqingqiweyo zaloo Mjelo uthile kwiSaziso sikaRhulumente.

1.3 uMphathiswa, ngokwemiqathango isiqendu 16(1) soMthetho, sokuba kuqatshelwe ezi mpawu zilandelayo ngeMijelo ekuMmandla woLawulo lwaManzi iBreede-Gouritz.

2. NAZI IIMPAWU ZOMJELO EZIPHAKANYISWAYO NEZIQINGQWE NGOKWEMIQATHANGO YESIQENDU 16(1) NO- (2) SOMTHETHO WEZAMANZI WESIZWE, KA1998

2.1 Iimpawu zoMjelo eziphakanyiswayo – nezibandakanya iiMfuno zaManzi zeNdalo (ii-Ecological Water Requirements ngelasemzini, ii- EWRs ngamafutshane) neMijelo yeeMfuno ezisiSiseko zoLuntu (ii-Basic Human Needs Reserve ngelasemzini, iiBHN ngamafutshane) kwimilambo ekwizikhundla ze-EWR nekwezo ndawo zikhethiweyo zendalo kuMmandla woLawulo lwaManzi iBreede-Gouritz – zibonisiwe **Sahluko 4**. IiNdawo zoBoniselo ngaManzi iGouritz neBreede-Overberg nezikhundla ze-EWR zibonisiwe phaya **kwiMizobo 1 no- 2 ngokulandelelanayo.**

2.2 Ibakala elifana neKwaliti yaManzi (phakathi kwezo mpawu zoMjelo ziphakanyiswayo ngaloo milambo ikwizikhundla ze-EWR kuMmandla woLawulo lwaManzi i-Breede-Gouritz ngokwemiqathango yesiqendu 16(1) soMthetho) libonisiwe phaya **kwiSahluko 5**.

2.3 Iimpawu eziphakanyiswayo zoMjelo wokuqokelela amanzi angaphantsi komhlaba ngokoMthamo neKwaliti yamanzi (njengoko kuxeliwe kwimiqathango yesiqendu 16(1) soMthetho malunga noMmandla woLawulo lwaManzi Breede-Gouritz) zibonisiwe phaya **kwiSahluko 6.**

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2.4 Iimpawu zoMjelo oliChweba eziphakanyiswayo ngokwemiqathango yesiqendu 16(1) soMthetho kuMmandla woLawulo lwaManzi i-Breede-Gouritz zibonisiwe phaya **kwiSahluko kwiSahluko 7**.

2.5 Iimpawu zoMjelo onguMwonyo eziphakanyisiweyo kuMmandla woLawulo lwaManzi i-Breede-Gouritz ngokwemiqathango yesiqendu 16(1) soMthetho zibonisiwe phaya **kwiSahluko 8**.

2.6 Ezi mpawu ziqingqiweyo ngoMjelo ngamnye ziza kuqala ukusebenza ukusukela ngomhla ezityikitywe ngawo njengoko isitsho imiqathango yesiqendu 16(1) somthetho, ngaphandle kokuba uMphathiswa ubone ngenye indlela.

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3. IZISHUNQULELO ZAMAGAMA NEENKCAZO

3.1 Izishunqulelo

Isishunqulelo	Inkcazo
BHN	Basic Human Needs (iiMfuno ezisiSiseko zoLuntu)
EC	Ecological Category (Inqanaba lendalo)
EcoSpecs	Ecological Specifications (Imiqathango yendalo)
EIS	Ecological Importance and Sensitivity (Undoqo novakalelo lwendalo)
ER	Ecological Reserve (Umjelo wendalo)
EWR	Ecological Water Requirement (IMfuno yaManzi yeNdalo)
MAR	Mean Annual Runoff (Ubuncikane bamanzi emvula ngonyaka)
MCM	ii-Million Cubic Metres
PES	Present Ecological Status (isimo sangoku sendalo)
RC	Reference conditions (iimeko ekubhekiswa kuzo)
REC	Recommended Ecological Category (Icandelo lendalo elindululwayo/elixhaswayo)
TPCs	Thresholds of Potential Concern (Imilinganiselo yenkathazo enokuvela)
WQSU	Water quality sub-unit (icandelwana lekwaliti yamanzi)

3.2 Inkcazo

Inketshenketshana yamanzi/ ulwelo: Ngalaa manzana asalayo emilanjeni ngexesha leemeko ezifana nemozulu engumqwebedu okanye leyo ingacacanga, kodwa ke ingengawo lawo asuka phantsi komhlaba. La manzana aquka lawo angena ngolibaziseko oluthile emilanjeni nalawo ke atsitsa nje ngaphantsi komhlaba.

Undoqo novakalelo lwendalo (i-EIS): Ezi ke zizalathisi/ziimpawu eziphambili ezijongwayo xa kuhlelwa imijelo yamanzi yendalo. Undoqo wendalo ubhekisa kwiimpawu ezifana nobukho, ubumeli nokwahluka kwemigqeku ye- biota nendawo yokuphilisana. Uvakalelo lwendalo lubhekisa kubungozi obunokwenzeka kwindawo yokuphilisana okanye kwi-biota xa kuthe kwenzeka inguqu kwindlela ahamba ngayo amanzi, kumanqanaba amanzi kanti nakwezo meko zibangelwa bubukho bekhemikhali kuloo ndawo ithile.

Iimfuno zamanzi zendalo (i-EWR): Iipethini zokuhamba kwamanzi (oko kukuthi ubungakanani, uhlalutyo lwexesha nelixa lobukho) nekwaliti yamanzi edingekayo ukuze kugcinwe impilo yasemanzini intle phantsi kweemeko ezithile. Esi sigama sisetyenziswa kakhulu xa kubhekiswa kwizinto ezifana namabakala omthamo nekwaliti.

Izikhundla zeemfuno zamanzi zendalo (ze-EWR): La ngamanqanaba omlambo athi aqingqwe ngaloo maxa kukhethwa isikhundla. Isikhundla se-EWR senziwa bubude bomlambo obunokuquka iindawana zokudlula kwezinto zasemanzini nezinye izinto zendalo. Ezi zikhundla zinezalathisi ezaneleyo zokuvavanya indlela ahamba ngayo amanzi zibuye zihlole namabakala ezifundo ezifunekayo ngentshukumo yamanzi (i-hydrology), ngokwakhekha komhlaba nangefuthe lobukho beekhemikhali nelohlobo oluthile lwendalo (umzekelo kwiintlanzi, kwizinto eziphilayo ezingenamathambo nakutyani lwaselunxwemeni).

Isimo sangoku sendalo (i-PES): Eli bakala libonisa impilo nemfezeko yangoku yeempawu ezininzi ezibonakalayo kuloo mjelo uthile wamanzi, ngakumbi xa uzithelekisa neemeko ezibhekiselele kwezo zendalo. Iziphumo zohlolo lwesimo sangoku ziye ziboniswe ngokusebenzisa amaBakala eNdalo (ii-Ecological Categories ngelasemzini – ii-ECs ngamafutshane) asukela ku-A (ochaza ukuba umjelo usekwisimo sendalo) ze aye kutsho ku-F (ochaza ukuba isimo somjelo siguquke ngokupheleleyo) xa kuthethwa nge-PES.

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Uvuselelo: Oku kuxela ukuba kongezwa amanzi apho ebesele ephele khona – nokuba kungokujikwa kwendlela yokunyuka komphunga ukuze ujoliswe ezantsi okanye ngamanzi angaphezu komhlaba okanye ke kufuduswe/kuthuthwe amanzi kwii-akhwifa (iindawo ezigcina amanzi emvula) ezimelene nendawo leyo iphelelwe ngamanzi.

IBakala leNdalo eliNdululwayo/elixhaswayo (i-REC): Ibakala lendalo elibonisa ibinzana elingqaliweyo lolawulo lwendalo kuloo mjelo uthile wamanzi oko kuxhomekeke kwihlelo lendalo elimisiweyo. La mahlelo asukela kwiBakala A (obonisa ukuba akukho nguqu yenzekileyo okanye isimo somjelo iseseso sendalo) ukuya kwiBakala D (obonisa ukuba isimo somjelo siguquke ngokupheleleyo).

Umjelo: Ngumthamo nekwaliti yamanzi afunekayo ukuze kwaneliswe iimfuno ezisisiseko zoluntu ngokuthi kugcinwe amanzi aya kwaneza loo mfuno isisiseko, kukhuselwe nempilo yasemanzini ngeenjongo zokufezekisa uphuhliso lwendalo oluya kuzinza nokuqinisekisa ukuba kusetyenziswa umjelo wamanzi ofanelekileyo.

Ummandla womlambo (ummandla wendalo): La ngamanqanaba aziziboniso nangumfuziselo wemijelo ekumphezulu wonxweme, okanye loo mimandla ithile apho kuphilisana izinto zasemanzini khona (njengemilambo, imiwonyo, amachweba namanzi angaphantsi komhlaba) apho kuqhuba intlalo yokuphilisana).

Imimandla yoboniselo ngamanzi yeminyaka emine (yekota): Ngamacandelwana amahle emimandla yoboniselo ngamanzi yeminyaka emine (imimandla yoboniselo ngamanzi ekwimisebe yemilambo emikhulu).

4. UDONGA LWEBAKALA LEKWALITI YAMANZI KWIMILAMBO EKWIZIKHUNDLA NEENDAWO EZIKHETHIWEYO ZE-EWR

Umjelo ngamnye uzizintlu ezimbini – uMjelo weeMfuno ezisiSiseko zoLuntu (i-BHN) noMjelo weNdalo (i-ER). I-BHN ibonelela ngeemfuno eziphambili zabantu abathile abancedwa nguloo mjelo uthile futhi yona iquka amanzi okusela, okupheka nalawo okuhlamba. I- ER yona inxulumene namanzi afunelwa imicimbi yokhuselo lwempilo yasemanzini kuloo mjelo uthile. Eli gama úmjelo' libhekisa **kumthamo nekwaliti** yamanzi akuloo mlambo uthile, futhi wona uguquguquka ngokuxhomekeke kwihlelo lomlambo lowo (umzekelo iHlelo I, II no-III).

UMMANDLA IBREEDE-OVERBERG (UMJELO WENDALO)

UTafile 4.1: Isishwankathelo seenkcukacha zeendawo nezikhundla ze-EWR. Izikhundla ze-EWR ziboniswe mnyama kakhulu.

Ummandla woboniselo ngamanzi weminyaka emine	Indawo/isikhundla se-EWR	Umjelo wamanzi	I-PES	I-EIS	i-REC	i-nMAR (i-MCM)	i-EWR (% nMAR)
G40C	Piii1	Palmiet	B	Phezulu	B	39.9	19.1
G40C	Piv10	Witklippiesskloof	D	Phezulu	D	15.1	21.5
G40C	Piv9	Palmiet	D	Phezulu	B	78.8	21.5
G40C	Piv8	Klipdrift	D	Phezulu	D	13.6	21.5
G40D	Piv4	Klein-Palmiet	D	Phezulu	D	13.7	21.5
G40D	Piv7	Krom/Ribbok	D	Phezulu kakhulu	A	27.5	21.5
G40D	Piii2	Palmiet	C	Phezulu kakhulu	B/C	206.6	31.2
G40D	Piv12	Dwars/Louws	C	Phezulu kakhulu	C	25.2	100.0
G40D	Piii3	Palmiet	C	Phezulu kakhulu	B	250.4	34.5
G40G	Niii5	Bot	C	Phezulu kakhulu	A	31.9	21.3

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Ummandla woboniselo ngamanzi weminyaka emine	Indawo/isi khundla se-EWR	Umjelo wamanzi	I-PES	I-EIS	i-REC	i-nMAR (i-MCM)	i-EWR (% nMAR)
G40H	Nx6	Onrus	E	Phezulu	B	5.1	13.4
G40F	Niv43	Swart	E	Phezulu	B	42.1	13.3
G40K	Niv45	Steenbok	E	Phezulu kakhulu	A	10.8	12.2
G40J	Nii4	Hartebees	D	Phezulu kakhulu	B	18.4	12.5
G40K	Nv23	Klein	D	Phakathi	C	43.0	19.3
G40M	Nx8	Uilkraal	C	Phezulu kakhulu	A	2.4	19.2
G50B	Ni4	Nuwejaar	D	Phakathi	D	12.5	13.0
G50C	Nvii15	Heuninges	D	-	D	17.8	13.1
G50C	Niv44	Heuninges	D	Phezulu kakhulu	B	18.8	13.1
G50C	Nii5	Kars	E	Phezulu kakhulu	B	21.6	20.4
G50E	Nv24	Kars	C	Phakathi	B	15.4	30.3
G50H	Nii7	DeHoop Vlei	B	Phezulu	B	27.1	30.0
G50H	Nii6	Sout	D	-	B	4.2	12.6
H10B	Nvii3	Rooikloof	B	Phezulu	B	6.807	37.95
H10B	Niv3	Titus	C	Phakathi	C	26.2	22.0
H10C	Niv1	Koekedou	D	Phezulu kakhulu	A	18.8	14.2
H10C	Niv2	Dwars	C	Phezulu	B	74.9	22.0
H10D	Nvi4	Breede	D	Phakathi	D	175.509	17.51
H10D	Niv4	Witels	A	Phezulu kakhulu	A	84.3	43.3
H10D	Nvi3	Breede	C	Phezulu	B	252.8	31.7
H10E	Nvi2	Wit	A	Phezulu kakhulu	A	42.6	46.6
H10F	Niv6	Wabooms	D	Phezulu	B	7.4	14.4
H10F	**Nviii1/ EWR1**	**Breede**	**D/E**	**Phezulu**	**D**	**434.90**	**31.7**
H10G	Niv7	Slanghoek	D	Phezulu	B	32.6	14.5
H10G	Niii1	Breede	D	Phezulu	B	497.6	25.4
H10J	Niv40	Elands	B	Phezulu kakhulu	A	58.1	50.8
H10J	Niv41	Krom	B	Phezulu kakhulu	A	9.0	50.8
H10J	**Nvii2/ EWR2**	**Molenaars**	**C**	**Phezulu kakhulu**	**B**	**105.6**	**35.0**
H10J	Niv42	Molenaars (Smalblaar)	E	Phezulu	B	191.2	17.4
H10K	Niv12	Holsloot	C	Phezulu	B	119.5	35.0
H10H	Nvii6	Hartbees	D	Phezulu kakhulu	A	4.0	14.4
H10H	Niv9	Hartbees/ de Wetskloof	D	Phezulu kakhulu	A	10.2	14.4
H10L	Nv3	Breede	C	Phezulu	B	850.9	31.7
H20G	Nvii7	Hex	C	Phakathi	C	102.8	22.3
H20H	Niv10	Hex	D	Phezulu	B	107.1	22.3
H40B	Nvii5	Koo	D	Phezulu	B	0.9	13.1
H40C	Niv11	Nuy	E	Phezulu	B	29.4	13.2
H40D	Niv13	Doring	E	Phezulu	B	47.4	12.9
H40F	**Nvii8/ EWR3**	**Breede**	**C/D**	**Phakathi**	**C/D**	**1042.8**	**45.5**
H40G	Nvii11	Poesnels	D	Phezulu	B	16.1	12.8

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Ummandla woboniselo ngamanzi weminyaka emine	**Indawo/isi khundla se-EWR**	**Umjelo wamanzi**	**I-PES**	**I-EIS**	**i-REC**	**i-nMAR (i-MCM)**	**i-EWR (% nMAR)**
H40K	Niv14	Keisers	D	Phezulu kakhulu	A	12.6	12.5
H40H	Niv15	Vink	D	Phezulu kakhulu	A	15.6	12.4
H30C	Niv20	Pietersfontein	D	Phakathi	C	17.3	12.0
H30B	Niv18	Kingna	D	Phezulu	B	27.1	12.3
H30D	Nvii9	Keisie	D	Phezulu	B	21.5	11.9
H30E	Nii2	Kogmanskloof	D	Phezulu kakhulu	B	52.0	18.9
H50B	Ni2	Breede	D	Phezulu	B	1170.1	17.3
H60B	Nvii10	Du Toits	B	Phezulu kakhulu	A	43.9	50.8
H60D	Nv7	Riviersonderend	C	Phezulu kakhulu	A	370.2	30.1
H60E	**Niv28/ EWR6**	**Baviaans**	**B**	**Phezulu**	**B**	**7.9**	**70.90**
H60E	Niv29	Sersants	D	Phezulu	B	4.6	29.9
H60F	Niv30	Gobos	C	Phezulu kakhulu	A	12.4	48.1
H60F	**Nv9/EWR5**	**Riviersonderend**	**D**	**Phezulu**	**D**	**413.7**	**24.5**
H60G	Niv31	Kwartel	D	Phezulu	B	10.7	13.4
H60H	Niv33	Soetmelksvlei	D	Phezulu kakhulu	A	4.0	29.9
H60H	Niv34	Slang	D	Phezulu kakhulu	A	2.1	29.9
H60H	Nv10	Riviersonderend	D	Phezulu kakhulu	A	442.9	24.5
H60K	Niv35	Kwassadie	E	Phezulu kakhulu	A	5.9	17.3
H60L	Ni3	Riviersonderend	D	Phezulu	B	483.8	24.5
H70A	Niv24	Leeu	E	Phezulu kakhulu	A	5.8	12.6
H70B	Nv2	Breede	C	Phezulu	B	1701.4	26.4
H70D	Nii3	Tradouw	B	Phezulu kakhulu	A	19.4	29.9
H70F	Niv25	Buffeljags	E	Phezulu	B	119.4	14.1
H70G	**Niii4/ EWR4**	**Breede**	**C**	**Phezulu kakhulu**	**B/C**	**1832.7**	**40.1**
H70J	Niv26	Slang	E	Phezulu	B	10.0	14.2

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UMMANDLA WONXWEME IGOURITZ (UMJELO WENDALO)

UTafile 4.2: Isishwankathelo seenkcukacha seendawo nezikhundla ze-EWR sites. Izikhundla zeEWR ziboniswe mnyama kakhulu.

Ummandla woboniselo ngamanzi weminyaka emine	Indawo/isikhundla se-EWR	Umjelo wamanzi	I-PES	I-EIS	i-REC	i-nMAR (i-MCM)	i-EWR (% nMAR)
J11C	giv34	Buffels	B	Phezulu	B	13.1	26.5
J11F	gv25	Buffels	B	Phezulu	B	24.2	17.8
J11H	**J1BUFF-EWR5**	**Buffels**	**C**	**Phakathi**	**C**	**27.4**	**17.9**
J11K	giv32	Groot	D	Phezulu	B	30.5	17.9
J12D	giv28	Touws	D	Phezulu	B	16.4	11.3
J12H	giv27	Touws	B	Phakathi	C	26.4	26.8
J12K	giv26	Brak	C	Phezulu	B	2.9	17.7
J12L	**J1DORI-EWR7**	**Doring**	**C/D**	**Phantsi**	**C/D**	**2.9**	**12.0**
J12L	J12L Modelled	Huis	D		D	1.56	40.3
J12M	**J1TOUW-EWR3**	**Touws**	**B/C**	**High**	**B/C**	**33.5**	**17.8**
J13B	gv7	Groot	C	Phezulu	B	72.7	18.0
J13C	gii3	Groot	B	Phezulu	B	78.1	27.0
J21D	giv3	Gamka	B	Phezulu	A	31.9	27.1
J22F	giv1	Koekemoers	C	Phezulu kakhulu	A	7.4	17.9
J22K	giv2	Leeu	C	Phezulu kakhulu	A	17.1	17.9
J23F	gv17	Gamka	B	Phezulu	B	58.1	27.0
J23J	gv27	Gamka	C	Phezulu	B	69.6	18.3
J24E	gv14	Dwyka	A	Phezulu	B	4.0	39.1
J25A	**J2GAMK-EWR4**	**Gamka**	**C/D**	**Phezulu**	**C**	**79.8**	**14.9**
J25E	gii2	Gamka	C	Phezulu	B	111.8	15.2
J31D	**J3OLIF-EWR9**	**Olifants**	**C**	**Phakathi**	**C**	**11.8**	**17.8**
J32E	giv15	Traka	C	Phezulu	C	2.7	17.9
J33B	gv33	Olifants	D	Phezulu	B	25.0	11.9
J33E	gv21	Meirings	C	Phezulu kakhulu	A	21.4	19.1
J33F	giv11	Olifants	E	Phezulu	B	80.0	12.4
J34C	**J3KAMM-EWR10**	**Kammanassie**	**C/D**	**Phantsi**	**C/D**	**41.2**	**15.3**
J34F	giv10	Leeu	E	Phezulu kakhulu	A	59.2	12.1
J35E	gv19	Olifants	E	Phezulu	B	224.5	12.9
J35F	giv17	Olifants	D	Phezulu	B	253.4	12.9
J40B	**J4GOUR-EWR6**	**Gouritz**	**C**	**Phakathi**	**C**	**489.1**	**14.8**
J40E	gv9	Gouritz	C	Phezulu	B	571.8	14.8
H80B	giii5	Duiwenhoks	E	Phezulu kakhulu	A	62.5	20.1
H80E	**H8DUIW-EWR1**	**Duiwenhoks**	**D**	**Phantsi**	**D**	**83.2**	**20.9**
H90C	giv27	Korinte	D	Phezulu	B	34.1	14.5
H90C	**H9GOUK-EWR2**	**Goukou**	**C/D**	**Phakathi**	**C/D**	**50.9**	**24.2**
H90E	gv41	Goukou	C	Phezulu	B	105.0	28.2

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Ummandla woboniselo ngamanzi weminyaka emine	**Indawo/isikh undla se-EWR**	**Umjelo wamanzi**	**I-PES**	**I-EIS**	**i-REC**	**i-nMAR (i-MCM)**	**i-EWR (% nMAR)**
K10D	giv25	Brandwag	D	Phezulu	B	17.9	9.9
K20A	gvii7	Groot-Brak	B/C	Phezulu kakhulu	A	27.0	26.5
K20A	**gviii2- EWR GB1-BC**	**Groot-Brak**	**B/C**	**Phezulu kakhulu**	**B/C**	**15.3**	**26.5**
K20A	**gvii3-EWR Var 3**	**Varing**	**D**	**Phezulu**	**C/D**	**8.4**	**20.9**
K20A	**gviii12- EWR Var2**	**Varing**	**D**	**Phezulu**	**C/D**	**6.0**	**20.9**
K30A	**gviii4-EWR**	**Maalgate**	**B**	**Phezulu kakhulu**	**A**	**15.3**	**46.0**
K30A	gvii8	Maalgate	B	Phezulu	D	30.1	16.4
K30B	gvii9	Malgas	C	Phezulu kakhulu	C	17.3	31.6
K30B	**gviii6 EWR Gwa1 -D**	**Gwaing**	**E**	**Phezulu**	**D**	**34.1**	**16.4**
K30C	**gviii7 EWR Sw1 - D**	**Swart**	**D**	**Phezulu**	**D**	**16.1**	**14.5**
K30C	**gvii11 EWR Ka1 - D**	**Kaaimans**	**B**	Phezulu	**B**	**18.6**	**50.2**
K30C	**gviii8 EWR Si1 -B**	**Silver**	**B**	Phezulu kakhulu	**B**	**14.9**	**50.2**
K30D	gvii12	Touws	B	Phezulu kakhulu	A	16.7	30.3
K30D	gx8	Klein Keurbooms	D	Phezulu kakhulu	B	2.5	14.1
K40A	**giii10 EWR 2 Diep -B**	**Diep**	**B**	**Phezulu kakhulu**	**B**	**12.4**	**30.3**
K40B	giii13	Hoekraal	B	Phezulu	A	27.9	30.3
K40C	**gvii13 EWR 4 Karatara-AB**	**Karatara**	**B**	**Phezulu kakhulu**	**A/B**	**11.2**	**40.2**
K40C	giii11	Karatara	A/B	**Phezulu kakhulu**	A	33.8	40,2
K40E	**Gou 1**	**Goukamma**	**B/C**	**Phezulu kakhulu**	**B/C**	**30.4**	**38.5**
K50A	**EWR 1**	**Knysna**	**B**	**Phezulu**	**B**	**26.5**	**32.1**
K50A	**Kny 2**	**Knysna**	**B**	**-**	**B**	**46.5**	**32.1**
K50B	**EWR 2**	**Gouna**	**A/B**	**Phezulu kakhulu**	**A/B**	**27.6**	**53.4**
K60C	**K6KEUR-EWR8**	**Keurbooms**	**C**	**Phezulu kakhulu**	**B/C**	**46.1**	**34.9**
K60D	giv5	Palmiet	A	Phezulu kakhulu	A	42.1	48.3
K60F	giv4	Bitou	C	Phezulu kakhulu	A	23.6	22.8
K60G	**Noe 1**	**Noetsie**	**B**	**Phezulu kakhulu**	**A/B**	**4.8**	**63.4**
K60G	gx3	Piesang	D	**Phezulu kakhulu**	A	7.3	28.5
K60E	gx9	Keurbooms	C	Phezulu kakhulu	A	91.3	34.9
K70A	gx4	Buffels	B	Phezulu kakhulu	B	1.8	34.3
K70A	gx5	Sout	B	Phezulu kakhulu	B	3.8	34.3
K70B	gvii15	Bloukrans	B	Phezulu kakhulu	B	31.2	33.9

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UTafile 4.3: IiMfuno ezisiSiseko zoLuntu kwiBreede-Gouritz WMA

Ummandla woboniselo ngamanzi weminyaka emine	Umjelo wamanzi	i-BHN (%NMAR)	Ummandla woboniselo ngamanzi weminyaka emine	Umjelo wamanzi	i-BHN (%NMAR)
G40C	Palmiet	0.008	J11C	Buffels	0.02
G40D	Palmiet	0	J11F	Buffels	0.03
G40G	Bot	0.50	J11H	Buffels	0.03
G40H	Onrus	5.88	J11K	Groot	0.36
G40F	Swart	0.17	J12D	Touws	0.03
G40K	Steenbok	0	J12H	Touws	0
G40J	Hartebees	0.08	J12K	Brak	0
G40K	Klein	0	J12L	Doring	0.21
G40M	Uilkraal	0.125	J12M	Touws	0
G50B	Nuwejaar	1.12	J13B	Groot	0.01
G50C	Heuninges	0	J13C	Groot	0
G50E	Kars	0.84	J21D	Gamka	0
G50G	DeHoop Vlei	0.03	J22F	Koekemoers	0.14
G50H	Sout	0.04	J22K	Leeu	0
H10B	Rooikloof	0	J23F	Gamka	0.10
H10C	Dwars	0.70	J23J	Gamka	0
H10D	Breede	0	J24E	Dwyka	0
H10E	Wit	0	J25A	Gamka	0.003
H10F	**Breede**	**0.04**	J25E	Gamka	**0.03**
H10G	Slanghoek	0	J31D	Olifants	0.02
H10J	Elands	0.02	J32E	Traka	0.03
H10K	Holsloot	0	J33B	Olifants	0.02
H10H	Breede	**0**	J33E	Meirings	**0.56**
H10L	Breede	0.005	J34C	Olifants	0.01
H20G	Hex	0.01	J34F	Kammanassie	0.05
H20H	Hex	1.20	J35E	Leeu	0.004
H40B	Koo	2.22	J35F	Olifants	0.01
H40C	Nuy	0.07	J40B	Olifants	0
H40D	Doring	0	J40E	Gouritz	0.003
H40F	Breede	0.002	H80B	Gouritz	0
H40G	Poesnels	0	H80E	Duiwenhoks	0.005
H40K	Keisers	0.32	H90C	Goukou	0.33
H40H	Vink	0.06	H90E	Goukou	0.06
H30C	Pietersfontein	0.07	K10D	Brandwag	0.06
H30B	Kingna	1.33	K20A	Varing	1.50
H30D	Keisie	0.04	K30A	Maalgate	0.39
H30E	Kogmanskloof	0.17	K30B	Malgas	0.18
H50B	Breede	0.004	K30C	Swart	8.99
H60B	Du Toits	0	K30D	Touws	0.54
H60D	Riviersonderend	0.001	K40A	Diep	0.04
H60E	Baviaans	1.14	K40B	Hoekraal	0
H60F	Gobos	0.007	K40C	Karatara	0.54
H60G	Kwartel	0	K40E	Goukamma	0.39
H60H	Soetmelksvlei	0	K50A	Knysna	0.002
H60K	Kwassadie	0	K50B	Gouna	0.47
H60L	Riviersonderend	0	K60C	Keurbooms	0.03
H70A	Leeu	0	K60D	Palmiet	25.26
H70B	Breede	0.01	K60F	Bitou	0.38
H70D	Tradouw	0	K60G	Piesang	4.34
H70F	Buffeljags	0.02	K60E	Keurbooms	0.02
H70G	Breede	0	K70A	Buffels	1.32
H70J	Slang	0.40	K70B	Bloukrans	0.03

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5. IBAKALA LEKWALITI YAMANZI ANGAPHEZU KOMHLABA KWIMILAMBO EKWIZIKHUNDLA ZE-EWR

I-BREEDE-OVERBERG

UTafile 5.1: Amabakala e-PES novavanyo lulonke lwesikhundla kumlambo iBreede kuNode Nviii1 (omelwe siSikhundla 1 seEWR)

UMLAMBO	Umlambo iBreede	**AMANQANABA OHLOLO LWEKWALITI YAMANZI**	
I-WQRU	1(Ekudibaneni komphezulu womlambo iBreede nomlambo iWit)	**I-RC**	Isitishi sohlolo sikaDWA @ Koekedou kuMlambo ose-Ceres (H1H013Q01) (1998 -2002, n=38)
ISIKHUNDLA SE-EWR	Isikhundla 1 se-EWR	**I-PES**	Isitishi sohlolo sikaDWA @ Witbrug (H1H006Q01) (1998 -2002, n=143)
Uvavanyo lokuba nakho	Phakathi. Isikhundla seEWR sithe qelele ukuya phaya kumazantsi onxweme lwesitishi sohlolo sikaDWA.		

IZithako zeKwaliti yaManzi		**Ixabiso le-RC**	**Ixabiso le-PES Value**	**IBakala/Amagqabantshintshi**
Ilityuwa ezingezozendalo (mg/L) 1:95th Amaxabiso ePercentile	$MgSO_4$	7	21	IBakala B
	Na_2SO_4	8	4	IBakala A
	$MgCl_2$	5	6	IBakala A
	$CaCl_2$	12	24	IBakala B
	NaCl	6	27	IBakala A
	$CaSO_4$	0	0	IBakala A
Izondlo (mg/L)	SRP	-	-	Akukho nkcukacha
	TIN	2.8011	0.318	IBakala B
	TDS	21.8-50.6	< 45	*IBakala B. I*-TDS iyonyuka ngeenyanga zaseBusika
	TSS	-	< 5	Yamkelekile
	$P0_4$	0.024	0.042	*IBakala C*
Ukwahluka kwendalo	pH (5^{th} – 95^{th} %)	6.2-7.5	6.9 – 7.8	*IBakala C*
	Ubushushu	-	-	Azikho iinkcukacha kodwa akukho ngxaki iboniweyo ngemixube ye-DO
	I-oksijini enyibilikisiweyo	-	-	
	Ubukho bodaka (NTU)	-	2	
	Ukutsala umbane (mS/m)	-	-	Azikho iinkcukacha
Ukwahluka ngokwemvakalelo	Chl a: periphyton	-	-	Azikho iinkcukacha
	Chl a: phytoplankton	-	-	Azikho iinkcukacha
	Ubukhulu bezinto eziphilayo ezingenamathambo	SASS score = >110 and an ASPT score >7	SASS score = 69 and ASPT score = 5.3	*IBakala D/E . Uguquke kakhulu*. Kude kwaphela nommandla wokuphilisana ngenxa yokuzaliswa kwamanzi.
	Inqaku lemigqeku yeentlanzi			*U-D/E. kwaziswa ngemigqeku yeentlanzi*, oko kukuthi i-bass, i-trout ne-blue gills.
Ilityhefu		-	Azikho iinkcukacha kodwa iintsalela zezibulali zinambuzane zithande ukuba yingxaki ngenxa yemisebenzi yezolimo eCeres	
LULONKE UHLELO LWESIKHUNDLA		***IBakala B***		

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UTafile 5.2: Amabakala e-PES novavanyo lwesikhundla lulonke kumlambo iMolenaars kwiNode Nvii2 (emelwe siSikhundla 2 seEWR)

UMLAMBO	Umlambo iMolenaars	**AMANQANABA OHLOLO LWEKWALITI YAMANZI**		
I-WQRU	2 (Umlambo opheleleyo iMolenaars)	**I-RC**	Umlambo iMolenaars @ kumjelo wehlathi iHawequas (H1H018Q01) (1998 -1992, n=93)	
ISIKHUNDLA SE-EWR	Isikjhundla 2 se-EWR	**I-PES**	Umlambo iMolenaars @ kumjelo wehlathi iHawequas (H1H018Q01) (1998 -2002, n=141)	
Uhlolo lokubanakho	Phezulu. Indawo yohlolo ikufuphi kakhulu kwisikhundla se-EWR. Iinkcukacha zembali azibonisi simbo sithile, yiloo nto iinkcukacha ze-PES ziye zasetyenziselwa ukubonisa iimeko ekubhekiswa kuzo.			
IZithako zeKwaliti yaManzi		**Ixabiso le-RC**	**Ixabiso le-PES**	**IBakala/Amagqabantshintshi**
Iityuwa ezingezozendalo (mg/L) 1:95th % Amaxabiso	$MgSO_4$	6	6	IBakala A
	Na_2SO_4	9	9	IBakala A
	$MgCl_2$	4	4	IBakala A
	$CaCl_2$	6	6	IBakala A
	NaCl	9	9	IBakala A
	$CaSO_4$	0	0	IBakala A
Izondlo (mg/L)	SRP		-	
	TIN (1:50th %)	0.151	0.151	IBakala A
	TDS	22	22	IBakala A
	TSS	< 5	< 5	IBakala A
	$P0_4$ (1:50th %)	0.025	0.025	IBakala C
	NH_3-N	<0.015.	<0.015.	Kobo buthuba besimo esaziwayo
Ukwahluka kwendalo	pH (5th – 95th %)	5.5 – 7.3	5.5 – 7.3	*IBabakala A*. Imeko eqhelekileyo yobumuncu bamanzi omlambo waseNtshona Koloni
	Ubushushu			Kobo buthuba besimo esaziwayo, iBakala A
	I-oksijini enyibilikisiweyo	80 - 120% uhluzo	80 - 120% uhluzo	
	Ubukho bodaka (NTU)	-	0	
	Ukutsala umbane (mS/m)	-	-	Azikho iinkcukacha
Ukwahluka ngokwemvakalelo	Chl a: periphyton	-	-	Azikho iinkcukacha
	Chl a: phytoplankton	-	-	Azikho iinkcukacha
	Ubukhulu bezinto eziphilayo ezingenamathambo	Inqaku le-SASS ≥140 nenqaku le- ASPT >8	Inqaku le-SASS score = 175 nenqaku le-ASPT = 7.9	*IBakala A/B*. Catchment is relatively pristine
	Inqaku lemigqeku yeentlanzi			*IBakala E. Azikho iintlanzi zomthonyama eziye zabhaliswa ngethuba lophando*
Iityhefu		-	-	Akukho zingxaki zeetyhefu ziye zavela
LULONKE UHLELO LWESIKHUNDLA		***IBakala A***		

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UTafile 5.3: Amabakala e-PES novavanyo lwesikhundla lulonke kumlambo iBreede kuNode Nvii8 (emelwe siSikhundla 3 se-EWR)

UMLAMBO	Umlambo iBreede	**IINDAWO ZOHLOLO LWEKWALITI YAMANZI**		
I-WQRU	3 (kuMbindi womlambo iBreede Ukusuka ekudibaneni kweMolenaars ne Kogmanskloof	**I-RC**	Ayikho. Asikho isitishi sohlolo lwe-WQ esiye sanika iinkcukacha ngeli candelo loMjelo.	
ISIKHUNDLA SE-EWR	ISikhundla 3 se-EWR Site 3	**I-PES**	Umlambo iBreede e-Le Chasseur (H4H017Q01) (1995 -1999, n=214)	
Uvavanyo lokuba nakho	Phakathi			
Izithako zekwaliti yamanzi		**Ixabiso l-RC**	**Ixabiso le-PES Value**	**IBakala/amagqabantshintshi**
Ilityuwa ezingezozendalo (mg/L) (1:95th %)	$MgSO_4$	-	39	Category D
	Na_2SO_4	-	5	Category A
	$MgCl_2$	-	12	Category A
	$CaCl_2$	-	32	Category B
	NaCl	-	95	Category B
	$CaSO_4$	-	0	Category A
Izondlo (mg/L)	SRP	-		
	TIN (1:50th %)	-	0.242	Category A
	TDS	-	< 45	*B Category*. High TDS loads. Irrigation return flows in tributaries and main stem between Brandvlei Dam and EWR Site 3.
	TSS	-	< 5	High TSS loads. Releases from Brandvlei to alleviate high TDS.
	$P0_4$ (1:50th %)	-	0.032	C Category
Ukwahluka ngendalo	pH (5th – 95th %)	-	6.9 – 7.8	A Category
	Temperature (°C)	-	22.4	Summer temperature
	Dissolved oxygen	-	-	No observed data
	Turbidity (NTU)	-	-	No data. Low sediment production area
	Electrical conductivity (mS/m)	-	-	No data
Ukwahluka ngemvakalelo	Chl a: periphyton	-	-	No data
	Chl a: phytoplankton	-	-	No data
	Ubukhulu bezinto eziphilayo ezingenamathambo	Inqaku le-SASS ≥110 nenqaku le-ASPT >7	Inqaku le-SASS = 91 nenqaku le-ASPT = 7	*IBakala A. lithetha ukuthi akukho futhe lingako kwisakhiwo sasekuhlaleni*.
	Inqaku lemigqeku yeentlanzi	-		*IBakala D. mi-2* kuphela kwesi-7 imigqeku yeentlanzi zamanzi ahlaziyekileyo ekulindeleke ukuba zibekho apho kuthathwa khona iisampulu.
Ilityhefu		-	-	Azikho iinkcukacha kodwa ke izibulala zinambuzane zixakile ngenxa yefuthe lemisebenzi yezolimo
LULONKE UHLELO LWESIKHUNDLA		*IBakala D. ikakhulu ifuthe libakho ngenxa yeemvula ezingephi zasehlotyeni neengqumba zeentlenge ezandileyo.*		

UTafile 5.4: Amabakala e-PES novavanyo lwesikhundla lulonke kumlambo iBreede kuNode Nvii4 (emelwe siSikhundla 4 se-EWR)

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MLAMBO	Umlambo iBreede	**IINDAWO ZOHLOLO LWEKWALITI YAMANZI**	
I-WQRU	6 (umlambo iBreede ukususka kumlambo i-Buffelsjags ukuya kutsho eChwebeni)	**I-RC**	Azikho. Asikho isitishi sohlolo lwe-WQ esiye sanika iinkcukacha ngeli candelo loMjelo.
ISIKHUNDLA SE-EWR	Isikhundla 4 se-EWR	**I-PES**	Kumazantsi omlambo iBreede @ eSwellendam (H7H006Q01) (1995 -1999, n=214)
Uhlolo lokuba nakho	Phakathi (Akukhange kubekho kubekho zinkcukacha zezamanzi kulo mmandla womlambo, futhi amanzi ebemaninzi kakhulu ukuba inani losetyenziso lingathatyathwa; indawo yohlolo ibikude lee ukuya kumphezulu womjelo.		

Izithako zekwaliti yamanzi		**Ixabiso le-RC**	**Ixabiso le-PES**	**Ibakala/Amagqabantshintshi**
Iityuwa ezingezizo zendalo (mg/L) (1:95th %)	$MgSO_4$	-	83	IBakala E/F
	Na_2SO_4	-	3	IBakala A
	$MgCl_2$	-	49	IBakala D
	$CaCl_2$	-	62	IBakala C
	NaCl	-	318	IBakala D
	$CaSO_4$	-	0	IBakala A
Izondlo (mg/L)	SRP	-	-	Azikho iinkcukacha
	TIN (1:50th %)	-	0.23	IBakala A
	TDS	-	-	*IBakala C*. iingqumba zeTDS ziphezulu ngenxa yamanzi abuya kwezonkcenkceshelo kumasebe emilambo nakuleyo mikhulu
	TSS	-	-	Azikho iinkcukacha
	$P0_4$ (1:50th %)	-	0.024	*Ibakala C*
	NH_3-N	-	0.3 (Phakathi)	Azikho iinkcukacha zembali
	NO_2NO_3-N	-	<1	Kundululwa ubuninzi bazo ebusika kodwa ehlotyeni zingakumaqondo aphantsi kangange- < 0.3 mg/l
Ukwahluka kwendalo	pH (5th – 95th %)	-	6.9 – 8.1	iBakala A/B. Akukho nguqu ingako.
	Ubushushu (°C)	-	-	Akukho zinkcukacha ziboniweyo. Kubonwe ingxaki yokwenyuka kusehla kwamanqanaba e- DO.
	I-oksijini enyibilikisiweyo	-	-	
	Ubukho bodaka (NTU)	-	-	
	Ukutsala umbane (mS/m)	-	-	Azikho iinkcukacha
Ukwahluka ngemvakalelo	Chl a: periphyton	-	-	Azikho iinkcukacha
	Chl a: phytoplankton	-	-	Azikho iinkcukacha
	Ubukhulu bezinto eziphilayo ezingenamathambo	Inqaku le-SASS ≥110 nenqaku le-ASPT >7	Inqaku le-SASS = 87 nenqaku le-ASPT = 6.9	*IBakala B. chaphazeleke ngokuphakathi*
	Inqaku lemigqeku yeentlanzi	10 imigqeku yeentlanzi zomthonyama		*IBakala C. ubukho be*-carp ne-bass.
Ityhefu		-		Azikho iinkcukacha kodwa ke izibulala zinambuzane zixakile ngenxa yefuthe lemisebenzi yezolimo
LULONKE UHLELO LWESIKHUNDLA		*IBakala D. oko kuxhomekeka ekungeneni kwamanzi anekwaliti asuka kumlambo iBuffelsjags khonukuze kuqinisekiswe ukuba i-WQ kumazantsi ecandelo lomlambo nasechwebeni yamkelekile*		

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UTafile 5.5: Amabakala e-PES novavanyo lwesikhundla lulonke kumlambo iRiviersonderend kuNode Nv7 (emelwe siSikhundla 5 se-EWR)

UMLAMBO	Umlambo iRiviersonderend	**IINDAWO ZOHLOLO LWEKWALITI YAMANZI**	
I-WQRU	7 (kumbindi womlambo iRiviersonderend ukususka kwidama i-Theewaterskloof ukuya kumlambo i-Bok	**RC**	iRiviersonderend kuMjelo weHlathi okumlambo iSwart River/Nuweberg (H6H008Q01) (1990 -1992, n=34)
ISIKHUNDLA SE-EWR	Isikhundla se-EWR 5	**PES**	iRiviersonderend kwidama iTheewaterskloof (H6H012Q01) (1998 -2002, n=39) iRiviersonderend eReenen (H6H009Q01) (1995 -1999, n=56)
Uhlolo lokuba nakho	Phezulu		

IZithako zeKwaliti yaManzi		**Ixabiso le-RC**	**Ixabiso le-PES**	**Ibakala/amagqabantshintshi**
Ilityuwa ezingezozendalo (mg/L) 1:95th % ixabiso	$MgSO_4$	7	12	IBakala A
	Na_2SO_4	7	13	IBakala A
	$MgCl_2$	4	14	IBakala A
	$CaCl_2$	5	14	IBakala A
	NaCl	11	99	IBakala B
	$CaSO_4$	0	0	IBakala A
Izondlo (mg/L)	SRP	-	-	Azikho iinkcukacha
	TIN (1:50th %)	0.068	0.154	IBakala A.
	TDS	13.6-32	Ehlotyeni: <100 Ebusika : < 150	*IBakala B.* lingqumba eziphezulu zeTDS ngenxa yamanzi asuka kwezolimo ebusika
	TSS	< 5	-	Azikho iinkcukacha
	$P0_4$ (1:50th %)	<0.0165	0.013	IBakala B. Phezulwana.
	NO_2NO_3-N	0.02	<0.25	Kundululwa ubuninzi bazo ebusika kodwa ehlotyeni zingakumaqondo aphantsi kangange < 0.2 mg/l
Ukwahluka kwendalo	pH (5th – 95th %)	6.5 – 7.5	6.4 - 7.4	*IBakala A/B.*
	Temperature (°C)	+-4 °C	-	Azikho iinkcukacha
	I-oksijini enyibilikisiweyo	80 - 120% Uhluzo	-	
	Ubukho bodaka (NTU)	-	4	
	Ukutsala umbane (mS/m)	-	-	Azikho iinkcukacha
Ukwahluka ngokwemvakalelo	Chl a: periphyton	-	-	Azikho iinkcukacha
	Chl a: phytoplankton	-	-	Azikho iinkcukacha
	Ubukhulu bezinto eziphilayo ezingenamathambo	Inqaku le-SASS ≥110 nenqaku le-ASPT >7	Inqaku le-SASS = 95 nenqaku le-ASPT = 6.8	*IBakala C/D. iindawo ezininzi zinekwaliti entle yamanzi kodwa ke ikwaliti yendawo yokuphilisana yona imbi kakhulu*
	Inqaku lemigqeku yeentlanzi	Imigqeku emithandathu yeentlanzi		*Ibakala E. Zigqunyelelwa zii-bass ezinemilomo emikhulu nemincinci.* Linciphile inani lemigqeku yeentlanzi zomthonyama.
Ilityhefu		-	-	Azikho iinkcukacha kodwa iintsalela zezibulala zinambuzane ziyingxaki ngenxa yezolimo kumphezulu womjelo wesikhundla i- EWR

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LULONKE UHLELO LWESIKHUNDLA	***IbAKALA A/B*** (Ubukho bedama iTheewaterskloof kuthande ukuyinciphisa ikwaliti yamanzi alaa mlambo usemazantsi onxweme)

UTafile 5.6: Amabakala e-PES novavanyo lwesikhundla lulonke kumlambo iBaviaans kuNode Niv28 (emelwe siSikhundla 6 se-EWR)

UMLAMBO	Baviaans River	**WATER QUALITY MONITORING POINTS**		
I-WQRU	9 (umlambo iBaviaans uphela)	**I-RC**	Umlambo iBaviaans kwisitishi somsebenzi saseGenadendal (H6H005Q01) (1972 -1994, n=346)	
ISIKHUNDLA SE-EWR	Isikhundla 6 se-EWR Site 6	**I-PES**	Umlambo iBaviaans kwisitishi somsebenzi saseGenadendal (H6H005Q01) (1998 -2002, n=42)	
Uvavanyo lokubanakho	Phezulu. Iinkcukacha ezingenileyo zintle futhi ziya kunceda kuvavanyo lobhekiselelo nolwe-PES. Iinkcukacha zembali azibonisi zimbo zithile, yiloo nto iinkcukhacha ze PES ziye zasetye data was used for Reference conditions			
IZithako zeKwaliti yaManzi		**Ixabiso le-RC**	**Ixabiso le-PES**	**IBakala/Amagqabantshintshi**
Ityuwa ezingezozendalo (mg/L) 1:95th % Ixabiso	$MgSO_4$	9	9	IBakala A
	Na_2SO_4	9	9	IBakala A
	$MgCl_2$	4	4	IBakala A
	$CaCl_2$	10	10	IBakala A
	NaCl	25	25	IBakala A
	$CaSO_4$	0	0	IBakala A
Izondlo (mg/L)	SRP	-	-	Azikho iinkcukacha
	TIN (1:50th % value)	0.04	0.040	IBakala A
	TDS	41	41	IBakala A
	TSS	-	-	Azikho iinkcukacha
	$P0_4$ (1:50th % value)	0.022	0.022	IBakala A
Ukwahluka kwendalo	pH (5th – 95th %)	4.7 – 7.1	4.7 – 7.0	*IBakala A*. Lithathwa njengelendalo kwimilambo ene pH esezantsi yaseNtshona Koloni
	Ubushushu (°C)	-	-	Azikho iinkcukacha kodwa ke akukho ngxaki yeDO evelayo
	I-oksijini enyibilikisiweyo	-	-	
	Ubukho bodaka (NTU)	-	-	
	Ukutsala umbane (mS/m)	-	-	Azikho iinkcukacha
Ukwahluka ngokwemvakalelo	Chl a: periphyton	-	-	Azikho iinkcukacha
	Chl a: phytoplankton	-	-	Azikho iinkcukacha
	Ubukhulu bezinto eziphilayo ezingenamathambo	Inqaku le-SASS ≥140 nenqaku leASPT >8	Inqaku le-SASS = 109 nenqaku le-ASPT = 8.38	*IBakala A. indawo yokuphilisana inciphile*.
	Inqaku lemigqeku yeentlanzi	Imigqeku emithathu yeentlanzi zomthonyama		*IBakala A/B. Yonke imigqeku ekulindeleke ukuba iphile apha ibhalisiwe*
Ityhefu		-	-	Azikho iinkcukacha kodwa ke kodwa ke ayikho ingxaki yeetyhefu ebonakalayo
LULONKE UHLELO LWESIKHUNDLA		***Ibakala***		

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IGOURITZ

UTafile 5.7: Amabakala e-PES novavanyo lwesikhundla lulonke kumlambo iDuiwenhoks kwiSikhundla 1 se-H8DUIW-EWR

UMLAMBO	Umlambo iDuiwenhoks	**IINDAWO ZOHLOLO LWEKWALITI YAMANZI**	
I-WQRU		**I-RC**	Udonga olunqamlezileyo lokuthatha umlinganiselo lukaDWS H8H001Q01 (1967 – 1979; inani leesampulu (n) = 66 - 71, Ukutsala umbane : n = 110).
ISIKHUNDLA SE-EWR	I-H8DUIW-EWR1	**I-PES**	Udonga olunqamlezileyo lokuthatha umlinganiselo lukaDWS H8H001Q01 (2007 – 2013; n = 69, Fluorine (F) = 48).

Uvavanyo lwesikhundla	Ukuba nakho: 3.5

IZithako zeKwaliti yaManzi		**Ixabiso le-PES**	**IBakala/Amagqabantshintshi**
Ilityuwa ezingezozendalo (mg/L)	SO_4	N/A	-
	Na	382.2	Zibetha ngaphaya kwe ≤ 70 mg/L (TWQR) zinceda kwezolimo : Kunkcenkceshelo
	Mg	67.4	Asikho isikhokelo.
	Ca	55.0	Asikho isikhokelo.
	Cl	805.4	Zibetha ngaphaya kwe ≤ 100 mg/L (TWQR) zinceda kwezolimo : Kunkcenkceshelo
	K	9.25	Asikho isikhokelo
Izondlo (mg/L)	SRP	0.014	A
	TIN	0.118	A
Ukwahluka kwendalo	pH (5^{th} – 95^{th} %)	6.6 and 8.1	B
	Ubushushu (°C)	N/A	A/B. Ifuthe libonakala xa amanzi emancinci.
	I-oksijini enyibilikisiweyo	N/A	B. Ifuthe libonakala xa amanzi emancinci.
	Ubukho bodaka (NTU)	N/A	B. Inguqu ebonakala eludakeni ibonakala ibangelwa ikakhulu ziinguqu zendalo ukuya kwezo zenziwe ngabantu, umzekelo ukukhiwa kwegraveli phaya kumphezulu womjelo
	Ukutsala umbane (mS/m)	272	80 mS/m
Ukwahluka ngokwemvakalelo	Chl a: phytoplankton	N/A	N/A
	Izinto eziphilayo ezingenamathambo	50.7% Inqaku le-SASS = 78 Nenqaku le-ASPT = 56	D
	ii-Diatoms	11.1	C/D (n = 1, Jan 2014)
	Inqaku lemigqeku yeentlanzi	51.6%	D (ezifuduselwe emachwebeni kummandla wamanzi ahlaziyekileyo nowezo zingezizo ezomthonyama).
Ilityhefu	i-Ammonia (njengo-N)	0.003	A
	i-Fluoride (njengo-F)	0.33	A
LULONKE UHLELO LWESIKHUNDLA		***IBakala C***	

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UTafile 5.8: Imiqathango yendalo yekwaliti yamanzi (ii-EcoSpecs) nee-TPCs (zeBakala C) kumlambo iDuiwenhoks kwi- H8DUIW-EWR1

Ii-Metrics	Ii-EcoSpecs	Nee-TPCs
ii-ions zeetyuwa ezingezozendalo		
Sulphate as SO_4	N/A	N/A
Sodium as Na	i- 95th percentile yeenkcukacha mayibe ngu ≤ 380 mg/L.	i-95th percentile yeenkcukacha mayibe ngu 300 - 380 mg/L.
Magnesium as Mg	i- 95th percentile yeenkcukacha mayibe ngu ≤ 67 mg/L.	i- 95th percentile yeenkcukacha mayibe ngu 53.5 - 67 mg/L.
Calcium as Ca	i- 95th percentile yeenkcukacha mayibe ngu ≤ 55 mg/L.	i- 95th percentile yeenkcukacha mayibe ngu 44 - 55 mg/L.
Chloride as Cl	i-95th percentile yeenkcukacha mayibe ngu ≤ 800 mg/L.	i- 95th percentile yeenkcukacha mayibe ngu 640 - 800 mg/L.
Potassium as K	i- 95th percentile yeenkcukacha mayibe ngu ≤ 9 mg/L.	i- 95th percentile yeenkcukacha mayibe ngu 7 - 9 mg/L.
Ukwahluka kwendalo		
Ukutsala umbane (mS/m)	i- 95th percentile yeenkcukacha mayibe ngu ≤ 270 mS/m.	i- 95th percentile yeenkcukacha mayibe ngu 210 - 270 mS/m.
pH	i- 5th percentile yeenkcukacha mayibe ngu 6.5. – 8.0, ze i- 95th percentile ibe ngu 8.0 - 8.8.	i- 5th percentile yeenkcukacha mayibe ngu ≤ 6.3 ze i-95th percentile ibe ngu ≥ 8.6.
Ubushushu [(a)]	Ubushushu bendalo obuqhelekileyo.	Qalisa uhlolo olusisiseko loku kwahluka.
I-oksijini enyibilikisiweyo[(a)](DO)	i-5th percentile yeenkcukacha mayibe ngu ≥ 7.0 mg/L.	i- 5th percentile yeenkcukacha mayibe ngu 7.2 - 7.0 mg/L. Qalisa uhlolo olusisiseko loku kwahluka
Ubukho bodaka [(a)]	Inguqu ebonakalayo yodaka ibangelwa ziiinguqulelo ezingephi ezenziwa ngabantu (umzekelo, ukukhiwa kwegraveli kumphezulu womjelo). Kulindeleke ukuba kubekho iintlenge kwindawo yokuphilisana.	Qalisa uhlolo olusisiseko loku kwahluka.
Izondlo		
TIN	i-50th percentile yeenkcukacha mayibe ngu ≤ 0.25 mg/L.	i- 50th percentile yeenkcukacha mayibe ngu 0.2 - 0.25 mg/L.
PO_4-P	i- 50th percentile yeenkcukacha mayibe ngu ≤ 0.015 mg/L.	i-50th percentile yeenkcukacha mayibe ngu 0.012 - 0.015 mg/L.
Ukwahluka ngokwemvakalelo		
Chl-a phytoplankton	i-50th percentile yeenkcukacha mayibe ngu < 15 µg/L.	i- 50th percentile yeenkcukacha mayibe ngu 12 - 15 µg/L.
Chl-a periphyton	i-50th percentile yeenkcukacha mayibe ngu ≤ 12 mg/m^2.	i- 50th percentile yeenkcukacha mayibe ngu 10 - 12 mg/m^2.
lityhefu		
Fluoride	i-50th percentile yeenkcukacha mayibe ngu ≤ 1.5 mg/L.	i- 50th percentile yeenkcukacha mayibe ngu 1.2 - 1.5 mg/L.
Ammonia (NH_3-N)	i-50th percentile yeenkcukacha mayibe ngu ≤ 0.015 mg/L.	i-50th percentile yeenkcukacha mayibe ngu 0.012 - 0.015 mg/L.
Ezinye iityhefu	i- 95th percentile yeenkcukacha mayibe phakathi kweqondo lekwaliti yamanzi eliqhelekileyo (iTarget Water Quality Range ngelasemzini (i-TWQR)njengoko kwaxelwayo nguDWAF (ngo1996) okanye ke kumda weBakala A njengoko kwaxelwayo nguDWAF (ngo2008).	Lilindelekile ifuthe ukuba i- 95th percentile yeenkcukacha ibetha ngaphaya kwe-TWQR eyaxelwayo nguDWAF (ngo1996) okanye ke kumda ophezulu weBakala A ngengoko kwaxelwayo nguDWAF (ngo2008).

(a) N/A- khange kubekho zinkcukacha kolu uvavanyo.

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UTafile 5.9: Amabakala e-PES novavanyo lwesikhundla lulonke kumlambo iGoukou kwi-H9GOUK-EWR2

UMLAMBO	Umlambo iGoukou	**WATER QUALITY MONITORING POINTS**	
I-WQRU		**RC**	Reference Condition (RC) was represented by the A Category benchmark tables in DWAF (2008), as no other data were available to describe natural state.
ISIKHUNDLA SE-EWR SITE	H9GOUK-EWR2	**PES**	DWS gauging weir H9H005Q01 (2007 – 2014; n = 63 - 71, F = 52).
UVAVANYO LOKUBA NAKHO	Inqanaba lokuba nakho: 3		

IZithako zeKwaliti yaManzi		**Ixabiso le-PES**	**IBakala/Amagqabantshintshi**
Ilityuwa ezingezozendalo (mg/L)	SO_4	N/A	N/A
	Na	650.4	Zibetha ngaphaya kwe ≤ 70 mg/L (TWQR) zinceda kwezolimo: kunkcenkceshelo.
	Mg	79.0	Asikho isikhokelo.
	Ca	57.1	Asikho isikhokelo.
	Cl	1081.3	Zibetha ngaphaya kwe ≤ 100 mg/L (TWQR) zinceda kwezolimo: kunkcenkceshelo.
	K	20.4	Asikho isikhokelo.
Izondlo (mg/L)	SRP	0.085	D
	TIN	0.055	A
Ukwahluka kwendalo	pH (5^{th} – 95^{th} %)	6.6 and 8.35	B
	Ubushushu (°C)	N/A	A/B. Ifuthe lilindeleke emanzini amancinci.
	i-oksijini enyibilikisiweyo	N/A	B. ifuthe lilindeleke emanzini amancinci.
	Ubukho bodaka (NTU)	N/A	A/B. Inguqu yodaka ibonakala ibangelwa ikakhulu yindalo.
	Ukutsala umbane (mS/m)	408.4	E/F
Ukwahluka ngokwemvakalelo	Chl a: phytoplankton	N/A	N/A
	Ubukhulu bezinto eziphilayo ezingenamathambo	51.2% Inqaku le-SASS =113 Inqaku le-ASPT = 6.6	D
	ii-Diatoms	14.4 and 11.0	C/D (n = 2; eyoMqungu neyeKhala ku2014)
	Inqaku lemigqeku yeentlanzi	47.4%	D
iityhefu	Ammonia (as N)	0.01	A
	Fluoride (as F)	0.59	A
LULONKE UHLELO LWESIKHUNDLA		***IBakala C/D***	

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UTafile 5.10: Imiqathango yendalo yekwaliti yamanzi (ii-EcoSpecs) nee-TPCs (zeBakala C/D) kumlambo iGoukou kwi- GOUK-EWR2

ii-Metrics	ii-EcoSpecs	ii-TPCs
Il-ions zeetyuwa ezingezozendalo		
Sulphate as SO_4	N/A	N/A
Sodium as Na	i-95th percentile yeenkcukacha iphakathi kwe ≤ 650 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 520 - 650 mg/L.
Magnesium as Mg	i- 95th percentile yeenkcukacha iphakathi kwe ≤ 80 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 64 - 80 mg/L.
Calcium as Ca	i-95th percentile yeenkcukacha iphakathi kwe ≤ 55 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 44 - 55 mg/L.
Chloride as Cl	i- 95th percentile yeenkcukacha iphakathi kwe ≤ 1 000 mg/L.	i-95th percentile yeenkcukacha iphakathi kwe 800 - 1 000 mg/L.
Potassium as K	i- 95th percentile yeenkcukacha iphakathi kwe ≤ 20 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 16 - 20 mg/L.
Ukwahluka kwendalo		
Ukutsala umbane (mS/m)	i- 95th percentile yeenkcukacha iphakathi kwe ≤ 400 mS/m.	i- 95th percentile yeenkcukacha iphakathi kwe 320 - 400 mS/m.
pH	i- 5th percentile yeenkcukacha mayibe ngu 6.5. – 8.0, ze i- 95th percentile ibe ngu8.0 - 8.8.	i- 5th percentile yeenkcukacha ngu ≤ 6.3 ze i-95th percentile ibe ngu ≥ 8.6.
Ubushushu [(a)]	Uluhlu lobushushu bendalo.	Qalisa uhlolo olusisiseko loku kwahluka.
I-oksijini enyibilikisiweyo[(a)]	i- 5th percentile yeenkcukacha iphakathi kwe ≥ 7.0 mg/L.	i-5th percentile yeenkcukacha iphakathi kwe 7.2 - 7.0 mg/L. Qalisa uhlolo olusisiseko loku kwahluka.
Ubukho bodaka[(a)]	Inguqu ebonakalayo yodaka ibangelwa ziiinguqulelo ezingephi ezenziwa ngabantu. Kulindeleke ukuba kubekho iintlenge kwindawo yokuphilisana	Qalisa uhlolo olusisiseko loku kwahluka.
Izondlo		
TIN-N	i-50th percentile yeenkcukacha iphakathi kwe ≤ 0.25 mg/L.	i- 50th percentile yeenkcukacha iphakathi kwe 0.2 - 0.25 mg/L.
PO_4-P	i- 50th percentile yeenkcukacha iphakathi kwe ≤ 0.125 mg/L.	i- 50th percentile yeenkcukacha iphakathi kwe 0.1 - 0.125 mg/L.
Ukwahluka ngokwemvakalelo[(a)]		
Chl-a phytoplankton	i-50th percentile yeenkcukacha iphakathi kwe < 15 µg/L.	i- 50th percentile yeenkcukacha iphakathi kwe 12 - 15 µg/L.
Chl-a periphyton	i- 50th percentile yeenkcukacha iphakathi kwe ≤ 21 mg/m^2.	i- 50th percentile yeenkcukacha iphakathi kwe 17 - 21 mg/m^2.
lityhefu		
Fluoride	i- 50th percentile yeenkcukacha iphakathi kwe ≤ 1.5 mg/L.	i-50th percentile yeenkcukacha iphakathi kwe 1.2 - 1.5 mg/L.
Ammonia (NH_3-N)	The 50th percentile yeenkcukacha iphakathi kwe ≤ 0.015 mg/L.	i- 50th percentile yeenkcukacha iphakathi kwe-0.012 - 0.015 mg/L.
Ezinye iityhefu	i- 95th percentile yeenkcukacha ikwi-TWQR eyaxelwayo nguDWAF (ngo1996) okanye ke kumda weBakala A owaxelwayo nguDWAF (ngo2008).	Likho ifuthe elilindelekileyo ukuba ngaba i-95th percentile yeenkcukacga ibetha ngaphaya kwe-TWQR njengoko kwaxelwayo nguDWAF (ngo1996) okanye ke kumda ophezulu weBakala A njengoko kwaxelwayo nguDWAF (ngo2008).

(a) N/A: Bezingekho iinkcukacha zolu vavanyo.

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UTafile 5.11: Amabakala e-PES novavanyo lwesikhundla lulonke kumlambo iTouws kwi - J1TOUW-EWR3

UMLAMBO	Umlambo iTouws	**IINDAWO ZOHLOLO LWEKWALITI YAMANZI**	
I-WQRU		**I-RC**	N/A
ISIKHUNDLA SE-EWR	J1TOUW-EWR3	**I-PES**	J1H018Q01 (Ikhowudi yoBugcisa boLawulo lwaManzi (i-WMS) ngu-102147), ume kumphezulu womjelo weSikhundla se- EWR. (iinkcukacha zibhaliswe ngo: 2000 – 2014; inani leesampulu (n) = ± 128).
Uvavanyo lokuba nakho	2.5		

iZithako zeKwaliti yaManzi		**Ixabiso le-PES**	**IBakala/Amagqabantshintshi**
Ilityuwa ezingezozendalo (mg/L)	SO_4	N/A	Zisetyenziswe zonke izikhokelo (zade zaphela) ngenxa yeqondo eliphezulu letyuwa emanzini kumhlaba okuloo mmandla. Kuthelekelelwa ukuba iqondo letyuwa emanzini liya konyuka ngenxa yamanzi abuya angene emjelweni emva konkcenkceshelo. Akukho maziko makhulu eedolophu akhoyo kulo mmandla.
	Na	2 016.9	
	Mg	370.1	
	Ca	258.2	
	Cl	3 494.6	
	K	37.06	
Izondlo (mg/L)	SRP	0.033	D
	TIN	0.079	A
Ukwahluka kwendalo	pH (5^{th} – 95^{th} %)	7.6 no-8.6	B
	Ubushushu (°C)	N/A	B. Ifuthe layo lilindeleke ukuba libe phantsi.
	I-oksijini enyibilikisiweyo	N/A	B. Ifuthe layo lilindelekile ukuba libe phantsi, nangona iinkcukacha zesikhundla zisabonisa amanqanaba aphezulu ayo nje.
	Ubukho bodaka (NTU)	N/A	B. Inguqu yodaka ikhangeleka ikakhulu iyeyendalo, noxa zikho nezo nguqulelo zincinci zibangelwa ngabantu.
	Ukutsala umbane (mS/m)	1181.8	
Ukwahluka kwemvakalelo	Chl a: phytoplankton	N/A	N/A
	Ubukhulu bezinto eziphilayo ezingenamathambo	74.0%	C
	iiDiatoms	8.6 (i-avareji)	D
	Inqaku lomgqeku weentlanzi	56.8%	D
iityhefu	Ammonia (as N)	0.034	A
	Fluoride (as F)	0.43	A
LULONKE UHLELO LWESIKHUNDLA		***IBakala B/C***	

Qaphela:
I-RC: Lulwazi olusezandleni sencutshe yekwaliti yamanzi olungeemeko zekwaliti yamanzi. Bekusakusetyenziswa ulwazi losetyenziso lomhlaba mandulo kuba zazingekho iinkcukacha ze-RC ngoko, futhi ke zona iitafile zolingiso zeBakala A ekwathethwa ngazo nguDWAF (ngo2008) zazisakucingelwa njengezingafanelekanga ngenxa yobukho betyuwa emanzini obabubangelwa luhlobo oluthile kuloo mmandla.

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UTafile 5.12: Imiqathango yendalo yekwaliti yamanzi (ii-EcoSpecs) nee-TPCs (zeBakala B/C) kumlambo lTouws kwi-J1TOUW-EWR3

ii-Metrics	ii-EcoSpecs	ii-TPCs
Ii-ion zeetyuwa ezingezozendalo		
Sulphate as SO_4	N/A	
Sodium as Na	i- 95th percentile yeenkcukacha iphakathi kwe ≤ 2000 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 1600 - 2000 mg/L.
Magnesium as Mg	i- 95th percentile yeenkcukacha iphakathi kwe ≤ 370 mg/L.	i-95th percentile yeenkcukacha iphakathi kwe 300 - 370 mg/L.
Calcium as Ca	i- 95th percentile yeenkcukacha iphakathi kwe ≤ 260 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 200 - 260 mg/L.
Chloride as Cl	i- 95th percentile yeenkcukacha iphakathi kwe ≤ 3500 mg/L.	i-95th percentile yeenkcukacha iphakathi kwe 2800 - 3500 mg/L.
Potassium as K	i- 95th percentile yeenkcukacha iphakathi kwe ≤ 37 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 30 - 37 mg/L.
Ukwahluka kwendalo		
Ukutsala umbane (mS/m)	i- 95th percentile yeenkcukacha iphakathi kwe ≤ 1100 mS/m.	i- 95th percentile yeenkcukacha iphakathi kwe 880 - 1100 mS/m.
pH	i- 5th percentile yeenkcukacha ngu 6.5 – 8.0, ze i-95th percentile ibe ngu8.0 - 8.8.	i- 5th percentile yyenkcukacha ngu ≤ 6.3 ze i-95th percentile ibe ngu ≥ 8.6.
Ubushushu	Uluhlu lobushushu bendalo.	Qalisa uhlolo olusisiseko loku kwahluka.
i-oksijini enyibilikisiweyo	i-5th percentile yeenkcukacha iphakathi kwe ≥ 7.0 mg/L.	i-5th percentile yeenkcukacha iphakathi kwe 7.2 - 7.0 mg/L. Qalisa uhlolo olusisiseko loku kwahluka.
Ubukho bodaka	Inguqu ebonakalayo yodaka ibangelwa ziiinguqulelo ezingephi ezenziwa ngabantu. Kulindeleke ukuba kubekho iintlenge	Qalisa uhlolo olusisiseko loku kwahluka.
Izondlo		
TIN-N	i-50th percentile yeenkcukacha iphakathi kwe ≤ 0.25 mg/L.	i-50th percentile yeenkcukacha iphakathi kwe 0.2 - 0.25 mg/L.
PO_4-P	i- 50th percentile yeenkcukacha iphakathi kwe ≤ 0.075 mg/L.	i- 50th percentile yeenkcukacha iphakathi kwe 0.06 - 0.075 mg/L.
Ukwahluka ngokwemvakalelo		
Chl-a phytoplankton	i- 50th percentile yeenkcukacha iphakathi kwe < 15 µg/L.	i-50th percentile yeenkcukacha iphakathi kwe 12 - 15 µg/L.
Chl-a periphyton	i-50th percentile yeenkcukacha iphakathi kwe ≤ 21 mg/m^2.	i- 50th percentile yeenkcukacha iphakathi kwe 17 - 21 mg/m^2.
Iityhefu		
Fluoride	i- 50th percentile yeenkcukacha iphakathi kwe ≤ 1.5 mg/L.	i- 50th percentile yeenkcukacha iphakathi kwe 1.2 - 1.5 mg/L.
Ammonia (NH_3-N)	i- 50th percentile yeenkcukacha iphakathi kwe ≤ 0.015 mg/L.	i- 50th percentile yeenkcukacha iphakathi kwe 0.012 - 0.015 mg/L.
Ezinye iityhefu	i- 95th percentile yeenkcukacha ikwi - TWQR ekuthethwa ngayo kuDWAF (1996) okanye kumda weBakala A Category ekuthethwa ngayo kuDWAF (2008).	Likho ifuthe elilindelekileyo ukuba ngaba i-95th percentile yeenkcukacga ibetha ngaphaya kwe-TWQR njengoko kwaxelwayo nguDWAF (ngo1996) okanye ke kumda ophezulu weBakala A njengoko kwaxelwayo nguDWAF (ngo2008).

(a) N/A: Azikhange zibekho iinkcukacha kolu hlolo.

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UTafile 5.13: Amabakala e-PES novavanyo lwesikhundla lulonke kumlambo iGamka J2GAMK-EWR4

UMLAMBO	Umlambo iGamka	**IINDAWO ZOHLOLO LWEKWALITI YAMANZI**	
I-WQRU		**I-RC**	Kusetyenziswe iitafile zolingiso zeBakala A ezisuka kuDWAF (2008).
ISIKHUNDLA SE-EWR	J2GAMK-EWR4	**I-PES**	Iinkcukacha zifunyenwe kwidonga elinqamlezileyo lokuthatha umlinganiselo lika DWS elingu-J2H016Q01 (ikhowudi ye-WMS engu102173), elime kumazantsi onxweme lwedama iGamkapoort, nakumphezulu womjelo wesikhundla seEWR site. (iinkcukacha ezibhalisiweyo: 2007 – 2014; n = 127).
Uuvavanyo lokuba nakho	3.0		

IZithako zeKwaliti yaManzi		**Ixabiso le-PES**	**Ibakala/Amagqabantshintshi**
Ilityuwa ezingezozendalo (mg/L)	SO_4	N/A	
	Na	114.0	Ibetha ngaphaya kwe-70mg/l (TWQR) isetyenziswa kwezolimo: kunkcenkceshelo
	Mg	20.5	Asikho isikhokelo
	Ca	57.6	Asikho isikhokelo
	Cl	155.5	Ibetha ngaphaya kwe-100mg/l (TWQR) isetyenziswa kwezolimo: kunkcenkceshelo
	K	7.9	Asikho isikhokelo
Izondlo (mg/L)	SRP	0.07	D
	TIN	0.523	B
Ukwahluka kwendalo	pH (5^{th} – 95^{th} %)	7.4 and 8.6	
	Ubushushu (°C)	N/A	Ifuthe lilindelekile njengoko isikhundla sikumazantsi omjelo wedama iGamkapoort (constructed in 1970)
	i-oksijini enyibilikisiweyo	N/A	
	Ubukho bodaka (NTU)	N/A	
	Ukutsala umbane (mS/m)	97.5	C. ubukho betyuwa bendalo bulindeleke ukuba bube ngaphezulu kwe- 30Ms/m elixabiso lolingiso leBakala A ekuthethwa ngalo kuDWAF (2008)
Ukwahluka ngokwemvakalelo	Chl a: phytoplankton	N/A	N/A
	Ubukhulu bezinto eziphilayo ezingenamathambo	61.4%	C/D
	iiDiatoms	9.9	D
	Inqaku lemigqeku yeentlanzi	60.4%	*C/D*
Ityhefu	Ammonia (as N)	0.015	A
	Fluoride (as F)	0.53	A
LULONKE UHLELO LWESIKHUNDLA		***IBakala B/C***	

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UTafile 5.14: Imiqathango yendalo yekwaliti yamanzi (ii-EcoSpecs) nee-TPCs (zeBakala B/C) kumlambo iGamka River kwi- J2GAMK-EWR4

iiMetrics	iiEcoSpecs: i-PES	i-TPCs: i-PES
Ii-ion zeetyuwa ezingezozendalo		
Sulphate as SO_4	N/A	N/A
Sodium as Na	i- 95th percentile yeenkcukacha iphakathi kwe ≤ 114 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 90 - 114 mg/L.
Magnesium as Mg	i- 95th percentile yeenkcukacha iphakathi kwe ≤ 20 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 16 - 20 mg/L.
Calcium as Ca	i- 95th percentile yeenkcukacha iphakathi kwe ≤ 58 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 47 - 58 mg/L.
Chloride as Cl	i- 95th percentile yeenkcukacha iphakathi kwe ≤ 155 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 124 - 155 mg/L.
Potassium as K	i-95th percentile yeenkcukacha iphakathi kwe ≤ 8 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 6.5 - 8.0 mg/L.
Ukwahluka kwendalo		
Ukutsala umbane (mS/m)	i-95th percentile yeenkcukacha ngu ≤ 100 mS/m.	i- 95th percentile yeenkcukacha iphakathi kwe 80 - 100 mS/m.
pH	i- 5th percentile yeenkcukacha ngu5.9 - 6.5, ze i- 95th percentile ibe ngu 8.0 - 8.8.	i- 5th percentile yeenkcukacha ngu ≤ 5.7 ze i- 95th percentile ibe ngu ≥ 8.6.
Ubushushu[(a)]	Ikho inguqu ephakathi eyenzekayo ngenxa yedama iGamkapoort kumphezulu womjelo.	Qalisa uhlolo olusisiseko loku kwahluka.
i-oksijini enyibilikisiweyo[(a)]	i- 5th percentile yeenkcukacha iphakathi kwe ≥ 7.0 mg/L. Nangona likho ifuthe elilindelekileyo ngenxa yedama iGamkapoort kumphezulu womjelo nje, ubukhulu bomlambo buya kunceda ekulithomalaliseni eli futhe.	i- 5th percentile of the data is between 7.2 - 7.0 mg/L. Qalisa uhlolo olusisiseko loku kwahluka
Ubukho bodaka[(a)]	Inguqu ebonakalayo yodaka ibangelwa ziiinguqulelo ezingephi ezenziwa ngabantu. Kulindeleke ukuba kubekho iintlenge	Qalisa uhlolo olusisiseko loku kwahluka.
Izondlo		
TIN-N	i-50th percentile yeenkcukacha iphakathi kwe≤ 0.7 mg/L.	i- 50th percentile yeenkcukacha iphakathi kwe 0.56 - 0.7 mg/L.
PO_4-P	i- 50th percentile yeenkcukacha iphakathi kwe ≤ 0.125 mg/L.	i- 50th percentile yeenkcukacha iphakathi kwe 0.1 - 0.125 mg/L.
Ukwahluka kwendalo		
Chl-a phytoplankton	i- 50th percentile yeenkcukacha iphakathi kwe < 15 µg/L.	i- 50th percentile yeenkcukacha iphakathi kwe 12 - 15 µg/L.
Chl-a periphyton	i- 50th percentile yeenkcukacha ngu ≤ 21 mg/m^2.	i- 50th percentile yeenkcukacha iphakathi kwe 17 - 21 mg/m^2.
Toxics		
Fluoride	i- 50th percentile yeenkcukacha iphakathi kwe ≤ 1.5 mg/L.	i- 50th percentile yeenkcukacha iphakathi kwe 1.2 - 1.5 mg/L.
Ammonia (NH_3-N)	i- 50th percentile yeenkcukacha iphakathi kwe ≤ 0.015 mg/L.	i-50th percentile yeenkcukacha iphakathi kwe 0.012 - 0.015 mg/L.
Ezinye iityhefu	i- 95th percentile yeenkcukacha ikwi - TWQR ekuthethwa ngayo kuDWAF (1996) okanye kumda weBakala A	Likho ifuthe elilindelekileyo ukuba ngaba i- 95th percentile yeenkcukacga ibetha ngaphaya kwe-TWQR njengoko kwaxelwayo nguDWAF (ngo1996) okanye ke kumda

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iiMetrics	iiEcoSpecs: i-PES	i-TPCs: i-PES
	Category ekuthethwa ngayo kuDWAF (2008).	ophezulu weBakala A njengoko kwaxelwayo nguDWAF (ngo2008).

(a) N/A: Khange zibekho iinkcukacha kolu hlolo.

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UTafile 5.15: Amabakala e-PES novavanyo lwesikhundla lulonke kumlambo iBuffels kwi-J1BUFF-EWR5

UMLAMBO	Umlambo iBuffels	**IINDAWO ZOHLOLO LWEKWALITI YAMANZI**	
I-WQRU		**I-RC**	Iinkcukacha zifunyenwe kudonga olunqamlezileyo lokuthatha umlinganiselo luka DWS olungu-J1H028Q01 (ikhowudi ye-WMS engu-102152), olumi kumazantsi onxweme lwedama i- Floriskraal, nakumphezulu womjelo wesikhundla se-EWR. Qaphela ukuba indawo yohlolo ayikho kwingingqi enye yeNqanaba II nesikhundla se- EWR; Kodwa ke, le ibiyindawo yeenkcukacha ephakathi kwedama nesikhundla eso. (Iinkcukacha ezibhalisiweyo: 1972 – 1977; n = 54, ukutsala: n = 33).
ISIKHUNDLA SE-EWR	J1BUFF-EWR5	**PES**	Iinkcukacha zifunyenwe kudonga olunqamlezileyo lokuthatha umlinganiselo likaDWS elingu-J1H028Q01 (ikhowudi yeWMS engu-102152) (Inkcukacha ezibhalisiweyoData record: 2010 – 2014; n = 44).
Uvavanyo lokuba nakho	Inqanaba lokuba nakho: 2.5		

IZithako zeKwaliti yaManzi		**Ixabiso le-PES**	**IBakala/Amagqabantshintshi**
Iityuwa ezingezozendalo (mg/L)	SO_4	61.42	Asikho isikhokelo
	Na	81.44	Zibetha ngaphaya kwe ≤ 70 mg/L (TWQR) zisetyenziswa kwezolimo: kunkcenkceshelo.
	Mg	25.2	Asikho isikhokelo
	Ca	48.68	Asikho isikhokelo.
	Cl	124.0	Zibetha ngaphaya kwe ≤ 100 mg/L (TWQR) zisetyenziswa kwezolimo: kunkcenkceshelo.
	K	6.11	Asikho isikhokelo.
Izondlo (mg/L)	SRP	0.015	B. Amanqana ancipha ukusukela kwii-1970s.
	TIN	0.26	A/B. Ayikho inguqu ukusukela kwii-1970s.
Ukwahluka kwendalo	pH (5^{th} – 95^{th} %)	7.5 no- 8.5	B. Ayikho inguqu ukusukela kwii-1970s.
	Ubushushu (°C)	N/A	Likho ifuthe elilindelekileyo njengoba isikhundla sikumazantsi omjelo wedama elikhulu i-Floriskraal (elokhiwa ngo-1965).
	i-oksijini enyibilikisiweyo	N/A	
	Ubukho bodaka (NTU)	N/A	
	Ukutsala umbane (mS/m)	78.1	Ayikho inguqu ukusukela kwii-1970s.
Ukwahluka ngokwemvakalelo	Chl a: phytoplankton	N/A	N/A
	Ubukhulu bezinto eziphilayo ezingenamathambo	72.0%	C
	iiDiatoms	11.2 (average)	C/D
	Inqaku lemigqeku yeentlazi	83.7%	B
Iityhefu	Ammonia (as N)	0.017	A
	Fluoride (as F)	0.66	A. Ayikho inguqu ukusukela kwii-1970s.
LULONKE UHLELO LWESIKHUNDLA		***IBakala B/C***	

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UTafile 5.16: Imiqathango yendalo yekwaliti yamanzi (ii-EcoSpecs) nee-TPCs (zeBakala B/C) kumlambo iBuffels River kwi- J1BUFF-EWR5

ii-Metrics	ii-EcoSpecs: PES	ii-TPCs: PES
Ii-ions zeetyuwa zendalo		
Sulphate as SO_4	i-95th percentile yeenkcukacha iphakathi kwe ≤ 60 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 48 - 60 mg/L.
Sodium as Na	i-95th percentile yeenkcukacha iphakathi kwe ≤ 80 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 64 - 80 mg/L.
Magnesium as Mg	i-95th percentile yeenkcukacha iphakathi kwe ≤ 25 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 20 - 25 mg/L.
Calcium as Ca	i- 95th percentile yeenkcukacha iphakathi kwe ≤ 50 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 40 - 50 mg/L.
Chloride as Cl	i- 95th percentile yeenkcukacha iphakathi kwe ≤ 125 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 100 – 125 mg/L.
Potassium as K	i- 95th percentile yeenkcukacha iphakathi kwe ≤ 6.0 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 4.8 - 6.0 mg/L.
Ukwahluka kwendalo		
Ukutsala umbane (mS/m)	i- 95th percentile yeenkcukacha iphakathi kwe ≤ 85 mS/m.	i- 95th percentile yeenkcukacha iphakathi kwe 68 - 85 mS/m.
i-pH	i- 5th percentile yeenkcukacha iphakathi kwe 5.9 - 6.5, ze i-95th percentile ibe phakathi kwe- 8.0 - 8.8.	i- 5th percentile yeenkcukacha ngu ≤ 5.7 ze i-95th percentile ibe ngu ≥ 8.6.
Ubushushu	Inguqu ephakathi yobushushu ilindelekile ngenxa yedama iFloriskraal kumphezulu womjelo.	Qalisa uhlolo olusisiseko loku kwahluka.
i-oksijini enyibilikisiweyo	i-5th percentile yeenkcukacha iphakathi kwe ≥ 7.0 mg/L. Nangona likhona nje ifuthe elilindelekileyo ngenxa yedama iFloriskraal kumphezulu womjelo, ubukhulu bomlambo buya kulithomalalisa eli futhe..	1- 5th percentile yeenkcukacha iphakathi kwe 7.2 - 7.0 mg/L. Qalisa uhlolo olusisiseko loku kwahluka.
Ubukho bodaka	Inguqu ebonakalayo yodaka ibangelwa ziiinguqulelo ezingephi ezenziwa ngabantu. Kulindeleke ukuba kubekho iintlenge	Qalisa uhlolo olusisiseko loku kwahluka.
Izondlo		
TIN-N	I-50th percentile yeenkcukacha iphakathi kwe ≤ 0.48 mg/L.	i-50th percentile yeenkcukacha iphakathi kwe 0.38 - 0.48 mg/L.
PO_4-P	i- 50th percentile yeenkcukacha iphakathi kwe ≤ 0.015 mg/L.	i-50th percentile yeenkcukacha iphakathi kwe 0.012 - 0.015 mg/L.
Ukwahluka ngokwemvakalelo		
Chl-a phytoplankton	i- 50th percentile yeenkcukacha iphakathi kwe < 10 µg/L.	i- 50th percentile yeenkcukacha iphakathi kwe 8 - 10 µg/L.
Chl-a periphyton	i- 50th percentile yeenkcukacha iphakathi kwe ≤ 12 mg/m^2.	i- 50th percentile yeenkcukacha iphakathi kwe 10 - 12 mg/m^2.
Iityhefu		
Fluoride	i-50th percentile yeenkcukacha iphakathi kwe ≤ 1.5 mg/L.	i-50th percentile yeenkcukacha iphakathi kwe 1.2 - 1.5 mg/L.
Ammonia (NH_3-N)	i-50th percentile yeenkcukacha iphakathi kwe ≤ 0.015 mg/L.	i- 50th percentile yeenkcukacha iphakathi kwe 0.012 - 0.015 mg/L.
Ezinye iityhefu	i- 95th percentile yeenkcukacha ikwi - TWQR ekuthethwa ngayo kuDWAF (1996) okanye kumda weBakala A	Likho ifuthe elilindelekileyo ukuba ngaba i-95th percentile yeenkcukacga ibetha ngaphaya kwe-TWQR njengoko kwaxelwayo

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ii-Metrics	ii-EcoSpecs: PES	ii-TPCs: PES
	Category ekuthethwa ngayo kuDWAF (2008).	nguDWAF (ngo1996) okanye ke kumda ophezulu weBakala A njengoko kwaxelwayo nguDWAF (ngo2008).

(a) N/A: Khange kubekho ziinkcukacha kolu hlolo.

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UTafile 5.17: Amabakala e-PES novavanyo lwesikhundla lulonke kumlambo iGouritz kwi-J4GOUR-EWR6

UMLAMBO	Umlambo iGouritz	**IINDAWO ZOHLOLO LWEKWALITI YAMANZI**	
I-WQRU		**I-RC**	Iinkcukacha zifunyenwe kudonga elinqamlezileyo lokuthatha umlinganiselo lukaDWS olungu-J4H002Q01 (ikhowudi ye-WMS engu-102201), elime kumjelo ophezulu wesikhundla se-EWR. (iinkcukacha ezibhalisiweyo: 1965 – 1967; n = 29)
ISIKHUNDLA SE-EWR	J4GOUR-EWR6	**i-PES**	Iinkcukacha zifunyenwe kudonga olunqamlezileyo lokuthatha umlinganiselo lukaDWS olungu-J4H002Q01 (iinkcukacha ezibhalisiweyo: 2010 – 2014; n = 85).
Uvavanyo lokuba nakho	Inqanaba lokuba nakho - 3		

IZithako zeKwaliti yaManzi		**Ixabiso le-PES**	**IBakala/Amagqabantshintshi**
Ilityuwa ezingezozendalo (mg/L)	SO_4	693.0	Asikho isikhokelo, kodwa ziya kwehla okuya lihamba ixesha.
	Na	964.0	Zibetha ngaphaya kwe- ≤ 70 mg/L (TWQR) zinceda kwezolimo: kunkcenkceshelo. Ziya ngokwenyuka okuya lihamba ixesha.
	Mg	127.0	Asikho isikhokelo.
	Ca	123.3	Asikho isikhokelo,
	Cl	1 289.3	Zibetha ngaphaya kwe ≤ 100 mg/L (TWQR) zinceda kwezolimo: kunkcenkceshelo.
	K	9.81	Azikho isikhokelo.
Izondlo (mg/L)	SRP	0.015	B/C
	TIN	0.05	A
Ukwahluka kwendalo	pH (5^{th} – 95^{th} %)	7.8 no- 8.65	B
	Ubushushu (°C)	N/A	Lincinci ifuthe elilindelekileyo
	i-oksijini enyibilikisiweyo	N/A	
	Ubukho bodaka (NTU)	N/A	
	Ukutsala umbane (mS/m)	542.5	Ayikho inguqu eyenzekileyo ukusukela kwii1970s.
Ukwahluka kwemvakalelo	Chl a: phytoplankton	N/A	N/A
	Ubukhulu bezinto eziphilayo ezingenamathambo	75.0%	C
	iiDiatoms	10.2 (i-avareji)	C/D
	Inqaku lemigqeku yeentlanzi	50.1%	D
Ilityhefu	Ammonia (as N)	0.015	A
	Fluoride (as F)	1.082	A. zonyuke ngokuthe xhaxhe ukusukela kwii1960s.
LULONKE UHLELO LWESIKHUNDLA		**IBakala B/C**	

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UTafile 5.18: Imiqathango yendalo yekwaliti yamanzi (ii-EcoSpecs) nee-TPCs (zeBakala B/C) kumlambo iGouritz kwi- J4GOUR-EWR6

ii-Metrics	ii-EcoSpecs	ii-TPCs
Ii-ions zeetyuwa ezingezizo zendalo		
Sulphate as SO_4	i-95th percentile yeenkcukacha iphakathi kwe- ≤ 690 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 550 - 690 mg/L.
Sodium as Na	i- 95th yeenkcukacha iphakathi kwe ≤ 960 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 770 - 960 mg/L.
Magnesium as Mg	i- 95th percentile yeenkcukacha iphakathi kwe ≤ 130 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 105 - 130 mg/L.
Calcium as Ca	i- 95th percentile yeenkcukacha iphakathi kwe ≤ 120 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 95 - 120 mg/L.
Chloride as Cl	i- 95th percentile yeenkcukacha iphakathi kwe ≤ 1300 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 1050 - 1300 mg/L.
Potassium as K	i-95th percentile yeenkcukacha iphakathi kwe ≤ 10 mg/L.	i-95th percentile yeenkcukacha iphakathi kwe 8 - 10 mg/L.
Ukwahluka kwendalo		
Ukutsala umbane (mS/m)	i- 95th percentile yeenkcukacha iphakathi kwe ≤ 550 mS/m.	i-95th percentile yeenkcukacha iphakathi kwe 450 - 550 mS/m.
I-pH	i-5th percentile yeenkcukacha iphakathi kwe 5.9 - 6.5, ze i- 95th ibe percentile 8.0 - 8.8.	i- 5th percentile yeenkcukacha nguis ≤ 5.7 ze i-95th percentile ibe ngu ≥ 8.6.
Ubushushu	Uluhlu lobushushu bendalo.	Qalisa uhlolo olusisiseko loku kwahluka
I-oksijini enyibilikisiweyo	i- 5th percentile yeenkcukacha iphakathi kwe ≥ 7.0 mg/L.	i- 5th percentile yeenkcukacha iphakathi kwe 7.2 - 7.0 mg/L. Qalisa uhlolo olusisiseko loku kwahluka.
Ubukho bodaka	Inguqu ebonakalayo yodaka ibangelwa ziiinguqulelo ezingephi ezenziwa ngabantu. Kulindeleke ukuba kubekho iintlenge	Qalisa uhlolo olusisiseko loku kwahluka
Izondlo		
TIN-N	i-50th percentile yeenkcukacha iphakathi kwe ≤ 0.25 mg/L.	i- 50th percentile yeenkcukacha iphakathi kwe 0.2 - 0.25 mg/L.
PO_4-P	i- 50th percentile yeenkcukacha iphakathi kwe ≤ 0.015 mg/L.	i- 50th percentile yeenkcukacha iphakathi kwe 0.012 - 0.015 mg/L.
Ukwahluka ngemvakalelo		
Chl-a phytoplankton	i-50th percentile yeenkcukacha iphakathi kwe < 10 µg/L.	i-50th percentile yeenkcukacha iphakathi kwe 8 - 10 µg/L.
Chl-a periphyton	i- 50th percentile yeenkcukacha iphakathi kwe ≤ 12 mg/m^2.	i-50th percentile yeenkcukacha iphakathi kwe 10 - 12 mg/m^2.
Iityhefu		
Fluoride	i-50th percentile yeenkcukacha iphakathi kwe ≤ 1.5 mg/L.	i- 50th percentile yeenkcukacha iphakathi kwe 1.2 - 1.5 mg/L.
Ammonia (NH_3-N)	i-50th percentile yeenkcukacha iphakathi kwe ≤ 0.015 mg/L.	i-50th percentile yeenkcukacha iphakathi kwe 0.012 - 0.015 mg/L.
Ezinye iityhefu	i- 95th percentile yeenkcukacha ikwi - TWQR ngokubhaliweyo kuDWAF (1996) okanye kumda weBakala A Category ekuthethwa ngayo kuDWAF (2008).	Likho ifuthe elilindelekileyo ukuba ngaba i-95th percentile yeenkcukacha ibetha ngaphaya kwe-TWQR ngokubhaliweyo kuDWAF (ngo1996) okanye ke kumda ophezulu weBakala A njengoko kwaxelwayo nguDWAF (ngo2008).

(a) N/A: Khange kubekho zinkcukacha zikhoyo kolu hlolo.

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UTafile 5.19: Amabakala e-PES novavanyo lwesikhundla lulonke kumlambo iKeurbooms kwi-K6KEUR-EWR8

UMLAMBO	Umlambo iKeurbooms River	**IINDAWO ZOHLOLO LWEKWALITI YAMANZI**	
I-WQRU		**RC**	Kusetyenziswe iitafile zolingiso zeBakala A ngokubhaliweyo nguDWAF (2008).
ISIKHUNDLA SE-EWR	K6KEUR-EWR8	**PES**	Iinkcukacha zifunyenwe kudonga olunqamlezileyo lokuthatha umlinganiselo luka DWS olungu-K6H001Q01 (ikhowudi ye-WMS engu-102295), olumi kude lee (kangange- 20 km) kumphezul womjelo wesikhundla se- EWR . (Iinkcukacha ezibhalisiweyo: 2007 – 2014; n = 121; Fluorine (F) = 107)
Uvavanyo lokuba nakho	Inqanaba lokuba nakho 3		

IZithako zeKwaliti yaManzi		**Ixabiso le-PES**	**IBakala/AmagComment**
Iityuwa ezingezozendalo (mg/L)	SO_4	27.90	Asikho isikhokelo.
	Na	70.24	Ngaphandle nje ko ≤ 70 mg/L (TWQR) zinceda kwezolimo: kunkcenkceshelo.
	Mg	11.25	Asikho isikhokelo.
	Ca	12.08	Asikho isikhokelo.
	Cl	129.02	zibetha ngaphaya kwe ≤ 100 mg/L (TWQR) zinceda kwezolimo: kunkcenkceshelo.
	K	2.76	Asikho isikhokelo.
Izondlo (mg/L)	SRP	0.012	B
	TIN	0.06	A
Ukwahluka kwendalo	pH (5^{th} – 95^{th} %)	6.6 no- 7.8	B
	Ubushushu (°C)	N/A	B. Iincinci ifuthe elilindelekileyo, nangona iinkcukacha zesikhundla zisabonisa amanqanaba aphezulu . B. Inguqu ebonakalayo yodaka ibangelwa ziiinguqulelo ezingephi ezenziwa ngabantu.
	I-oksijini enyibilikisiweyo	N/A	
	Ubukho bodaka (NTU)	N/A	
	Ukutsala umbane (mS/m)	54.6	B
Ukwahluka kwemvakalelo	Chl a: phytoplankton	N/A	
	Ubukhulu bezinto eziphilayo ezingenamathambo	64.0%	C
	iiDiatoms	9.9 (i-avareji)	C/D
	Inqaku lomgqeku weentlanzi	76.4%	C
Ityhefu	Ammonia (as N)	0.001	A
	Fluoride (as F)	0.26	A
LULONKE UHLELO LWESIKHUNDLA		***IBakala B***	

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UTafile 5.20: Imiqathango yendalo yekwaliti yamanzi (ii-EcoSpecs) nee-TPCs (zeBakala B) kumlambo iKeurbooms kwi- K6KEUR-EWR8

ii-Metrics	ii-Eco Specs	ii-TPCs
Ii-ion zeetyuwa ezingezozendalo		
Sulphate as SO_4	i-95th percentile yeenkcukacha iphakathi kwe ≤ 28 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 22 - 28 mg/L.
Sodium as Na	i-95th percentile yeenkcukacha iphakathi kwe ≤ 70 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 56 - 70 mg/L.
Magnesium as Mg	i-95th percentile yeenkcukacha iphakathi kwe ≤ 12 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 10 - 12 mg/L.
Calcium as Ca	i- 95th percentile yeenkcukacha iphakathi kwe ≤ 12 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 10 - 12 mg/L.
Chloride as Cl	i- 95th percentile yeenkcukacha iphakathi kwe ≤ 130 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 104 - 130 mg/L.
Potassium as K	i- 95th percentile yeenkcukacha iphakathi kwe ≤ 3 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 2.4 - 3.0 mg/L.
Ukwahluka kwendalo		
Ukutsala umbane (mS/m)	i-95th percentile yeenkcukacha iphakathi kwe ≤ 55 mS/m.	i- 95th percentile yeenkcukacha iphakathi kwe 45 - 55 mS/m.
I-pH	i-5th and 95th yeenkcukacha iphakathi kwe 6.5 - 8.0.	I- 5th ne- 95th yeenkcukacha ngu ≥ 6.3 no- ≤ 8.2.
Ubushushu	Natural temperature range.	Qalisa uhlolo olusisiseko loku kwahluka.
i-oksijini enyibilikisiweyo	i- 5th percentile yeenkcukacha iphakathi kwe ≥ 7.0 mg/L.	i-5th percentile yeenkcukacha iphakathi kwe 7.2 - 7.0 mg/L. Qalisa uhlolo olusisiseko loku kwahluka.
Ubukho bodaka	Inguqu ebonakalayo yodaka ibangelwa ziiinguqulelo ezingephi ezenziwa ngabantu. Kulindeleke ukuba kubekho iintlenge.	Qalisa uhlolo olusisiseko loku kwahluka.
Izondlo		
TIN-N	i- 50th percentile yeenkcukacha iphakathi kwe ≤ 0.25 mg/L.	i-50th percentile yeenkcukacha iphakathi kwe 0.2 - 0.25 mg/L.
PO_4-P	i- 50th percentile yeenkcukacha iphakathi kwe ≤ 0.015 mg/L.	i- 50th percentile yeenkcukacha iphakathi kwe 0.012 - 0.0715 mg/L.
Ukwahluka kwemvakalelo		
Chl-a phytoplankton	i- 50th percentile yeenkcukacha iphakathi kwe < 10 µg/L.	i- 50th percentile yeenkcukacha iphakathi kwe 8 - 10 µg/L.
Chl-a periphyton	i- 50th percentile yeenkcukacha iphakathi kwe ≤ 12 mg/m^2.	i- 50th percentile yeenkcukacha iphakathi kwe 9.6 - 12.0 mg/m^2.
Iityhefu		
Fluoride	i- 50th percentile yeenkcukacha iphakathi kwe ≤ 1.5 mg/L.	i- 50th percentile yeenkcukacha iphakathi kwe 1.2 - 1.5 mg/L.
Ammonia (NH_3-N)	i- 50th percentile yeenkcukacha iphakathi kwe ≤ 0.015 mg/L.	I- 50th percentile yeenkcukacha iphakathi kwe 0.012 - 0.015 mg/L.
Ezinye iityhefu	i- 95th percentile yeenkcukacha ikwi - TWQR ngokubhaliweyo kuDWAF (1996) okanye kumda weBakala A Category ekuthethwa ngayo kuDWAF (2008).	Likho ifuthe elilindelekileyo ukuba ngaba i-95th percentile yeenkcukacha ibetha ngaphaya kwe-TWQR ngokubhaliweyo kuDWAF (ngo1996) okanye ke kumda ophezulu weBakala A njengoko kwaxelwayo nguDWAF (ngo2008).

(a) N/A: Khange kubekho zinkcukacha zikhoyo kolu vavanyo.

UTafile 5.21: Amabakala e-PES novavanyo lwesikhundla lulonke kumlambo i-Olifants kwi-J3OLIF-EWR9

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UMLAMBO	Umlambo i-Olifants	**IINDAWO ZOHLOLO LWEKWALITI YAMANZI**	
I-WQRU		**I-RC**	linkcukacha zolwazi malunga neemeko zekwaliti yamanzi nosetyenziso lomhlaba ebezisezandleni zenkcutshe yezekwaliti yamanzi ziye zafumaneka, futhi ke iitafile zolingiso zeBakala A ngokubhaliweyo kuDWAF (2008) ziye zabonwa zingafanelekanga zona.
ISIKHUNDLA SE-EWR	J3OLIF-EWR9	**I-PES**	linkcukacha zifumaneke kudonga olunqamlezileyo lokuthatha umlinganiselo lukaDWS olungu-J3H021Q01 (ikhowudi yeWMS ingu-102192) zaza zasetyenziswa kuvavanyo lwemeko yangoku kumazantsi womjelo wesikhundla seEWR nakumphezulu womjelo wedama iStompdrift. (iinkcukacha ezibhalisiweyo: 1982 – 1993; n = 127).
Uvavanyo lokuba nakho	**Iqondo lokuba nakho: 2.5**		

IZithako zeKwaliti yaManzi		**Ixabiso le-PES**	**IBakala/Amagqabantshintshi**
Iityuwa ezingezozendalo (mg/L)	SO_4	1 353.4	Asikho isikhokelo, kodwa ukujiya kwazo kuthande ukuba kwinqanaba eliphezulu
	Na	1 774.5	Zibetha ngaphaya kwe ≤ 70 mg/L (TWQR) zinceda kwezolimo: kunkcenkceshelo.
	Mg	336.0	Asikho isikhokelo
	Ca	284.4	Asikho isikhokelo
	Cl	3 113	Zibetha ngaphaya kwe ≤ 100 mg/L (TWQR) zinceda kwezolimo: kunkcenkceshelo.
	K	30.16	Asikho isikhokelo.
Izondlo (mg/L)	SRP	0.019	B/C
	TIN	0.11	A
Ukwahluka kwendalo	pH (5^{th} – 95^{th} %)	7.3 no-9.0	B/C, kodwa kuthelekelelwa ukuba kunxulumene nenkangeleko yamanzi angaphantsi komhlaba.
	Ubushushu (°C)	N/A	C. Lincinci ifuthe elilindelekileyo.
	i-oksijini enyibilikisiweyo	N/A	
	Ubukho bodaka (NTU)	N/A	B/C. Ifuthe lilindelekile ngenxa yemfuyo eninzi nokhukuliseko lomhlaba olwandileyo kulo mmandla..
	Ukutsala umbane (mS/m)	1 078.7	Iqondo lobukho beetyuwa emanzini ngokwendalo kulindeleke ukuba libe phezulu ngenxa yokwakheka komhlaba kulo mmandla.
Ukwahluka ngokwemvakalelo	Chl a: phytoplankton	N/A	N/A
	Ubukhulu bezinto eziphilayo ezingenamathambo	69.0%	C
	iiDiatoms	6.0 (i-avareji)	D/E
	Inqaku lemigqeku yeentlanzi	N/A	
Iityhefu	Ammonia (as N)	0.038	B
	Fluoride (as F)	0.678	A
LULONKE UHLELO LWESIKHUNDLA		***IBakala C***	

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(a) N/A: Khange kubekho zinkcukacha zikhoyo kolu vavanyo.

UTafile 5.22: Imiqathango yendalo yekwaliti yamanzi (ii-EcoSpecs) nee-TPCs (zeBakala C) kumlambo i-Olifants kwi-J3OLIF-EWR9

ii-Metrics	ii-Eco Specs	ii-TPCs
Ii-ions zeetyuwa ezingezozendalo		
Sulphate as SO_4	i- 95th percentile yeenkcukacha iphakathi kwe ≤ 1350 mg/L.	i-95th percentile yeenkcukacha iphakathi kwe 1080 - 1350 mg/L.
Sodium as Na	i- 95th percentile yeenkcukacha iphakathi kwe ≤ 1775 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 1420 - 1775 mg/L.
Magnesium as Mg	i- 95th percentile yeenkcukacha iphakathi kwe ≤ 335 mg/L.	i-95th percentile yeenkcukacha iphakathi kwe 270 - 335 mg/L.
Calcium as Ca	i- 95th percentile yeenkcukacha iphakathi kwe ≤ 285 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 230 - 285 mg/L.
Chloride as Cl	i- 95th percentile yeenkcukacha iphakathi kwe ≤ 3000 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 2400 - 3000 mg/L.
Potassium as K	i- 95th percentile yeenkcukacha iphakathi kwe ≤ 30 mg/L.	i- 95th percentile yeenkcukacha iphakathi kwe 24 - 30 mg/L.
Ukwahluka kwendalo		
Ukutsala umbane (mS/m)	The 95th percentile of the data is between ≤ 1100 mS/m.	i-95th percentile yeenkcukacha iphakathi kwe 880 - 1100 mS/m.
I-pH	i-5th percentile yeenkcukacha iphakathi kwe 5.9 - 6.5, ze i- 95th percentile ibe ngu 8.8 - 9.2.	i- 5th percentile yeenkcukacha ngu ≤ 5.7 ze i-95th percentile ibe ngu ≥ 9.0.
Ubushushu	Umphezulu we-Olifants uhamba ngaphantsi ubukhulu becala, kubekho namanzi abonakala kwiindawo ezithile. La asingomanzi angaphantsi komhlaba asuka kwii-akhwifa, kodwa ingamanzi asuka kumda we-vadose. Amaqondo obushushu awonyukileyo namanqanaba e- DO alindelekile kwezi meko. Kungoko ii-EcoSpecs nee-TPCs kunzima ukuzilungiselela oku kwahluka nje, endaweni yoko kumele zinxulunyaniswe nokuhlangabezana neemfuno neemvakalelo zebiotic ezinxulumene nohlolo.	Qalisa uhlolo olusisiseko
i-oksijini enyibilikisiweyo		Qalisa uhlolo olusisiseko loku kwahluka, apho lufuneka khona ukuba kunokwenzeka.
Ubukho bodaka	Inguqu ebonakalayo yodaka ibangelwa ziiinguqulelo ezingephi ezenziwa ngabantu. Kulindeleke ukuba kubekho iintlenge.	Qalisa uhlolo olusisiseko loku kwahluka.
Izondlo		
TIN-N	i-50th percentile yeenkcukacha iphakathi kwe ≤ 0.25 mg/L.	i- 50th percentile yeenkcukacha iphakathi kwe 0.2 - 0.25 mg/L.
PO_4-P	i- 50th percentile yeenkcukacha iphakathi kwe ≤ 0.025 mg/L.	i- 50th percentile yeenkcukacha iphakathi kwe 0.02 - 0.025 mg/L.
ukwahluka ngokwemvakalelo[(a)]		
Chl-a phytoplankton	i- 50th percentile yeenkcukacha iphakathi kwe < 15 µg/L.	i- 50th percentile yeenkcukacha iphakathi kwe 12 - 15 µg/L.
Chl-a periphyton	i-50th percentile yeenkcukacha iphakathi kwe ≤ 21 mg/m^2.	i- 50th percentile yeenkcukacha iphakathi kwe 17 - 21 mg/m^2.
lityhefu		
Fluoride	i- 50th percentile yeenkcukacha iphakathi kwe ≤ 1.5 mg/L.	i- 50th percentile yeenkcukacha iphakathi kwe 1.2 - 1.5 mg/L.

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ii-Metrics	ii-Eco Specs	ii-TPCs
Ammonia (NH_3-N)	i-50th percentile yeenkcukacha iphakathi kwe ≤ 0.044 mg/L.	i-50th percentile yeenkcukacha iphakathi kwe 0.035 - 0.044 mg/L.
Ezinye iityhefu	i- 95th percentile yeenkcukacha ikwi - TWQR ngokubhaliweyo kuDWAF (1996) okanye kumda weBakala A Category ekuthethwa ngayo kuDWAF (2008).	Likho ifuthe elilindelekileyo ukuba ngaba i-95th percentile yeenkcukacha ibetha ngaphaya kwe-TWQR ngokubhaliweyo kuDWAF (ngo1996) okanye ke kumda ophezulu weBakala A njengoko kwaxelwayo nguDWAF (ngo2008).

UTafile 5.23: Amabakala e-PES nohlolo lwesikhundla lulonke kumlambo iKammanassie kwi-J3KAMM-EWR10

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MLAMBO	Umlambo iKammanassie	**IINDAWO ZOHLOLO LWEKWALITI YAMANZI**	
I-WQRU		**RC**	Azikhange zibekho iinkcukacha zovavanyo lwekwaliti yamanzi. Usetyenziso lomhlaba nolwazi olufumanekayo, iinkcukacha ze-diatom, iinkcukacha zekwaliti yamanzi *kwisikhundla ngqo* neenkcukacha zophando – onke la mabakala asetyenzisiwe khonukuze inkcutshe yezekwaliti ikwazi ukunika iimbono zayo, iqambe nomzekelo we-PAI igqibe nangebakala elibumbeneyo lwekwaliti yamanzi kweso sikhundla siphatsi kophando. .
ISIKHUNDLA SE-EWR SITE	J3KAMM-EWR10	**PES**	N/A
Uvavanyo lokuba nakho	Inqanaba lokuba nakho: 2		

IZithako zeKwaliti yaManzi		**Ixabiso le-PES**	**IBakala/Amagqabantshintshi**
Ilityuwa ezingezozendalo (mg/L)	SO_4	N/A	N/A
	Na	N/A	N/A
	Mg	N/A	N/A
	Ca	N/A	N/A
	Cl	N/A	N/A
	K	N/A	N/A
Izondlo (mg/L)	SRP	N/A	N/A
	TIN	N/A	N/A
Ukwahluka kwendawo	pH (5^{th} – 95^{th} %)	N/A	N/A
	Ubushushu (°C)	N/A	N/A
	i-oksijini enyibilikisiweyo	N/A	N/A
	Ubukho bodaka (NTU)	N/A	N/A
	Ukutsala umbane (mS/m)	N/A	N/A
Ukwahluka ngokwemvakalelo	Chl a: phytoplankton	N/A	N/A
	Izinto eziphilayo ezingenamathambo	C/D	
	iiDiatoms	C/D	Ikwaliti yamanzi yendalo kwesi sikhundla ibiphakathi. Amanqanaba ezondlo, ongcoliso lwendalo nawobukho betyuwa emanzini anyukele phezulwana – apho amanqanaba obukho betyuwa emanzini edibene nawongcoliso lwendalo ethande ukuxaka. Inkqubela ebonakalayo ngekwaliti yamanzi eyenziwa bubukho be-diatom inganxulunyaniswa namaqondo aphezulu angenyanga yeKhala ku2014 wona abangela ukuba kube lula ukucocwa kokungcola, kuba imigqeku ye-diatom enxulunyaniswa namanqanaba aphezulu ayo ibixhaphake kakhulu
	Inqaku lemigqeku yeentlanzi	D	
Ilityhefu	Ammonia (as N)		
	Fluoride (as F)		
LULONKE UHLELO LWESIKHUNDLA		***IBakala C***	

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a) N/A: Khange kubekho nkcukacha kolu hlolo.
Qaphela ukuba azanelanga kuyaphi iinkcukacha zekwaliti yamanzi ngobugcisa bomlambo iKammanassie. Kungoko uvavanyo lwekwaliti yamanzi alo mlambo belungqiyame nje kuphela ngolwazi obelufumaneka neembono zenkcutshe yezekwaliti yamanzi.

UTafile 5.24: Amabakala e-PES novavanyo lwesikhundla lulonke kumlambo iGroot Brak kwi-WQSU 1 & 2. (iimbono zenkcutshe yezekwaliti yamanzi)

UMLAMBO	Umlambo iGroot Brak	**IINDAWO ZOHLOLO LWEKWALITI YAMANZI**	
I-WQSU	WQSU 1 + 2	**I-RC**	Iitafile zomda ezingagqibekanga ngomlambo weBakala “A”
ISIKHUNDLA SE-EWR	Asikho	**I-PES**	Umlambo iGroot Brak kwidama i-Ernest Robertson - K2H005-Q01 (1983 – 1996; n = 29)
Uvavanyo lokuba nakho	Inqanaba lokuba nakho lisezantsi kakhulu kuba linxulunyaniswa namanzi aphuphumela ngaphandle kwedama, hayi nenkcukacha zangoku.		
IZithako zeKwaliti yaManzi		**IXabiso**	**Ibakala/Amagqabantshintshi**
Iityuwa ezingezozendalo (mg/L)	$MgSO_4$		Azikho iinkcukacha
	Na_2SO_4		
	$MgCl_2$		
	$CaCl_2$		
	NaCl		
	$CaSO_4$		
Izondlo (mg/L)	SRP (mg/l)	0.042	Kusetyenziswe iinkcukacha ezingagqibekanga
	TIN (mg/l)	<0.25	Ibakala A
Ukwahluka kwendalo	pH (5^{th} – 95^{th} %)	4.62	Zine-asidi ngendalo
	Ubushushu		Azikho iinkcukacha
	I-oksijini enyibilikisiweyo		Kulindeleke kube kwinqanaba eliphezulu
	Ubukho bodaka (NTU)		Kulindeleke kube kwinqanaba eliphantsi
	Ukutsala umbane (mS/m)	<30	Ibakala A
Ukwahluka ngokwemvakalelo	Chl a: periphyton		Azikho iinkcukacha
	Chl a: phytoplankton		Azikho iinkcukacha
	Ubukhulu bezinto eziphilayo ezingenamathambo(ASPT)		Azikho iinkcukacha
	Inqaku lemigqeku yeentlanzi		Azikho iinkcukacha
Iityhefu			Azikho iinkcukacha – kulindeleke ukuba zibe mbalwa
LULONKE UHLELO LWESIKHUNDLA		**A/B** (ngokweembono zenkcutshe)	

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UTafile 5.25: Imiqathango yendalo yekwaliti yamanzi (ii-EcoSpecs) nee-TPCs (zeBakala A/B) kumlambo i-Groot Brak kwi-WQSU 1&2

UMLAMBO		Umlambo iGroot Brak	**IINDAWO ZOHLOLO LWEKWALITI YAMANZI**			
I-WQSU		WQSU 1&2	**DWAF WQ WMS**	Okwangoku akukabikho sitishi sohlolo		
ISIKHUNDLA SE-EWR		GB 1	**RHP**	Okwangoku akukabikho sikhundla sohlolo		
Ukukholelwa kuvavanyo lwe-PES		Kwiqondo eliphantsi kakhulu kuba lukhutshelwe ngaphandle kwe-WQSU 3				
IZithako zeKwaliti yaManzi		**IBakala le-PES**	**ii-Ecospecs ze-WQ**	**Ingaba inkqubela iyafuneka?**	**i-TPC**	**Ixesha elimiyo lohlolo**
Ilityuwa ezingezozendalo (mg/L)	$MgSO_4$	Azikho	≤23 mg/L	N/A	i-95th percentile ibe ngu < 23 mg/L	Ngenyanga
	Na_2SO_4		≤33 mg/L		i-95th percentile ibe ngu < 33 mg/L	
	$MgCl_2$		≤30 mg/L		i-95th percentile ibe ngu < 30 mg/L	
	$CaCl_2$		≤57 mg/L		i-95th percentile ibe ngu < 57 mg/L	
	NaCl		≤191 mg/L		i-95th percentile ibe ngu < 191 mg/L	
Izondlo (mg/L)	SRP	IBakala = C.	≤0.012 mg/L	Ewe ukuya ku- A	i-50th percentile ibe ngu e < 0.012 mg/L	Ngenyanga
	TIN	IBakala = A	≤0.25 mg/L	Hayi	i- percentile ibe ngu < 0.25 mg/L	Ngenyanga
Ukwahluka kwendalo	pH	Umlambo one-asidi ngendalo	< 7.9	Hayi	i-95th percentile ibe ngu < 7.9	Ngenyanga
	Ubushushu	Azikho iinkcukacha, kodwa kungekho nto ithi ikho ingxaki kulo mlambo..	Gcina uluhlu	N/A	Gcina uluhlu lwendalo	Ngenyanga
	I-oksijini enyibilikisiweyo		7 – 8 mg/L	N/A	i-5th percentile ibe ngu > 7 mg/L	Ngenyanga
	Ubukho bodaka (NTU)		Inguqu ephakathi	N/A	Moderate change allowed	Ngenyanga
	Ukutsala umbane (mS/m)	IBakala = A	≤30 mS/m	Hayi	i-95th percentile ibe ngu < 30 mS/m	Ngenyanga
Ukwahluka ngokwemvakalelo	Chl a: periphyton	Azikho iinkcukacha. Uhlolo ngokubona Kwindla & Silimela. Alukho uphawu olubonakalayo lwe- algae.	≤12 mg/m^2 (B category)	N/A	i-50th percentile ibe ngu < 12 mg/ m^2	Ngekota
	Chl a: phytoplankton		≤ 15 µg/L (iBakala B)		i-50th percentile ibe ngu < 15 µg/L	
	Ubukhulu bezinto eziphilayo ezingenamathambo	A (esi sifundo)	Bona ii-Ecospecs zeentlanzi nezezinto eziphilayo ezingenamathambo, ngokulandelelanayo			
	Inqaku lemigqeku yeentlanzi	C (esi sifundo)				
	Ukutyhefeka komphakathi womjelo	Azikho iinkcukacha	Vavanya kuphela xa neziphumo zohlolo lwendalo zibonisa ukuba ikho ingxaki futhi isizathu sayo asaziwa.			
iityhefu		Azikho iinkcukacha. Kungenzeka ukuba zikho izibulala zinambuzane				

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UTafile 5.26: Amabakala e-PES nohlolo lwesikhundla lulonke kumlambo iGroot Brak kwi- WQSU 3

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UMLAMBO	Umlambo iGroot Brak	**1.1.1 IINDAWO ZOHLOLO LWEKWALITI YAMANZI**	
I-WQSU	WQSU 3	**RC**	Moordkuil R. at Banff - K1H005 (1979 – 1982 n = 91)
ISIKHUNDLA SE-EWR	GB 1	**PES**	K1H005 (2002 – 2006 n = 51)
Uvavanyo lokuba nakho	Phakathi. Qaphela: Kuba ukhutshelwe ngaphandle kwenye iindawo yoboniselo ngamanzi. Iinkcukacha zendalo ziyayixhasa ikwaliti yamanzi ethengiswayo.		

IZithako zeKwaliti yaManzi		**Ixabiso le-RC**	**Ixabiso le-PES**	**IBakala/Amagqabantshintshi**
Ityuwa ezingezozendalo (mg/L)	$MgSO_4$			Azikho iinkcukacha
	Na_2SO_4			
	$MgCl_2$			
	$CaCl_2$			
	NaCl			
	$CaSO_4$			
Izondlo (mg/L)	SRP	0.006*	0.029	IBakala = C. kukho ukwenyuka okuthile ngokwesimbo
	TIN	0.04	0.06	IBakala = A. Isimbo sisesihle
Ukwahluka kwendalo	pH (5^{th} – 95^{th} %)	Ayibalwanga	6.6 – 7.9	
	Ubushushu			Azikho iinkcukacha, kodwa ke oku akuthethi kuthi oku kukwahluka okunengxaki, kuba akubangelwa ngamazantsi omjelo wedama.
	i-oksijini enyibilikisiweyo			
	Ubukho bodaka (NTU)			Bekubonakala ubukho bentwana yodaka emanzini kutyelelo lwangeyoKwindla nolwangeyeSilimela ku2007 (kodwa ke emva kweemvula ezinkulu).
	Ukutsala umbane (mS/m)	40	30	Isimbo sihle kancinci
Ukwahluka ngokwemvakalelo	Chl a: periphyton			Bekubonakala ubukho bentwana yodaka emanzini kutyelelo lwangeyoKwindla nolwangeyeSilimela. Azikho iimpawu ze-algae ezibonakalayo
	Chl a: phytoplankton			
	Ubukhulu bezinto eziphilayo ezingenamathambo (ASPT)	-	A	ngokwendalo; ASPT = 8.0; SASS = 192 (olu phando)
	Inqaku lemigqeku yeentlanzi	-	C	Olu phando

Ilityhefu				Azikho iinkcukacha. Kungenzeka ukuba zibekho izibulala zinambuzane eizuka kwezolimo.
LULONKE UHLOLO LWESIKHUNDLA		**B** (ngokomzekeliso we- PA)		

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UTafile 5.27: Imiqathango yendalo yekwaliti yamanzi (ii-EcoSpecs) nee-TPCs (zeBakala B) kumlambo i-Groot Brak - WQSU 3

UMLAMBO		Umlambo iGroot Brak	**IINDAWO ZOHLOLO LWEKWALITI**			
I-WQSU		3	**DWAF WQ WMS**	Okwangoku asikabikho isitishi sohlolo		
ISIKHUNDLA SE-EWR SITE		GB 1	**RHP**	Okwangoku asikabikho isikhundla sohlolo		
Ukukholelwa uhlolo lwe-PES		Phantsi – phakathi, kuba ukhutshelwe ngaphandle komlambo iMoordkuil. Iinkcukacha zendalo zixhasa i-PES ethengisiweyo yekwaliti yamanzi.				
IZithako zeKwaliti yaManzi		**Ibakala -PES**	**Ii-Ecospecs ze-WQ**	**Ingaba ikho inkqubela efunekayo?**	**I-TPC**	**Ixesha elimiyo lohlolo**
Ilityuwa ezingezozendalo (mg/L)	$MgSO_4$	Azikho	≤23 mg/L	N/A	i-95th percentile ibe ngu < 23 mg/L	Ngenyanga
	Na_2SO_4		≤33 mg/L		i-95th percentile ibe ngu < 33 mg/L	
	$MgCl_2$		≤30 mg/L		i-95th percentile ibe ngu < 30 mg/L	
	$CaCl_2$		≤57 mg/L		i-95th percentile ibe ngu < 57 mg/L	
	NaCl		≤191 mg/L		i-95th percentile ibe ngu < 191 mg/L	
Izondlo (mg/L)	SRP	Ibakala = C.	≤0.02 mg/L	Yes to B	i-50th percentile ibe ngu < 0.02 mg/L	Ngenyanga
	TIN	Ibakala = A	≤0.25 mg/L	No	i-50th percentile ibe ngu < 0.25 mg/L	Ngenyanga
Ukwahluka kwendalo	pH	Umlambo one-asidi ngendalo	< 7.9	No	i-95th percentile ibe ngu < 7.9	Ngenyanga
	Ubushushu	Azikho iinkcukacha, kodwa singenakuthi ikho ingxaki kulo mlambo.	Gcina uluhlu	N/A	Gcina uluhlu lwendalo	Ngenyanga
	i-oksijini enyibilikisiweyo		7 – 8 mg/L	N/A	i-5th percentile ibe ngu > 7 mg/L	Ngenyanga
	Ubukho bodaka (NTU)		Inguqu iphakathi	N/A	Inguqu ephakathi ivumelekile	Ngenyanga
	Ukutsala umbane (mS/m)	IBakala = A	≤30 mS/m	No	i-95th percentile ibe ngu < 30 mS/m	Ngenyanga
Ukwahluka ngokwemvakalelo	Chl a: periphyton	Azikho iinkcukacha. Uhlolo lolwangeyokwindla neyeSilimela. Akukho zimpawu zibonakalayo ze-algae.	≤12 mg/m² (IBakala B)	N/A	i-50th percentile ibe ngu < 12 mg/ m²	Ngekota
	Chl a: phytoplankton		≤ 15 µg/L (IBakala B)		i-50th percentile to be < 15 µg/L	
	Ubukhulu bezinto eziphilayo ezingenamathambo (ASPT)	A (olu phando)	Bona ii-Ecospecs zeentlanzi nezinto eziphilayo ezingenamathambo ngokulandelelanayo			
	Inqaku lemigqeku yeentlanzi	C (olu phando)				

	Ukutyhefeka komphakathi womjelo	Azikho iinkcukacha	Vavanya kuphela xa iziphumo zohlolo lwendalo zibonisa ukuba ikho ingxaki eqatseleyo futhi isizathu singaziwa.
iityhefu		Azikho iikcukacha. Kungenzeka ukuba zikho ezo zibulala zinambuzane zithile	

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UTafile 5.28: amabakala e-PES nohlolo lwesikhundla lulonke kumlambo iGroot Brak kwi-WQSU 4 (*ixabiso lomda liphuculwe) (iimbono zencutshe)

UMLAMBO	Umlambo iGroot Brak		**IINDAWO ZOHLOLO LWEKWALITI YAMANZI**		
I-WQSU	4		**I-RC**	Umlambo iGroot Brak. kwiWolwedans - K2H002-Q01 (1976 – 1978; n = 68)	
ISIKHUNDLA SE-EWR	Asikho		**I-PES**	K2H002 (2002 – 2006; n = 57)	
Uvavanyo lokuba nakho	**Kuhle kakhulu. Isitishi sohlolo simi e-WQSU, kumphezulu wentsukaphi yendawo. Iinkcukacha zifunyenwe > kwiminyaka eli-15 phambi kokwakhiwa kwedama.**				
IZithako zeKwaliti yaManzi		**Ixabiso le-RC**	**Ixabiso le-PES**	**Inqanaba/Amagqabantshintshi**	
Iityuwa ezingezozendalo (mg/L)	$MgSO_4$			Azikho iinkcukacha	
	Na_2SO_4				
	$MgCl_2$				
	$CaCl_2$				
	NaCl				
	$CaSO_4$				
Izondlo (mg/L)	SRP	0.016*	0.037	IBakala = C. isimbo siyanda	
	TIN	0.04	0.075	IBakala = A. isimbo siyanda	
ssUkwakheka kwendalo	pH (5^{th} – 95^{th} %)		6.8 – 8.1	Kuxhomekeke kwisitishi sohlolo esimi ku-WQSU, ngaphezulu kwentsukaphi yendawo.	
	Ubushushu		Azikho iinkcukacha	Inokubakho ingxaki xa ucinga ngamazantsi omjelo wedama. Ifuna uhlolo	
	i-oksijini enyibilikisiweyo		Azikho iinkcukacha		
	Ubukho bodaka (NTU)		Azikho iinkcukacha		
	Ukutsala umbane (mS/m)	30	52	IBakala = B. isimbo siyanda	
Ukwakheka ngokwemvakalelo	Chl a: periphyton			Azikho iinkcukacha	
	Chl a: phytoplankton			Azikho iinkcukacha	
	Ubukhulu bezinto eziphilayo ezingenamathambo (ASPT)			Azikho iinkcukacha	
	Inqaku lemigqeku yeentlanzi			Azikho iinkcukacha	
Iityhefu				Azikho iinkcukacha	
LOLUNKE UHLELO LWESIKHUNDLA		**B/C** (Iimbono zencutshe)			

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UTafile 5.29: Imiqathango yendalo yekwaliti yamanzi (ii-EcoSpecs) nee-TPCs (zeBakala B/C) kumlambo i-Groot Brak kwi- WQSU 4

UMLAMBO		Umlambo i-Groot Brak	**IINDAWO ZOHLOLO LWEKWALITI YAMANZI**			
I-WQSU		4	**DWAF WQ WMS**	Okwangoku, asikabikho isitishi sohlolo		
ISIKHUNDLA SE-EWR		GB 1	**RHP**	Okwangoku, asikabikho isitishi sohlolo		
Ukukholelwa kuvavanyo lwe-PES		Iphantsi kakhulu, kuba ikhutshelwe ngaphandle kwe-WQSU 3.				
IZithako zeKwaliti yaManzi		**IBakala le-PES**	**Ecospecs ze-WQ**	**Ingaba ikho inkqubela efunekayo?**	**I-TPC**	**Ixesha elimiyo lohlolo**
Ilityuwa ezingezozendalo (mg/L)	$MgSO_4$	Azikho	≤23 mg/L	N/A	i-95th percentile ibe ngu < 23 mg/L	Ngenyanga
	Na_2SO_4		≤33 mg/L		i-95th percentile ibe ngu < 33 mg/L	
	$MgCl_2$		≤30 mg/L		i-95th percentile ibe ngu < 30 mg/L	
	$CaCl_2$		≤57 mg/L		i-95th percentile ibe ngu < 57 mg/L	
	NaCl		≤191 mg/L		i-95th percentile ibe ngu < 191 mg/L	
Izondlo (mg/L)	SRP	IBakala = C.	≤0.025 mg/L	Ewe ukuya ku-B/C	i-50th percentile ibe ngu < 0.025 mg/L	Ngenyanga
	TIN	IBakala = A	≤0.25 mg/L	No	i-50th percentile ibe ngu < 0.25 mg/L	Ngenyanga
Ukwahluka kwendalo	pH	Umlambo one-asidi ngendalo	< 7.9	No	i-95th percentile ibe ngu < 7.9	Ngenyanga
	Ubushushu	Azikho iinkcukacha, kodwa asingetsho ukuba ikho ingxaki kulo mlambo.	Gcina uluhlu	N/A	Gcina uluhlu lwendalo	Ngenyanga
	I-oksijini enyibilikisiweyo		7 – 8 mg/L	N/A	i-5th percentile ibe ngu > 7 mg/L	Ngenyanga
	Ubukho bodaka (NTU)		Inguqu ephakathi	N/A	Inguqu ephakathi ivumelekile	Ngenyanga
	Ukutsala umbane (mS/m)	IBakala = A	≤30 mS/m	No	i-95th percentile ibe ngu < 30 mS/m	Ngenyanga
Ukwahluka ngemvakalelo	Chl a: periphyton	Azikho iinkcukacha. Uhlolo lolwangeyoKwindla nolwangeyeSilimela. Akukho zimpawu zibonakalayo ze-algae.	≤12 mg/m^2 (IBakala B)	N/A	i-50th percentile ibe ngu < 12 mg/ m^2	Ngekota
	Chl a: phytoplankton		≤ 15 µg/L (IBakala B)		i-50th percentile ibe ngu < 15 µg/L	
	Izinto eziphilayo ezingenamathambo (ASPT)	A (olu phando)	Bona ii-Ecospecs zeentlanzi nezezinto eziphilayo ezingenamathambo ngokulandelelanayo			
	Inqaku lemigqeku yeentlanzi	C (olu phando)				

	Ukutyhefeka komphakathi womjelo	Azikho iinkcukacha	Vavanya kuphela xa iziphumo zohlolo lwendalo zibonisa ukuba ikho ingxaki eqatseleyo futhi isizathu singaziwa.
lityhefu		Azikho iinkcukacha. Kungenzeka ukuba zikho izibulala zinambuzane ezithile	

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UTafile 5.30: Imiqathango yendalo yekwaliti yamanzi (ii-EcoSpecs) nee-TPCs kumlambo i-Malgas kwi- WQSU2

UMLAMBO	Umlambo iMalgas	**IINDAWO ZOHLOLO LWEKWALITI YAMANZI**	
I-WQSU	WQSU 2	**RC**	Amaxabiso angagqibekiyo
ISIKHUNDLA SE-EWR SITE	Mal 1	**PES**	Malgas R. at Blanco - K3H004-Q01 ('01 – '06 n = 53)
Uhlolo lokuba nakho	Uyilungele xa iyonke i-WQSU. Uphantsi xa sithetha ngesikhundla se-EWR.		

IZithako zeKwaliti yaManzi		**Ixabiso le-RC**	**Ixabiso le-PES**	**IBakala/Amagqabantshintshi**	**G-power (ukuba nakho)**
Ilityuwa ezingezozendalo (mg/L)	$MgSO_4$				Azikho iinkcukacha
	Na_2SO_4				
	$MgCl_2$				
	$CaCl_2$				
	NaCl				
	$CaSO_4$				
Izondlo (mg/L)	SRP	≤0.005	0.038	IBakala = C. Isimbo siyanda.	0.116 (Phantsi)
	TIN	≤0.25	0.413	IBakala = A/B. Isimbo siyanda	
Ukwahluka kwendalo	pH (5^{th} + 95^{th} %ile)		4.3 + 7.2	Une-asidi ngendalo.	0.84 (Phezulu)
	Ubushushu	16.3 (50%ile)	-	Azikho iinkcukacha ze-PES. Akulindelekanga ngxaki kuba akukho dama phaya kumphezulu womjelo	
	I-oksijini enyibilikisiweyo				
	Ubukho bodaka (NTU)			Azikho iinkcukacha. Ingakho yona ingxaki ngenxa yekwari	
	Ukutsala umbane (mS/m)	<30	15	IBakala = A. Isimbo = senyuka kancinane	0.64 (Phakathi)
Ukwahluka ngokwemvakalelo	Chl a: periphyton			Azikho iinkcukacha	Azikho iinkcukacha (kodwa uhlolo olwenziweyo kwisikhundla se-EWR lubonisa ingxaki).
	Chl a: phytoplankton			Azikho iinkcukacha	
	Ubukhulu bezinto eziphilayo ezingenamathambo			**IBakala A** ; ASPT = 8.2, SASS = 164 (olu phando)	
	Inqaku lemigqeku yeentlanzi			**C/D** (olu phando)	
Ilityhefu				Azikho iinkcukacha. Kungenzeka kubekho ukutyhefeka ngenxa yemisebenzi yekwari/yesamente/ ye-asphalt, nangenxa yamanzi asuka ezindlwini nalawo asuka kwimisebenzi yezolimo	
ULULONKE UHLELO LWESIKHUNDLA		**IBakala B** (xa sisebenzisa umzekelo we-PAI)			

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UTafile 5.31: Amabakala e-PES novavanyo lwesikhundla lulonke kumlambo i-Maalgate

UMLAMBO	Umlambo i-Moeras/i-Maalgate	**IINDAWO ZOHLOLO LWEKWALITI YAMANZI**	
I-WQSU	N/A	RC	Iitafile zomda ezingagqibekiyo ngomlambo webakala A
ISIKHUNDLA SE-EWR	Moe 1 & Maa 2	PES	Umlambo iMaalgate . @ Noetze Kamma K3H003 ('02 – '06; n = 52)
Uvavanyo lokuba nakho	Kuhle.		

IZithako zeKwaliti yaManzi		**Ixabiso**	**IBakala/Amagqabantshintshi**
Izondlo (mg/L)	SRP	0.019	IBakala = B (TP = 0.015 mg/L)
	TIN	0.1	IBakala = A
Ukwahluka kwendalo	pH (5th – 95th %)	5.7 – 7.7	Une-asidi ngendalo
	Ubushushu		Azikho iinkcukacha. Usenokuchaphazeleka (ngakumbi xa kutsalwa amanzi)
	I-oksijini enyibilikisiweyo		Azikho. Usenokuchaphazeleka (ngakumbi xa amanzi etsalwa ngokugqithisileyo)
	Ubukho bodaka (NTU)		Azikho iinkcukacha. Utyelelo kwesi sikhundla lubonisile ukuba umlambo awunyuswanga.
	Ukutsala umbane (mS/m)	63	IBakala = C
Ukwahluka ngemvakalelo	Chl a: periphyton		Azikho iinkcukacha. Utyelelo lwesikhundla lubonise i-periphyton ekumaqondo aphezulu
	Chl a: phytoplankton		Azikho iinkcukacha
	Ubukhulu bezinto eziphilayo ezingenamathambo (ASPT)		D (uphando lwangoku) Kuhle (RHP)
	Inqaku lemigqeku yeentlanzi		D (uphando lwangoku)
Ityhefu			Azikho iinkcukacha – kulindeleke ukuba kubekho izibulala zinambuzane ezisuka kwezolimo
LULONKE UHLELO LWESIKHUNDLA		**Ibakala C (ngeokweembono zencutshe)**	

Amaxabiso emida		
Isiqinisekisi	**Ixabiso lomda osezantsi**	**Ixabiso lomda ophezulu**
TIN (mg/L) – 50th %ile		2.0
PHYTOPLANKTON Chl a (µg/L) – 50th %ile	15	20
SRP or PO4 (mg/L) – 50th %ile		0.058
PERIPHYTON Chl a (mg/m^2) – 50th %ile	12	21
pH – 5th %ile and 95th %ile	i-5th percentile: 5.00 – 5.23	
UBUSHUSHU (°C) – 10 th %ile and 90 th %ile	Lwahluka hayi ngaphezulu kwe- 2°C kuluhlu lwendalo	
I-oksijini enyibilikisiweyo (mg/L) - 5th %ile	6	
ISALATHISI SENDALO (ASPT)	5.67	

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UTafile 5.32: Amabakala e-PES nohlolo lwesikhundla lulonke kumlambo i-Gwaing (i-Malgas/i-Keur) kwi-WQSU1

UMLAMBO	Umlambo i-Malgas (iKeur)	**IINDAWO ZOHLOLO LWEKWALITI YAMANZI**	
I-WQSU	WQSU 1	**RC**	Umlambo iRooi @ George K3H002-Q01 ('77 – '79 n = 84)
ISIKHUNDLA SE-EWR	Asikho	**PES**	K3H002-Q01 ('01 – '06 n = 65)
Uhlolo lokuba nakho	Phantsi. Qaphela: akhutshelwe ngaphandle kwendawo yoboniselo ngamanzi ekufuphi		

IZithako zeKwaliti yaManzi		**Ixabiso le-RC**	**Ixabiso le-PES**	**Amabakala/Amagqabantshintshi**
Ilityuwa ezingezozendalo (mg/L)	$MgSO_4$			Azikho
	Na_2SO_4			
	$MgCl_2$			
	$CaCl_2$			
	NaCl			
	$CaSO_4$			
Izondlo (mg/L)	SRP	0.014	≤0.014*	IBakala = A
	TIN	0.04	≤0.25*	IBakala = A
Ukwahluka kwendalo	pH (5^{th} – 95^{th} %)		3.7 – 6.7	Une-asidi ngendalo
	Temperature			Azikho iinkcukacha kodwa kulindeleke ukuba uhlale unjengoko udaliwe kuba uphuhliso olukumphezulu womjelo alukho kangako.
	i-oksijini enyibilikisiweyo			
	Ubukho bodaka (NTU)			
	Ukutsala umbane (mS/m)	16	17	IBakala = A
Ukwahluka ngokwemvakalelo	Chl a: periphyton			Azikho iinkcukacha
	Chl a: phytoplankton			
	Ubukhulu bezinto eziphilayo ezingenamathambo			Kuhle (RHP)
	Inqaku lemigqeku yeentlanzi			kwendalo (RHP)
Ilityhefu				Azikho iinkcukacha
LULONKE UHLELO LWESIKHUNDLA		**IBakala A** (ngokweembono zencutshe)		

Amaxabiso emida		
Isiqinisekisi	**Ixabiso lomda osezantsi**	**Ixabiso lomda ophezulu**
TIN (mg/L) – 50^{th} %ile		≤ 0.25
PHYTOPLANKTON Chl a (µg/L) – 50^{th} %ile		<10
SRP or PO4 (mg/L) – 50^{th} %ile		≤ 0.005
PERIPHYTON Chl a (mg/m^2) – 50^{th} %ile		< 1.7
pH – 5^{th} %ile and 95^{th} %ile	6.5 – 8.00	
UBUSHUSHU (°C) – 10^{th} %ile and 90^{th} %ile	Uluhlu lobushushu lwendalo	
I-oksijini enyibilikisiweyo (mg/L) - 5^{th} %ile	>8	
ISALATHISI SENDALO (ASPT)	7	

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UTafile 5.33: Amabakala e-PES novavanyo lwesikhundla lulonke kumlambo i- Gwaing (i-Malgas) kwi-WQSU2

UMLAMBO	Umlambo iMalgas	**IINDAWO ZOHLOLO LWEKWALITI YAMANZI**	
I-WQSU	WQSU 2	**I-RC**	Amaxabiso okungagqibeki
ISIKHUNDLA SE-EWR	Mal 1	**I-PES**	Umlambo iMalgas . @ Blanco - K3H004-Q01 ('01 – '06 n = 53)
Uvavanyo lokuba nakho	Kuhle ngayo iyonke i- WQSU. Phantsi ngesikhundla se-EWR.		

IZithako zeKwaliti yaManzi		**IXabiso le-RC**	**Ixabiso le-PES Value**	**IBakala/Amagqabantshintshi**	**G-power (Ukuba nakho)**
Ityuwa ezingezozendalo (mg/L)	$MgSO_4$				Azikho iinkcukacha
	Na_2SO_4				
	$MgCl_2$				
	$CaCl_2$				
	NaCl				
	$CaSO_4$				
Izondlo (mg/L)	SRP	≤0.005	0.038	IBakala = C. isimbo siyanda	0.116 (Phantsi)
	TIN	≤0.25	0.413	IBakala = A/B. Isimbo siyanda	
Ukwahluka kwendalo	pH (5^{th} – 95^{th} %)		4.3 – 7.2	Une-asidi yendalo.	0.84 (Phezulu)
	Ubushushu	16.3 (50%ile)	-	Azikho iinkcukacha ze-PES. Akukho ngxaki ilindelekileyo kuba alikho idama kumphezulu womjelo	
	i-oksijini enyibilikisiweyo				
	Ubukho bodaka (NTU)			Azikho iinkcukacha. Ingakho ingxaki ngenxa yekwari	
	Ukutsala umbane (mS/m)	<30	15	IBakala = A.Isimbo sanda kancinci nje	0.64 (Phakathi)
Ukwahlula ngokwemvakalelo	Chl a: periphyton			Azikho iinkcukacha	Azikho iinkcukacha (kodwa uphando lubonisile ukuba ikho ingxaki kule ndawo).
	Chl a: phytoplankton			Azikho iinkcukacha	
	Ubukhulu bezinto eziphilayo ezingenamathambo			**IBakala A**; ASPT = 8.2, SASS = 164 (olu phando)	
	Inqaku lemigqeku yeentlanzi			**C/D** (olu phando)	
Ityhefu				Azikho iinkcukacha. Kungakho ukutyhefeka ngenxa yemisebenzi yekwari/yesamente/ye-asphalt, amanzi asuka emakhayeni nabuyela emlanjeni.	
LULONKE UHLELO LWESIKHUNDLA		**IBakala B** (ngokomzekelo we-PAI). **Iukhangeleka lunokubangcono kwisikhundla se-EWR uqobo.**			

Amaxabiso emida

Isiqinisekisi	**Ixabiso lomda osezantsi**	**Ixabiso lomda ophezulu**
TIN (mg/L) – 50^{th} %ile		0.75
PHYTOPLANKTON Chl a (µg/L) – 50^{th} %ile	5	10
SRP or PO4 (mg/L) – 50^{th} %ile		0.02

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PERIPHYTON Chl a (mg/m^2) – 50th %ile	1.7	12
pH – 5th %ile and 95th %ile	I-5th percentile: 6.00 – 6.24 I-95th percentile: 8.37 – 8.69	
UBUSHUSHU (°C) – 10 th %ile and 90 th %ile	Uluhlu lobushushu bendalo	
I-oksijini enyibilikisiweyo (mg/L) - 5th %ile	7	
ISALATHISI SENDALO (ASPT)	6.34	

UTafile 5.34: Amabakala e-PES novavanyo lwesikhundla lulonke kumlambo i- Gwaing kwi-WQSU3

UMLAMBO	Umlambo i-Gwaing	**IINDAWO ZOHLOLO LWEKWALITI YAMANZI**		
I-WQSU	WQSU 3	**I-RC**	Amaxabiso okungagqibeki	
ISIKHUNDLA SE-EWR	Asikho	**I-PES**	Asikho isitishi sohlolo sikaDWS	
Uvavanyo lokuba nakho	Une-RC ephantsi ngenxa yokusetyenziswa kwamaxabiso okungagqibeki. Une-PES ephakathi kuba kungekho sitishi sohlolo, kodwa ke uxhaswa ziinkcukacha zendalo neenkcukacha ezingephi ezongezelelweyo.			
IZithako zeKwaliti yaManzi		**Ixabiso le-RC**	**Ixabiso le-PES**	**IBakala /Amagqabantshintshi**
Ityuwa ezinezozendalo (mg/L)	$MgSO_4$			Azikho iinkcukacha
	Na_2SO_4			
	$MgCl_2$			
	$CaCl_2$			
	NaCl			
	$CaSO_4$			
Izondlo (mg/L)	SRP	≤0.005	1.4 mg/L	Ibakala = F
	TIN	≤0.25		IBakala = D
Ukwahluka kwendalo	pH (5th – 95th %)			
	Ubushushu			Azikho iinkcukacha. Kungenzeka ibekho ingxaki ngenxa ye-DO esezantsi nobukho bodaka obukwinqanaba eliphezulu
	i-oksijini enyibilikisiweyo			
	Ubukho bodaka (NTU)			
	Ukutsala umbane (mS/m)	<30	49	
Ukwahluka ngokwemvakalelo	Chl a: periphyton			Azikho iinkcukacha
	Chl a: phytoplankton			
	Ubukhulu bezinto eziphilayo ezingenamathambo (ASPT)			RHP = “amanzi anekwaliti embi”
	Inqaku lemigqeku yeentlanzi			
Ityhefu				Azikho iinkcukacha, kodwa ingakho ingxaki
LULONKE UHLELO LWESIKHUNDLA		**IBakala D/E** (iimbono zencutshe)		
Amaxabiso emida				
Isiqinisekisi		**Ixabiso lomda osezantsi**		**Ixabiso lomda eliphezulu**
TIN (mg/L) – 50th %ile				4.0
PHYTOPLANKTON Chl a (µg/L) – 50th %ile		20		30
SRP or PO4 (mg/L) – 50th %ile				0.125
PERIPHYTON Chl a (mg/m^2) – 50th %ile		21		84

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pH – 5th %ile and 95th %ile	i-5th percentile: 5.46 – 5.7 i-95th percentile: 8.56 – 10.00	
UBUSHUSHU (°C) – i-10 th %ile ne-90 th %ile	Awuguquki ngaphezu kwe- 4°C xa uwuthelekisa noluhlu lwendalo	
I-oksijini enyibilikisiweyo (mg/L) - 5th %ile	4	
ISALATHISI SENDALO (ASPT)	5	

Apho kuye kwafunyanwa umahluko kumaxabiso ekwaliti yamanzi kwiMijelo yokuphilisana yeNdalo, kulapho kuye kwakhethwa ixabiso eliqatha okanye lokhuselo ngecandelo lekwaliti yamanzi laloo mjelo.

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UTafile 5.35: amabakala e-PES novavanyo lwesikhundla lulonke kumlambo iKaaimans kwi-WQSU 2

UMLAMBO	Umlambo i-Kaaimans River	**IINDAWO ZOHLOLO LWEKWALITI YAMANZI**	
I-WQSU	WQSU 2	**RC**	Kaaimans R. @ Barbierskraal - K3H001-Q01 ('77 – '81; n = 175)
ISIKHUNDLA SE-EWR	Ka1	**PES**	K3H001-Q01 ('01 – '06; n = 56)
Uvavanyo lokuba nakho	Uphezulu ngokwe-RC ne-PES, kuba isitishi sohlolo sikwi- WQSU, unobude obuvisayo beenkcukacha, kuba iincinci inguqu yomhlaba kwindawo yoboniselo ngamanzi.		

IZithako zeKwaliti yaManzi		**Ixabiso le-RC**	**Ixabiso le-PES**	**IBakala/Amagqabantshintshi**	**G-power (ukuba nakho)**
Ityuwa ezingezozendalo (mg/L)	$MgSO_4$				Azikho iinkcukacha
	Na_2SO_4				
	$MgCl_2$				
	$CaCl_2$				
	NaCl				
	$CaSO_4$				
Izondlo (mg/L)	SRP	0.011	0.028*	IBakala = B. isimbo = sande kancinane	0.122 (Phantsi)
	TIN	0.04	0.061	IBakala = A. isimbo sande nje kancinci	
Ukwahluka kwendalo	pH (5^{th} – 95^{th} %)		4.4 – 7.4	Amanzi ane-asidi yendalo	0.87 (Phezulu)
	Ubushushu			Azikho iinkcukacha. Ayinakude ibange ingxaki le nto	
	i-oksijini enyibilikisiweyo				
	Ubukho bodaka (NTU)			Azikho iinkcukacha. Uphando ngokubona = ubukho bodaka kwinqanaba elisezantsi	
	Ukutsala umbane (mS/m)	16	17	IBakala A. isimbo = sizinzile	0.87 (Phezulu)
Ukwahluka ngokwemvakalelo	Chl a: periphyton			Azikho iinkcukacha. Uphando ngokubona = alukho baxekileyo ukhulo lwe- algal	
	Chl a: phytoplankton				
	Ubukhulu bezinto eziphilayo ezingenamathambo			IBakala A; ASPT = 8.0, SASS = 175 (olu phando). kwendalo (RHP)	
	Inqaku lemigqeku yeentlanzi			B	
Ityhefu				Azikho iinkcukacha, kodwa ayinakude ibe yingxaki le nto	
LULONKE UHLELO LWESIKHUNDLA		**IBakala A** (lithathelwe kumzekelo we-PAI)			

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UTafile 5.36: Imiqathango yendalo yekwaliti yamanzi (ii-EcoSpecs) kumlambo iKaaimans River kwi- K30C

IZithako zeKwaliti yamanzi	**umda**	**IiMfuno zoMjelo weNdalo**	**UMqathango weeMfuno ezisisiseko zoLuntu [5]**	**UMqathango woMjelo: ikwaliti yamanzi**
Ikhemistri ngokuthe gabalala– iityuwa ezingezizendalo eziphambili	$MgSO_4$ (mg/l) [1]	< 16	N/A	< 16
	Na_2SO_4 (mg/)l [1]	< 20	N/A	< 20
	$MgCl_2$ (mg/l) [1]	< 15	N/A	< 15
	$CaCl_2$ (mg/l) [1]	< 21	N/A	< 21
	NaCl (mg/l) [1]	< 45	N/A	< 45
Ikhemistri ngokuthe gabalala – iioni eziphambili	Sodium (mg/l)	N/A	<200	<200
	Magnesium (mg/l)	N/A	<100	<100
	Chloride (mg/l)	N/A	<200	<200
	Calcium (mg/l)	N/A	<80	<80
	Sulphate (mg/l)	N/A	<400	<400
Izondlo	Phosphate (PO_4) (mg/l) [2]	<0.02mg/L	N/A	<0.02mg/L
	Iyonke i- Inorganic Nitrogen (mgN/l) [2]	<0.25mg/L	N/A	<0.25mg/L
Ikwaliti ebonakalyo yamanzi	pH (range) i-5th percentile i-95th percentile	6.7 7.4	5 9.5	5 7.4
	i-oksijini enyibilikisiweyo (mg/l)[1]	>1.7 mg/L	N/A	**>1.7 mg/L**
	Ubushushu[1]	Incinci inguqu xa ubuthelekisa nobendalo		Incinci inguqu xa ubuthelekisa nobendalo
	Ukutsala umbane (mS/m) – WUSEBENZISE KUPHELA XA IITYUWA EZIZIZIGAQA ZIVELISIWE	≤30mS/m	0-70	≤30mS/m
Ikwaliti yamanzi yendalo	Chl-a: periphyton[3]	<1.7 mg/m^2	N/A	
	Chl-a: phytoplankton[3]	< 10 µg/L (A category)	N/A	
	Ukwakheka komgqeku we-Biotic – Ubukhuly bezinto eziphilayo ezingenamathambo s	ASPT: 8 (A category)		
	Ukutyhefeka ngaphakathi komjelo	Ukutyhefeka ngaphakathi		

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IZithako zeKwaliti yamanzi	**umda**	**liMfuno zoMjelo weNdalo**	**UMqathango weeMfuno ezisisiseko zoLuntu [5]**	**UMqathango woMjelo: ikwaliti yamanzi**
		komjelo makungenzeki		
lityhefu nemixube entsonkothileyo	lityhefu (njengoko kudwelisiwe ku DWAF, 1996 [6])	≤ TWQR	≤ TWQR	≤ TWQR

PHAWULA:
[1] : Ukuthobela imiqathango yi-95th percentile. [2]: ukuthobela imiqathango yi-50th percentile. [3] i-Chl-a ayibandakanyeki kwizifundo ngemijelo zekhompyutha. [4] ukuthobela imiqathango kukwinqanaba le-90th percentile
[5] ref: *South African Water Quality Guidelines, Volume 1: Domestic Water Use*, *2nd Ed*. 1996. Department of Water Affairs and Forestry. Pretoria, South Africa.
[6] ref: *South African Water Quality Guidelines, Volume 7: Aquatic Ecosystems*, *2nd Ed*. 1996. Department of Water Affairs and Forestry. Pretoria, South Africa.

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UTafile 5.37: Amabakala e-PES novavanyo lwesikhundla lulonke kumlambo iDiep River kwi- WQSU 3

UMLAMBO	Umlambo iDiep River	**IINDAWO ZOHLOLO LWEKWALITI YAMANZI**	
I- WQSU	WQSU 3 (Kuqala inqanaba II le-Ecoregion 20.02 ukuya ekuqaleni komda womjelo wasezintabeni)	**I-RC**	Umlambo iDiep R. @ uMjelo weHlathi i-Woodville K4H003Q01 ('77 – '80; n = 58)
ISIKHUNDLA SE-EWR	3	**I-PES**	K4H003Q01 ('03 – '07; n = 36)
Uvavanyo lokuba nakho	Phakathi ukuya Phezulu		

IZithako zeKwaliti yaManzi		**Ixabiso le-RC**	**Ixabiso le-PES**	**IBakala /Amagqabantsintshi**
Ilityuwa ezingezozendalo (mg/L)	$MgSO_4$	8.86	15.87	U-TEACHA usetyenziselwe ukuqokelela iinkcukacha zohlolo. Ilityuwa = iBakala A
	Na_2SO_4	0.00	0.00	
	$MgCl_2$	14.83	14.52	
	$CaCl_2$	7.18	9.89	
	NaCl	102.10*	94.31	
	$CaSO_4$	0.66	0.59	
Izondlo (mg/L)	SRP	0.003	0.018	IBakala B/C.
	TIN	0.04	0.07	IBakala A.
Ukwahluka kwendalo	pH (5^{th} + 95^{th} %ile)	4.8 + 6.2	4.8 + 7.5	IBakala B.
	Ubushushu	-	-	Azikho iinkcukacha kodwa akukho futhe lilindelekileyo.
	i-oksijini enyibilikisiweyo	-	-	
	Ubukho bo (NTU)	-	-	Azikho iinkcukacha. Kubonakala kancinci imizila yeentlenge.
	Ukutsala umbane (mS/m)		18.0	IBakala A
Ukwahluka ngokwemvakalelo	Chl a: periphyton	-	21.25	Kukho ukwenyuka okuthile kwezondlo okuboniswa ziinkcukacha ze- periphyton data (IBakala C/D category; n=1)
	Chl a: phytoplankton	-	0.18	
	Ubukhulu bezinto eziphilayo ezingenamathambo	ASPT[$]: ubuncikane be- 6.58	ASPT: 7.3 MIRAI**: 86.1%	IBakala B lesimo sangoku.
	Inqaku lemigqeku yeentlanzi.	-	FRAI[♦]: 86.1%	IBakala B lesimo sangoku.
	ii-Diatoms	-	SPI[#]=17.6	Ikwaliti ephezulu yamanzi
Ilityhefu		-	-	Azikho iinkcukacha, kodwa ke likho ifuthe elilindelekileyo ngenxa yezibulala zinambuzane ezisetyenziswa ezifama nezichumisi
LULONKE UHLELO LWESIKHUNDLA		**B** (Ngokomzekelo we-PAI)		

*: ixabiso lomda lihlengahlengisiwe sovavanyo
-: Azikho iinkcukacha
♦: FRAI = Fish Response Assessment Index (Isalathisi lokuvakalelwa kweentlanzi)
**: MIRAI = Macro Invertebrate Response Assessment Index (Isalathisi sovavanyo lokuvakalelwa kobukhulu bezinto eziphilayo ezingenamathambo)
#: Specific Pollution Index (Isalathisi soqobo lokungcola)[$]: ASPT = inqaku le-avareji ngokwe-Taxon

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UTafile 5.38: Imiqathango yendalo yekwaliti yamanzi (ii-EcoSpecs) kumlambo iDiep River (kwi-WQSU 3, K40A)

Umlambo: iDiep		Isikhundla se-EWR: 3	Isikhundla sohlolo: K4H003Q01
Ii- metrics zekwaliti yamanzi		i-ECOSPEC	
Iityuwa ezingezozendalo*	$MgSO_4$	i- 95th percentile yeenkcukacha mayibe ngu ≤ 16 mg/L.	
	Na_2SO_4	i- 95th percentile yeenkcukacha mayibe ngu ≤ 20 mg/L.	
	$MgCl_2$	i- 95th percentile yeenkcukacha mayibe ngu ≤ 15 mg/L.	
	$CaCl_2$	i- 95th percentile yeenkcukacha mayibe ngu ≤ 21 mg/L.	
	NaCl	i- 95th percentile yeenkcukacha mayibe ngu ≤ 191 mg/L.	
	$CaSO_4$	i- 95th percentile yeenkcukacha mayibe ngu ≤ 351 mg/L.	
Ukwahluka kwendalo	EC	i- 95th percentile yeenkcukacha mayibe ngu ≤ 30 mS/m.	
	pH	i-5th ne-95th percentiles yeenkcukacha mayibe phakathi ko-4.5 no- 7.5.	
	Ubushushu	Kukho ukuphambuka okuncinane kuluhlu lobushushu bendalo	
	i-oksijini enyibilikisiweyo	i-5th percentile yeenkcukacha mayibe ngu ≥ 7.5 mg/L.	
	Ubukho bodaka	Vary by a small amount from the natural turbidity range; minor silting of instream habitats acceptable.	
Izondlo	TIN	i- 50th percentile yeenkcukacha mayibe ngu ≤ 0.25 mg/L.	
	PO_4-P	i- 50th percentile yeenkcukacha mayibe ngu ≤ 0.025 mg/L.	
Ukwahluka ngokwemvakalelo	Chl-a phytoplankton	i- 50th percentile yeenkcukacha mayibe ngu <15 µg/L.	
	Chl-a periphyton	i- 50th percentile yeenkcukacha mayibe ngu ≤ 52.5 mg/m^2.**	
Ityhefu		i-95th percentile yeenkcukacha mayibe phakathi koLuhlu lweKwaliti yaManzi eNgqaliweyo (i-Target Water Quality Range (TWQR) njengoko kubhaliwe kuDWAF (1996).	

* Mayiveliswe ngokusebenzisa i-TEACHA xa i-TPC ye- EC ilindelekilekile okanye ungcoliso lwetyuwa lulindelekile.
** i-Periphyton (21.25 mg/m^2) kanye-kanye ikwiBakala C/D (C = 12 - 21 no- D = 21 - 84 mg/m^2; DWAF, 2008), ngoko ke umda ophezulu kaC/D uchazwe njenge- EcoSpec.

UTafile 5.39: ii-TPC zekwaliti yamanzi kumlambo iDiep River (kwi-WQSU 3, K40A)

Umlambo: i-Diep		ISIKHUNDLA SE-EWR: 3	Isikhundla sohlolo: K4H003Q01
Ii- metrics zekwaliti yamanzi		I-TPC	
Iityuwa ezingezozendalo*	$MgSO_4$	i- 95th percentile yeenkcukacha mayibe ngu 13 – 16 mg/L.	
	Na_2SO_4	i- 95th percentile yeenkcukacha mayibe ngu 16 – 20 mg/L.	
	$MgCl_2$	i- 95th percentile yeenkcukacha mayibe ngu 12 – 15 mg/L.	
	$CaCl_2$	i- 95th percentile yeenkcukacha mayibe ngu 17 – 21 mg/L.	
	NaCl	i- 95th percentile yeenkcukacha mayibe ngu 36 – 45 mg/L.	
	$CaSO_4$	i- 95th percentile yeenkcukacha mayibe ngu 153 – 191 mg/L.	
Ukwahluka kwendalo	EC	i-95th percentile yeenkcukacha mayibe ngu 24 – 30 mS/m.	
	pH	i- 5th ne-95th percentiles yeenkcukacha mayibe ngu <4.7 and >7.3.	
	Ubushushu	Luncinane ukuya phakathi uphambuko xa uthelekisa noluhlu lobushushu Sbendalo. Ikho loo migqeku ingamininzanga nengaxhaphakanga kuyaphi kunoko kulindelekileyo ngokofuniselo.	
	i-oksijini enyibilikisiweyo	i- 5th percentile yeenkcukacha mayibe ngu 7.8 – 7.5 mg/L.	
	Ubukho bodaka	Zikho iinguqu eziphakathi kusetyenziso lomhlaba wendawo yoboniselo ngamanzi, nezithi zibangele (okwexeshana nje) iingqumba zeentlenge ezikwinqanaba eliphezulu ngokuqatseleyo nobukho bodaka obukwinqanaba eliphezulu.	

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Umlambo: i-Diep		**ISIKHUNDLA SE-EWR: 3**	**Isikhundla sohlolo: K4H003Q01**
Ii- metrics zekwaliti yamanzi		**I-TPC**	
Izondlo	TIN	i-50th percentile yeenkcukacha mayibe ngu 0.2 – 0.25 mg/L.	
	PO_4-P	i-50th percentile yeenkcukacha mayibe ngu 0.02 – 0.025 mg/L.	
Ukwahluka ngokwemvakalelo	Chl-a phytoplankton	i- 50th percentile yeenkcukacha mayibe ngu 12 – 15 µg/L.	
	Chl-a periphyton	i- 50th percentile yeenkcukacha mayibe ngu 42 – 52.5 mg/m^2.	
Iityhefu		i95th percentile yeenkcukacha mayibe phakathi koLuhlu lweKwaliti yaManzi eNgqaliweyo (i-Target Water Quality Range (TWQR) njengoko kubhaliwe ku DWAF (1996).	

UTafile 5.40: Amabakala e-PES novavanyo lwesikhundla lulonke kumlambo iKaratara kwi-WQSU 5

UMLAMBO	Umlambo iKaratara	**IINDAWO ZOHLOLO LWEKWALITI YAMANZI**	
I-WQSU	WQSU 5 (endaweni yemveli ukuya eSwartvlei)	**I-RC**	iKaratara R. @ kuMjelo weHlathi iKaratara K4H002Q01 ('76 – '79; n = 115)
ISIKHUNDLA SE-EWR	4	**I-PES**	K4H002Q01 ('03 – '07; n = 36)
Uvavanyo lokuba nakho	Phakathi, kuba zanele iinkcukacha zovavanyo lentsukaphi nezesimo sangoku		

IZithako zeKwaliti yaManzi		**Ixabiso le-RC**	**Ixabiso le-PES**	**IBakala/Amagqabantshintshi**
Iityuwa ezingezizo zendalo (mg/L)	$MgSO_4$	7.62	12.63	U-TEACHA uye wasetyenziswas kuvavanyo lweenkcukacha used for data assessment. Iityuwa = ibakala A
	Na_2SO_4	2.05	3.01	
	$MgCl_2$	4.43	4.16	
	$CaCl_2$	9.89	9.16	
	NaCl	35.59	36.15	
	$CaSO_4$	0.73	0.73	
Izondlo (mg/L)	SRP	0.022 *	0.047	IBakala B.
	TIN	0.07	0.128	IBakala A.
Ukwahluka kwendalo	pH (5th + 95th %ile)	3.7 + 7.7	3.8 + 6.6	IBakala A.
	Ubushushu	-	-	Azikho iinkcukacha kodwa ke akukho futhe lilindelekileyo
	i-oksijini enyibilikisiweyo	-	-	
	Ubukho bodaka (NTU)	-	-	Azikho iinkcukacha. Buncinane ubungqina bobukho beentlenge.
	Ukutsala umbane (mS/m)	-	7.0	iBakala A.
Ukwahluka ngokwemvakalelo	Chl a: periphyton	-	9.91	IBakala B nge-periphyton.
	Chl a: phytoplankton	-	0.09	
	Ubukhulu bezinto eziphilayo ezingenamathambo	ASPT: 7.3	ASPT: 8.1 MIRAI: 92.3%	IBakala A/B ngesimo sangoku.
	Inqaku lemigqeku yeentlanzi	-	FRAI: 82.4%	IBakala B ngesimo sangoku.
	ii-Diatoms	-	SPI=19.9	Amanzi anekwaliti ephezulu
iityhefu		-	-	Azikho iinkcukacha, kodwa likho elo futhe libangelwa kukwenziwa kwamaplangabut e-Geelhoutvlei.
LULONKE UHLELO LWESIKHUNDLA		**nguB ngeWQSU 5**, nangona ilibakala A ekunabeni komlambo womjelo osemantla (umzekelo we-PAI)	

*: Ixabiso lomda lihlengahlengisiwe
-: Azikho iinkcukacha

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Table 5.41: Imiqathango yendalo yekwaliti yamanzi (ii-EcoSpecs) kumlambo iKaratara kwi-WQSU 5

River: Karatara		EWR Site: 4	Monitoring site: K4H002Q01
Water quality metrics		ECOSPEC	
Ityuwa ezingezozendalo*	$MgSO_4$	i-95th percentile yeenkcukacha mayibe ngu ≤ 16 mg/L.	
	Na_2SO_4	i- 95th percentile yeenkcukacha mayibe ngu ≤ 20 mg/L.	
	$MgCl_2$	i-95th percentile yeenkcukacha mayibe ngu ≤ 15 mg/L.	
	$CaCl_2$	i- 95th percentile yeenkcukacha mayibe ngu ≤ 21 mg/L.	
	NaCl	i-95th percentile yeenkcukacha mayibe ngu ≤ 191 mg/L.	
	$CaSO_4$	i- 95th percentile yeenkcukacha mayibe ngu ≤ 351 mg/L.	
Ukwahluka kwendalo	EC	i-95th percentile yeenkcukacha mayibe ngu ≤ 30 mS/m.	
	pH	i-5th ne- 95th percentiles yeenkcukacha mayibe phakathi ko- 4.5 no- 7.5.	
	Ubushushu	Uluhlu lobushushu bendalo.	
	i-oksijini enyibilikisiweyo	i-5th percentile yeenkcukacha mayibe ngu ≥ 8.0 mg/L.	
	Ubukho bodaka	Vary by a small amount from the natural turbidity range; minor silting of instream habitats acceptable.	
Izondlo	TIN	i-50th percentile yeenkcukacha mayibe ngu ≤ 0.25 mg/L.	
	PO_4-P	i-50th percentile yeenkcukacha mayibe ngu ≤ 0.075 mg/L.	
Ukwahluka ngokwemvakalelo	Chl-a phytoplankton	i-50th percentile yeenkcukacha mayibe ngu < 10 µg/L.	
	Chl-a periphyton	i-50th percentile yeenkcukacha mayibe ngu ≤ 12 mg/m^2.	
Ityhefu		i-95th percentile yeenkcukacha mayibe phakathi koluhlu lwekwaliti yamanzi engqaliweyo (i-Target Water Quality Range (TWQR) njengoko kubhaliwe ku DWAF (1996).	

* ziza kufunyanwa ngokusebenzisa u-TEACHA xa ne- TPC ye-EC ibethe ngaphaya okanye ungcoliso lweetyuwa lulindelekile.

UTafile 5.42: Ii-TPCs zekwaliti yamanzi kumlambo iKaratara kwi- WQSU 5

Umlambo: iKaratara		Isikhundla se-EWR: 4	Isikhundla sohlolo: K4H002Q01
Ii-metrics zekwaliti yamanzi		I-TPC	
Ityuwa ezingezizo zendalo*	$MgSO_4$	i-95th percentile yeenkcukacha mayibe ngu 13 – 16 mg/L.	
	Na_2SO_4	i- 95th percentile yeenkcukacha mayibe ngu 16 – 20 mg/L.	
	$MgCl_2$	i- 95th percentile yeenkcukacha mayibe ngu 12 – 15 mg/L.	
	$CaCl_2$	i- 95th percentile yeenkcukacha mayibe ngu 17 – 21 mg/L.	
	NaCl	i- 95th percentile yeenkcukacha mayibe ngu 36 – 45 mg/L.	
	$CaSO_4$	i- 95th percentile yeenkcukacha mayibe ngu 153 – 191 mg/L.	
Ukwahluka kwendalo	EC	i-95th percentile yeenkcukacha mayibe ngu 24 – 30 mS/m.	
	pH	i- 5th and 95th percentiles yeenkcukacha mayibe ngu <4.7 and >7.3.	
	Ubushushu	Kukho ukuphambuka kancinci kolwaa luhlu lobushushu bendalo.	
	i-oksijini enyibilikisiwe	i- 5th percentile yeenkcukacha mayibe ngu 8.2 – 8.0 mg/L.	
	Ubukho bodaka	Zincinci ukuya kweziphakathi iinguqu kusetyenziso lomhlaba kwindawo yoboniselo ngamanzi, nto leyo ibangela ifuthe elincinci nelilelexeshana nje leentlenge zeeendawo zokuphilisana.	
Izondlo	TIN	i- 50th percentile yeenkcukacha mayibe ngu 0.2 – 0.25 mg/L.	
	PO_4-P	i- 50th percentile yeenkcukacha mayibe ngu 0.06 – 0.075 mg/L.**	

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Umlambo: iKaratara		**Isikhundla se-EWR: 4**	**Isikhundla sohlolo: K4H002Q01**
Ii-metrics zekwaliti yamanzi		**I-TPC**	
Ukwahluka ngokwemvakalelo	Chl-a phytoplankton	i- 50th percentile yeenkcukacha mayibe ngu 8 – 10 µg/L.	
	Chl-a periphyton	i- 50th percentile yeenkcukacha mayibe ngu 10 – 12 mg/m^2.	
Ityhefu		i-95th percentile yeenkcukacha mayibe phakathi koluhlu lwekwaliti yamanzi engqaliweyo (i-Target Water Quality Range (TWQR) njengoko kubhaliwe ku DWAF (1996).	

* Ziza kufunyanwa ngokusebenzisa u-TEACHA xa ne-TPC ye-EC ibethe ngaphaya okanye ungcoliso lomoya lulindelekile .

**** nangona umda ophezulu we le-phosphate elichanileyo ungu-0.125 mg/L, i- TPC yona yenzelwe ku-0.075 mg/L njengoko amanqanaba e-PES ye- phosphate ebengu- 0.046 mg/L.**

UTafile 5.43: Amabakala e-PES novavanyo lwesikhundla lulonke kumlambo iHoëkraal kwi- WQSU 4

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UMLAMBO	Umlambo iHoëkraal	**IINDAWO ZOHLOLO LWEKWALITI YAMANZI**	
I-WQSU	I-WQSU 4 (ukusuka nokuya kutsho ekuqaleni kweenduli zeenyawo ezisemazantsi)	**I-RC**	Hoëkraal R. @ Eastbrook K4H001Q01 ('77 – '80; n = 83)
ISIKHUNDLA SE-EWR	-	**I-PES**	K4H001Q01 ('03 – '07; n = 28)
Uvavanyo lokuba nakho	Phantsi - Phakathi njengoko ziincinci nenkcukacha kuhlolo lwesimo sangoku. Kwindawo esemazantsi kumda owongezelelweyo ukusuka kwichibi iSwartvlei. Qaphela ukuba udonga olunqamlezileyo lokuthatha umlinganiselo lumi kumazantsi omlambo i- Hoëkraal.		

IZithako zeKwaliti yaManzi		**Ixabiso le-RC**	**Ixabiso le-PES**	**IBakala/Amagqabantshintshi**
Iityuwa ezingezizo zendalo (mg/L)	$MgSO_4$	35.87	153.20	U-TEACHA usetyenziselwe ukuhlalutya iinkcukacha ze-WMS. Iziphumo mazingahoywa kuba iinkcukacha zibonisa ukungenelela kweetyuwa kwichibi lokukhupha iityuwa emanzini iSwartvlei.
	Na_2SO_4	9.95	159.5	
	$MgCl_2$	35.92	100.33	
	$CaCl_2$	24.80	45.24	
	NaCl	399.69	1560.41	
	$CaSO_4$	0.59	0.73	
Izondlo (mg/L)	SRP	0.014 *	0.034	IBakala B.
	TIN	0.06	0.088	IBakala A.
Ukwahluka kwendalo	pH (5^{th} + 95^{th} %ile)	4.4 + 7.2	4.5 + 7.8	IBakala A.
	Ubushushu	-	-	Azikho iinkcukacha kodwa alikho ifuthe elilindelekileyo, nangona nje lomlambo unzulu futhi ubanzi ngaphezulu kwesikhundla esisemazantsi, nto leyo inokubangela ukuhla kwamanqanaba e-oksijini.
	i-oksijini enyibilikisiweyo	-	-	
	Ubukho bodaka (NTU)	-	-	Azikho iinkcukacha kodwa bukho obo bungqina bobukho beentlenge.
	Ukutsala umbane (mS/m)		4.2: isikhundla esiphezulu	IBakala A
Ukwahluka ngokwemvakalelo	Chl a: periphyton	-	4.81: isikhundla esiphezulu 152.93: isikhundla esisezantsi	Isikhundla esisemazantsi sibonisa izindlo ezakheka ukwenyuka emanzini.
	Chl a: phytoplankton	-	0.14: isikhundla esiphezulu 0.47: isikhundla esisezantsi	
	Ubukhulu bezilwanyana ezingenamathambo	-	-	Khange kuvavanywe kuba esi ayisosikhundla se- EWR.
	Inqaku lemigqeku yeentlanzi	-	-	
	ii-Diatoms	-	SPI=19.8: Umlambo ophezulu. SPI=16.2: umlambo osezantsi	Isikhundla esiphezulu: Amanzi anekwaliti ephezulu. Isikhundla esisemazantsi: amanzi anekwaliti entle.
iityhefu		-	-	Azikho iinkcukacha, kodwa ke akukho futhe lilindelekileyo.
LULONKE UHLELO LWESIKHUNDLA		**IBakala C Category** (umzekelo we-PAI)		

* Ixabiso lomda lihlengahlengisiwe

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Table 5.44: Imiqathango yendalo yekwaliti yamanzi (ii-EcoSpecs) kumlambo i-Hoëkraal kwi-WQSU 4

Umlambo : iHoëkraal		**Isikhundla se-EWR: -**	**Isikhundla sohlolo: K4H001Q01, nangona simi kwindawo esemazantsi yomlambo futhi nokungenelela kwamanzi anetyuwa kuyarhaneleka ngenxa yenkxaso yechibi i- Swartvlei.**
Ii-metrics zekwaliti yamanzi		**ECOSPEC**	
Ilityuwa ezingezozendalo*	$MgSO_4$	i- 95th percentile yeenkcukacha mayibe ngu ≤ 16 mg/L.	
	Na_2SO_4	i- 95th percentile yeenkcukacha mayibe ngu ≤ 20 mg/L.	
	$MgCl_2$	i- 95th percentile yeenkcukacha mayibe ngu ≤ 15 mg/L.	
	$CaCl_2$	i- 95th percentile yeenkcukacha mayibe ngu ≤ 21 mg/L.	
	NaCl	i- 95th percentile yeenkcukacha mayibe ngu ≤ 191 mg/L.	
	$CaSO_4$	i- 95th percentile yeenkcukacha mayibe ngu ≤ 351 mg/L.	
Ukwahluka kwendalo	EC	i- 95th percentile yeenkcukacha mayibe ngu ≤ 30 mS/m.	
	pH	i- 5th ne-95th percentiles yeenkcukacha mayibe phakathi ko- 4.5 no- 7.5.	
	Ubushushu	Kukho ukuphambuka kancinci kolwaa luhlu lobushushu bendalo.	
	i-oksijini enyibilikisiweyo	i- 5th percentile yeenkcukacha mayibe ngu ≥ 7.5 mg/L.	
	Ubukho bodaka	Uguquka nje kancinci kolwa luhlu lobukho bodaka bendalo; okwa kubanentlengana kweendawo zokuphilisana zangaphakathi komjelo kwamkelekile.	
Izondlo	TIN	i-50th percentile yeenkcukacha mayibe ngu ≤ 0.25 mg/L.	
	PO_4-P	i- 50th percentile yeenkcukacha mayibe ngu ≤ 0.125 mg/L.	
Ukwahluka ngokwemvakalelo	Chl-a phytoplankton	i-50th percentile yeenkcukacha mayibe ngu yeenkcukacha mayibe ngu <10 µg/L.	
	Chl-a periphyton	i- 50th percentile yeenkcukacha mayibe ngu ≤ 12 mg/m^2.	
Ilityhefu		i-95th percentile yeenkcukacha mayibe phakathi koluhlu lwekwaliti yamanzi engqaliweyo (i-Target Water Quality Range (TWQR) njengoko kubhaliwe ku DWAF (1996).	

* ziza kufunyanwa ngokusebenzisa u-TEACHA xa ne-TPC ye- EC ibetha ngaphaya nongcoliso lwetyuwa lulindelekile.

UTafile 5.45: Ii- TPCs zekwaliti yamanzi kumlambo i-Hoëkraal kwi- WQSU 4

Umlambo: iHoekraal		**Isikhundla se-EWR: -**	**Isikhundla sohlolo: K4H001Q01**
Ii- metrics zekwaliti yamanzi		**i-TPC**	
Ilityuwa ezingezozendalo *	$MgSO_4$	i- 95th percentile yeenkcukacha mayibe ngu- 13 – 16 mg/L.	
	Na_2SO_4	i- 95th percentile yeenkcukacha mayibe ngu- 16 – 20 mg/L.	
	$MgCl_2$	i- 95th percentile yeenkcukacha mayibe ngu- 12 – 15 mg/L.	
	$CaCl_2$	i- 95th percentile yeenkcukacha mayibe ngu- 17 – 21 mg/L.	
	NaCl	i- 95th percentile yeenkcukacha mayibe ngu- 36 – 45 mg/L.	
	$CaSO_4$	i- 95th percentile yeenkcukacha mayibe ngu- 153 – 191 mg/L.	
Ukwahluka kwendalo	EC	i- 95th yeenkcukacha mayibe ngu- 24 – 30 mS/m.	
	pH	i-5th ne- 95th yeenkcukacha mayibe ngu <4.7 no>7.3.	
	Ubushushu	Ziphantsi ukuya phakathi iinguqu zosetyenziso lomhlaba kwindawo yoboniselo ngamanzi, nto leyo ibangela ifuthe elincinci nelilelexeshana lokuba neentlenge kweendawo zokuphilisana.	
	i-oksijini enyibilikisiweyo	i- 5th percentile yeenkcukacha mayibe ngu- 7.8 – 7.5 mg/L.	
	Ubukho bodaka	Ziphakathi iinguqu zosetyenziso lomhlaba kwindawo yoboniselo ngamanzi, nto leyo ibangela iingqumba zexeshana zeentlenge ezikwiqondo eliphezulu ngokungaqhelekanga nobukho bodaka obukumanqanaba aphezulu.	

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Umlambo: iHoekraal		**Isikhundla se-EWR: -**	**Isikhundla sohlolo: K4H001Q01**
Ii- metrics zekwaliti yamanzi		**i-TPC**	
Izondlo	TIN	i- 50th percentile yeenkcukacha mayibe ngu- 0.2 – 0.25 mg/L.	
	PO_4-P	i- 50th percentile yeenkcukacha mayibe ngu- 0.1 – 0.125 mg/L.	
Ukwahluka ngokwemvakalelo	Chl-a phytoplankton	i- 50th percentile yeenkcukacha mayibe ngu- 8 – 10 µg/L.	
	Chl-a periphyton	i- 50th percentile yeenkcukacha mayibe ngu- 10 – 12 mg/m^2.	
Ityhefu		i- 95th percentile yeenkcukacha mayibe phakathi koluhlu lwekwaliti yamanzi engqaliweyo (i-Target Water Quality Range (TWQR) njengoko kubhaliwe ku DWAF (1996).	

UTafile 5.46: Amabakala ePES novavanyo lwesikhundla lulonke kumlambo iGoukamma kwi- WQSU 1

UMLAMBO	Umlambo iGoukamma	**IINDAWO ZOHLOLO LWEKWALITI YAMANZI**	
I-WQSU	WQSU 1 (kwintsukaphi ukuya esiphelweni sommandla wentaba)	**RC**	iRooi R. @ George K3H002-Q01 ('77 – '79 n = 84)
ISIKHUNDLA SE-EWR	Asikho	**PES**	K3H002-Q01 ('01 – '06 n = 65)
Uvavanyo lokuba nakho	Phantsi ukuya Phakathi kuba asikho isitishi sohlolo sakwaDWAF. Kodwa ke indawo yoboniselo ngamanzi ayichaphazeleki futhi ke uza kuse ufane nje neminye imijelo yeentaba.		

IZithako zeKwaliti yaManzi		**Ixabiso le-RC**	**Ixabiso le-PES**	**IBakala/Amagqabantshintshi**
Ityuwa ezingezizo zendalo (mg/L)	$MgSO_4$			Azikho iinkcukacha
	Na_2SO_4			
	$MgCl_2$			
	$CaCl_2$			
	NaCl			
	$CaSO_4$			
Izondlo (mg/L)	SRP	0.014	≤0.014*	IBakala A.
	TIN	0.04	≤0.25*	IBakala A.
Ukwahluka kwendalo	pH (5th – 95th %)		3.7 – 6.7	Une-asidi ngendalo.
	Ubushushu			Azikho iinkcukacha kodwa ke bulindeleke ukuba bubebobendalo kuba luncinci uphuhliso olwenzekayo phaya kumphezulu womjelo wendawo yoboniselo ngamanzi.
	i-oksijini enyibilikisiweyo			
	Ubukho bodaka (NTU)			
	Ukutsala umbane (mS/m)	16	17	IBakala A.
Ukwahluka ngokwemvakalelo	Chl a: periphyton			Azikho iinkcukacha
	Chl a: phytoplankton			Azikho iinkcukacha
	Ubukhulu bezinto eziphilayo ezingenamathambo			Azikho iinkcukacha
	Inqaku lemigqeku yeentlanzi			Azikho iinkcukacha
Ityhefu				Azikho iinkcukacha.
LULONKE UHLELO LWESIKHUNDLA		**A**		

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uTafile 5.47: Imiqathango yendalo yekwaliti yamanzi (ii-EcoSpecs) kumlambo iGoukamma kwi- WQSU 2

UMLAMBO		Umlambo iGoukamma	**IINDAWO ZOHLOLO LWEKWALITI YAMANZI**			
I-WQSU		2	**DWAF WQ WMS**	Ayikho		
ISIKHUNDLA SE-EWR SITE		Asikho	**RHP**	Okwangoku kukho isikhundla se-RHP phezulu phaya kwindawo yoboniselo ngamanzi		
Ukukholelwa kuvavanyo lwe-PES		Iphantsi kuba ukhutshelwe ngaphandle kwenye indawo yoboniselo ngamanzi (iKaratara R) ne-WQSU (Goukamma WQSU 2). Iinkcukacha zendalo (ukusuka kwiprojekhthi yangoku ne-RHP yomphezulu wendawo yoboniselo ngamanzi) zixhasa i-PES eqikelelwayo yekwaliti yamanzi.				
IZithako zekwaliti yamanzi		**IBakala lePES**	**ii-Eco specs zeWQ**	**Ingaba ikho inkqubela efunekayo?**	**I-TPC**	**Ixesha elimiyo lohlolo**
Ilityuwa ezingezozendalo (mg/L)	$MgSO_4$	Azikho	≤16 mg/L	N/A	i-95th percentile ibe ngu < 16 mg/L	Rhoqo ngeenyanga ezimbini
	Na_2SO_4		≤20 mg/L		i-95th percentile ibe ngu < 20 mg/L	
	$MgCl_2$		≤15 mg/L		i-95th percentile ibe ngu < 15 mg/L	
	$CaCl_2$		≤21 mg/L		i-95th percentile ibe ngu < 21 mg/L	
	NaCl		≤45 mg/L		i-95th percentile ibe ngu < 45 mg/L	
Izondlo (mg/L)	**SRP**	**A**	**≤0.012 mg/L**	Yes - B/C	i-50th percentile ibe ngu < 0.025 mg/L	Rhoqo ngeenyanga ezimbini
	TIN	A	≤0.25 mg/L	No	i-50th percentile ibe ngu < 0.25 mg/L	Rhoqo ngeenyanga ezimbini
Ukwahluka kwendalo	pH	Umlambo one-asidi ngendalo	< 6.4	No	i-95th percentile ibe ngu < 6.4	Rhoqo ngeenyanga ezimbini
	Ubushushu	Azikho iinkcukacha. Uhlolo olwenziweyo alubonisanga ngxaki yabukho bodaka.	Uluhlu lwendalo	N/A	Uluhlu lobushushu bendalo	Rhoqo ngeenyanga ezimbini
	i-oksijini enyibilikisiweyo		8 mg/L	N/A	i-5th percentile ibe ngu > 8 mg/L	Rhoqo ngeenyanga ezimbini
	Ubukho bodaka (NTU)		Alukho utshintsho	N/A	Ayikho inguqu evumelekileyo	Rhoqo ngeenyanga ezimbini
	Ukutsala umbane (mS/m)	A – Iizinzile	≤30 mS/m	No	i-95th percentile ibe ngu < 30 mS/m	Rhoqo ngeenyanga ezimbini
Ukwahluka ngokwemvakalelo	Chl a: periphyton	Azikho iinkcukacha. Uhlolo olwenziweyo alubonisanga ngxaki yabukho bodaka.	≤ 1.7 mg/m² (Ibakala A)	N/A	i-50th percentile ibe ngu < 1.7 mg/m²	Ngekota
	Chl a: phytoplankton		≤ 10 µg/L (ibakala B)		i-50th percentile ibe ngu < 10 µg/L	
	Ubukhulu bezinto eziphilayo ezingenamathambo (ASPT)	B (olu phando)	Bona ii-Ecospecs zeentlanzi nezezinto eziphilayo ezingenamathambo ngokulandelelanayo.			

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	Ingaku lemiggeku yeentlanzi	C (olu phando)	
	Ukutyhefeka komphakathi womjelo	Azikho iinkcukacha	Ayinakubakho ingxaki. Vavanya kuphela xa neziphumo zohlolo lwendalo zibonisa ukuba ikho ingxaki eqatseleyo futhi isizathu sayo asaziwa.
lityhefu		Azikho iinkcukacha.	

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UTafile 5.48: Amabakala e- PES novavanyo lwesikhundla lulonke kumlambo iGoukamma kwi-WQSU 2

UMLAMBO	Umlambo iGoukamma	**IINDAWO ZOHLOLO LWEKWALITI YAMANZI**	
I-WQSU	I-WQSU 2 (Encamini yommandla weentaba namahlathi ukuya esiphelweni esiphezulu sefuthe lamaza – kanye phaya ngakwibhulorho u- N2)	**I-RC**	Karatara R. @ IHlathi likaRhulumente iKaratara K4H002-Q01 ('71 – '76; n = 107)
ISIKHUNDLA SE-EWR	Gou 1	**I-PES**	K4H002-Q01 ('01 – '06; n = 51)
Uvavanyo lokuba nakho	Kwinqanaba eliphantsi. Isitishi sohlolo yindawo yoboniselo ngamanzi ekufuphi.		

IZithako zeKwaliti yaManzi		**Ixabiso le-RC**	**Ixabiso le-PES**	**Ibakala/Amagqabantshintshi**	**G-power (ukuba nakho)**
Ityuwa ezingezozendalo (mg/L)	$MgSO_4$				Azikho iinkcukacha
	Na_2SO_4				
	$MgCl_2$				
	$CaCl_2$				
	NaCl				
	$CaSO_4$				
izondlo (mg/L)	SRP	0.018	0.048*	Ibakala = C. isimbo = siyanda	0.232 (phantsi)
	TIN	0.11	0.11	ibakala = A. isimbo = sizinzile	
Ukwahluka kwendalo	pH (5^{th} – 95^{th} %)		3.8 – 6.4	Amanzi ane-asidi ngendalo	0.781 (phakathi)
	Ubushushu			Azikho iinkcukacha. Ayinakubakho ingxaki	
	i-oksijini enyibilikisiweyo				
	Ubukho bodaka (NTU)			Azikhjo iinkcukacha. Uhlolo ngokubona = ubukho bodaka busezantsi	
	Ukutsala umbane (mS/m)	10	12	Ibakala = A. isimbo = sizinzile	0.997 (phezulu)
Ukwahluka kwemvakalelo	Chl a: periphyton			Azikho iinkcukacha. Uhlolo ngokubona = alukho ukhulo olubaxekileyo lwe- algae	
	Chl a: phytoplankton				
	Ubukhulu bezinto ezingenamathambo			Ibakala B; ASPT = 7.2, SASS = 143 (uphando lwangoko). Lwendalo (RHP)	
	Inqaku lemigqeku yeentlanzi			C (olu phando)	
Ityhefu				Azikho iinkcukacha, kodwa ayinakubakho ingxaki	
LULONKE UHLELO LWESIKHUNDLA		**Ibakala A** (umzekelo wePAI)			

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UTafile 5.49: Imiqathango yendalo yekwaliti yamanzi (ii-EcoSpecs) kumlambo iGoukamma kwi-WQSU 2

UMLAMBO		Umlambo iGoukamma	**IINDAWO ZOHLOLO LWEKWALITI YAMANZI**			
I-WQSU		2	**DWAF WQ WMS**	Ayikho		
ISIKHUNDLA SE-EWR		Gou 1	**RHP**	Okwangoku isikhundla se- RHP siphaya phezulu kwindawo yoboniselo ngamanzi		
Ukukholelwa kuvavanyo lwe- PES		Kwibakala eliphantsi – kweliphakathi kuba ikhutshelwe ngaphandle ukususka kwenye indawo yohlolo (iKaratara R). iinkcukacha (ukususka kwiprojekhthi yangoku nendawo yoboniselo ngamanzi ephezulu iRHP) xhasa i-PES ethengisiweyo yekwaliti yamanzi.				
IZithako zeKwaliti yaManzi		**IBakala le-PES**	**ii-Eco specs ze-WQ**	**Ingaba ikho inkqubela efunekayo?**	**I-TPC**	**Ixesha elimiyo lohlolo**
Ilityuwa ezingezozendalo (mg/L)	$MgSO_4$	Azikho	≤16 mg/L	N/A	i-95th percentile ibe ngu < 16 mg/L	Rhoqo ngeenyanga ezimbini
	Na_2SO_4		≤20 mg/L		i-95th percentile ibe ngu < 20 mg/L	
	$MgCl_2$		≤15 mg/L		i-95th percentile ibe ngu < 15 mg/L	
	$CaCl_2$		≤21 mg/L		i-95th percentile ibe ngu < 21 mg/L	
	NaCl		≤45 mg/L		i-95th percentile ibe ngu < 45 mg/L	
Izondlo (mg/L)	**SRP**	**C**	**≤0.025 mg/L**	Ewe- B/C	i-50th percentile ibe ngu < 0.025 mg/L	Rhoqo ngeenyanga ezimbini
	TIN	A	≤0.25 mg/L	Hayi	i-50th percentile ibe ngu < 0.25 mg/L	Rhoqo ngeenyanga ezimbini
Ukwahluka kwendalo	pH	Umlambo one-asidi ngendalo	< 6.4	Hayi	i-95th percentile ibe ngu < 6.4	Rhoqo ngeenyanga ezimbini
	Ubushushu	Azikho iinkcukacha. Uhlolo ngokubona alubonisanga ngxaki yabukho bodaka.	Uluhlu lwendalo	N/A	Uluhlu lobushushu bendalo	Rhoqo ngeenyanga ezimbini
	i-oksijini enyibilikisiweyo		8 mg/L	N/A	5th percentile ibe ngu > 8 mg/L	Rhoqo ngeenyanga ezimbini
	Ubukho bodaka (NTU)		Ayikho inguqu	N/A	Ayikho inguqu evumelekileyo	Rhoqo ngeenyanga ezimbini
	Ukutsala umbane (mS/m)	A – kuzinzile	≤30 mS/m	No	i-95th percentile ibe ngu < 30 mS/m	Rhoqo ngeenyanga ezimbini
Ukwahluka ngokwemvakalelo	Chl a: periphyton	Azikho iinkcukacha. Uhlolo ngokubona alubonisanga ngxaki yabukho bodaka	≤ 1.7 mg/m² (ibakala A)	N/A	i-50th percentile ibe ngu < 1.7 mg/m²	Ngekota
	Chl a: phytoplankton		≤ 10 µg/L (ibakala B)		i-50th percentile ibe ngu < 10 µg/L	
	Ubukhulu bezinto eziphilayo ezingenamathambo (ASPT)	B (olu phando)	Bona ii-Ecospecs zeentlanzi nezezinto eziphilayo ezingenamathambo ngokulandelelanayo.			
	Inqaku lemigqeku yeentlanzi	C (olu phando)				

	Ukutyhefeka kwangaphakathi komjelo	Azikho iinkcukacha	Ayinakubakho ingxaki. Vavanya kuphela xa neziphumo zohlolo lwendalo zibonisa ukuba ikho ingxaki eqatseleyo futhi isizathu sayo asaziwa.
iityhefu		Azikho iinkcukacha.	

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UTafile 5.50: Amabakala e-PES novavanyo lwesikhundla lulonke kumlambo iKnysna kwi- WQSU 1

UMLAMBO	Umlambo iKnynsa		**IINDAWO ZOHLOLO LWEKWALITI YAMANZI**		
I-WQSU	I-WQSU 1		**I-RC**	Knysna R. @ Millwood K5H002Q01 ('77 – '80; n = 75)	
ISIKHUNDLA SE-EWR	1		**I-PES**	K5H002Q01 ('04 – '07; n = 26)	
Uvavanyo lokuba nakho	Kwinqanaba eliphakathi njengoko iinkcukacha zovavanyo lwentsukaphi nesimo sangoku zikho ngokwaneleyo				
IZithako zeKwaliti yaManzi			**Ixabiso le-RC**	**Ixabiso le-PES**	**Ibakala/Amagqabantshintshi**
Iityuwa ezingezozendalo (mg/L)	$MgSO_4$		7.18	7.19	U-TEACHA usetyenziselwe uhlolo lweenkcukacha. iityuwa = ibakala A.
	Na_2SO_4		1.49	4.20	
	$MgCl_2$		2.60	2.73	
	$CaCl_2$		11.50	3.92	
	NaCl		50.83*	39.54	
	$CaSO_4$		0.53	0.38	
Izondlo (mg/L)	SRP		0.011*	0.021	Ibakala A
	TIN		0.06	0.112	Ibakala A
Ukwahluka kwendalo	pH (5^{th} + 95^{th} %ile)		4.0 + 6.9	4.5 + 7.2	Ibakala A
	Ubushushu		-	-	Azikho iinkcukacha kodwa alikho ifuthe elilindelekileyo, nangona nje imibala engenziwa kangako ingabangela ukwenyuka kancinci kobushushu bangaphakathi emjelweni.
	i-oksijini enyibilikisiweyo		-	-	
	Ubukho bodaka (NTU)		-	-	Azikho iinkcukacha. Bukho ubungqina bobukho beentlengana ezithile obuboniweyo .
	Ukutsala umbane (mS/m)			9.0	Ibakala A.
Ukwahluka ngokwemvakalelo	Chl a: periphyton		-	4.08	Ukwanda okuthile kwezondlo kuboniswe ngamaxabiso e-periphyton (ibakala B; n=1).
	Chl a: phytoplankton		-	0.12	
	Ubukhulu bezinto eziphilayo ezingenamathambo		ASPT: mean of 8.1	ASPT: 6.9 MIRAI: 86.92%	IBakala B lwesimo sangoku.
	Inqaku lemigqeku yeentlanzi		-	FRAI: 86.4%	IBakala B lwesimo sangoku.
	iiDiatoms		-	SPI=18.9	Amanzi anekwaliti ephezulu
Iityhefu			-	-	Azikho iinkcukacha kodwa alikho ifuthe elilindelekileyo
LULONKE UHLELO LWESIKHUNDLA			**A/B kwi-WQSU 1**, nangona ilibakala A kwi-EWR 1 nakumphezulu womjelo wesikhundla (umzekelo we-PAI)		

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UTafile 5.51: Imiqathango yendalo yekwaliti yamanzi (ii-EcoSpecs) kumlambo iKnysna kwi- WQSU 1

Umlambo : iKnysna		**I-EWR: 1**	**Isikhundla sohlolo: K5H002Q01**
ii-metrics zekwaliti yamanzi		**ii-ECOSPEC**	
Ilityuwa ezingezozendalo*	$MgSO_4$	i-95th percentile yeenkcukacha mayibe ngu ≤ 16 mg/L.	
	Na_2SO_4	i-95th percentile yeenkcukacha mayibe ngu ≤ 20 mg/L.	
	$MgCl_2$	i- 95th percentile yeenkcukacha mayibe ngu ≤ 15 mg/L.	
	$CaCl_2$	i-95th percentile yeenkcukacha mayibe ngu ≤ 21 mg/L.	
	NaCl	i-95th percentile yeenkcukacha mayibe ngu ≤ 45 mg/L.	
	$CaSO_4$	i- 95th percentile yeenkcukacha mayibe ngu ≤ 351 mg/L.	
Ukwahluka kwendalo	EC	i- 95th percentile yeenkcukacha mayibe ngu ≤ 30 mS/m.	
	pH	-5th ne- 95th percentiles yeenkcukacha mayibe phakathi ko-4.5 no- 7.5.	
	Ubushushu	Uluhlu lobushushu bendalo.	
	i-oksijini enyibilikisiweyo	i-5th percentile yeenkcukacha mayibe ngu ≥ 8.0 mg/L.	
	Ubukho bodaka	Yahluka kancinci kolwaa luhlu lobukho bodaka lwendalo; ukubakho kweentlenge kwiindawo zokuphilisana zangaphakathi komjelo kuvumelekile.	
Izondlo	TIN	i-50th percentile yeenkcukacha mayibe ngu ≤ 0.25 mg/L.	
	PO_4-P	i- 50th percentile yeenkcukacha mayibe ngu ≤0.025 mg/L.	
Ukwahluka ngokwemvakalelo	Chl-a phytoplankton	i-50th percentile yeenkcukacha mayibe ngu <15 µg/L.	
	Chl-a periphyton	i- 50th percentile yeenkcukacha mayibe ngu ≤ 12 mg/m^2.	
Ilityhefu		i-95th percentile yeenkcukacha mayibe phakathi koluhlu lwekwaliti yamanzi engqaliweyo (i-Target Water Quality Range (TWQR) njengoko kubhaliwe ku DWAF (1996).	

* Ziza kufunyanwa ngokusebenzisa u-TEACHA xa ne-TPC ye-EC ibethe ngaphaya okanye ungcoliso lwetyuwa lulindelekile.

UTafile 5.52: ii-TPCs zekwaliti yamanzi kumlambo iKnysna kwi- WQSU 1

Umlambo: iKnysna		**I-EWR: 1**	**Isikhundla sohlolo: K5H002Q01**
Ii-metrics zekwaliti yamanzi		**I-TPC**	
Ilityuwa ezingezozendalo*	$MgSO_4$	i-95th percentile yeenkcukacha mayibe ngu- 13 – 16 mg/L.	
	Na_2SO_4	i- 95th percentile yeenkcukacha mayibe ngu- 16 – 20 mg/L.	
	$MgCl_2$	i- 95th percentile yeenkcukacha mayibe ngu- 12 – 15 mg/L.	
	$CaCl_2$	i- 95th percentile yeenkcukacha mayibe ngu- 17 – 21 mg/L.	
	NaCl	i- 95th percentile yeenkcukacha mayibe ngu- 36 – 45 mg/L.	
	$CaSO_4$	i-95th percentile yeenkcukacha mayibe ngu- 280 – 351 mg/L.	
Ukwahluka kwendalo	EC	i-95th percentile yeenkcukacha mayibe ngu- 24 – 30 mS/m.	
	pH	i- 5th ne- 95th percentiles yeenkcukacha mayibe phakathu kuka- <4.7 no>7.3.	
	Ubushushu	Uphambuka kancinci kolwaa luhlu lobushushu bendalo.	
	i-oksijini enyibilikisiweyo	i-5th percentile yeenkcukacha mayibe ngu- 8.2 – 8.0 mg/L.	
	Ubukho bodaka	Iinguqu eziphakathi kusetyenziso lomhlaba wendawo yoboniselo ngamanzi, oko kubangela iingqumba zeentlenge eziphezulu ngokugqithisileyo nobukho bodaka obukumanqanaba aphezuluModerate.	
Izondlo	TIN	i-50th percentile yeenkcukacha mayibe ngu 0.2 – 0.25 mg/L.	
	PO_4-P	i- 50th percentile yeenkcukacha mayibe ngu 0.02 – 0.025 mg/L.	
Ukwahluka ngokwemvakalelo	Chl-a phytoplankton	i- 50th percentile yeenkcukacha mayibe ngu 12 – 15 µg/L.	

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Umlambo: iKnysna		**I-EWR: 1**	**Isikhundla sohlolo: K5H002Q01**
Ii-metrics zekwaliti yamanzi		**I-TPC**	
	Chl-a periphyton	i-50th percentile yeenkcukacha mayibe ngu 10 – 12 mg/m^2.	
Ityefu		i-95th percentile yeenkcukacha mayibe phakathi koluhlu lwekwaliti yamanzi engqaliweyo (i-Target Water Quality Range (TWQR) njengoko kubhaliwe ku DWAF (1996).	

* Ziza kufunyanwa ngokusebenzisa u- TEACHA xa ne-TPC ye-EC ibetha ngaphaya nongcoliso lweetyuwa lulindelekile.

UTafile 5.53: Amabakala e-PES novavanyo lwesikhundla lulonke kumlambo iGouna kwi-WQSU 2

UMLAMBO	Gouna River		**IINDAWO ZOHLOLO LWEKWALITI YAMANZI**	
I-WQSU	I-WQSU 2		**I-RC**	Gouna R. @ Gouna Commonage K5H001Q01 ('77 – '80; n = 76)
ISIKHUNDLA SE-EWR	2		**I-PES**	K5H001Q01 ('81 – '84; n = 30)
Uvavanyo lokuba nakho	Liphantsi inwanaba ngenxa yeenkcukacha ezingephi, ngakumbi kwisimo sangoku			
iZithako zeKwaliti yaManzi		**Ixabiso le-RC**	**Ixabiso le-PES**	**Ibakala/Amagqabantshintshi**
Ityuwa ezingezozendalo (mg/L)	$MgSO_4$	14.45	23.19	UTEACHA usetyenzisiwe ukuze kwenziwe uhlolo lweenkcukacha. Ukunyukela phezulwana kweetyuwa kuboniwe, i.e. kwinqanaba A/B
	Na_2SO_4	3.78	0.30	
	$MgCl_2$	10.75	12.11	
	$CaCl_2$	10.59	9.35	
	NaCl	95.29*	102.20	
	$CaSO_4$	0.54	0.72	
Izondlo (mg/L)	SRP	0.009*	0.011	Inqanaba A
	TIN	0.070	0.120	Inqanaba A
Ukwahluka kwendalo	pH (5th + 95th %ile)	4.0 + 6.8	4.0 + 5.6	Inqanaba A njengoko incinane inguqu xa uyithelekisa naleyo yendalo.
	Ubushushu	-	-	Azikho iinkcukacha kodwa alikho ifuthe elilindelekileyo.
	i-oksijini enyibilikisiweyo	-	-	
	Ubukho bodaka (NTU)	-	-	Azikho iinkcukacha. Zikho iinlenge ezibonakala kumazantsi e- WQSU, i.e. ngaphantsi kwesitishi sokumpompa.
	Ukutsala umbane (mS/m)		15.0	Ibakala A.
Ukwahluka ngokwemvakalelo	Chl a: periphyton	-	43.70	Kuboniswa kukwenyuka komgangatho wexabiso le-periphyton value (Ibakala D; n=1).
	Chl a: phytoplankton	-	0.09	
	Ubukhulu bezinto eziphilayo ezingenamathambo	ASPT: 6.9 – 7.6	ASPT: 7.6 MIRAI: 92.8%	Ibakala A lesimo sangoku.
	Inqaku lemigqeku yeentlanzi	-	FRAI: 93.8%	Ibakala A lesimo sangoku.
	iiDiatoms	-	SPI=19.8	Amanzi anekwaliti ephezulu.
Ityhefu		-	-	Azikho iinkcukacha kodwa azikho iityhefu ezilindelekileyo.
LULONKE UHLELO LWESIKHUNDLA		**B nge-WQSU 2**, nangona ilibakala A ekunabeni komlambo ukuya kumphezulu womjelo wesitishi sokumpompa (umzekelo we-PAI)		

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UTafile 5.54: Imiqathango yendalo yekwaliti yamanzi (ii-EcoSpecs) kumlambo iGouna kwi-WQSU 2

Umlambo : i-Gouna		**I-EWR: 2**	**Isikhundla sohlolo: K5H001Q01**
ii-metrics zekwaliti yamanzi		**I-ECOSPEC**	
Ilityuwa ezingezozendalo*	$MgSO_4$	i-95th percentile yeenkcukacha mayibe ngu ≤ 23 mg/L.	
	Na_2SO_4	i-95th percentile yeenkcukacha mayibe ngu ≤ 20 mg/L.	
	$MgCl_2$	i-95th percentile yeenkcukacha mayibe ngu ≤ 15 mg/L.	
	$CaCl_2$	i-95th percentile yeenkcukacha mayibe ngu ≤ 21 mg/L.	
	NaCl	i-95th percentile yeenkcukacha mayibe ngu ≤ 191 mg/L.	
	$CaSO_4$	i- i-95th percentile yeenkcukacha mayibe ngu ≤ 351 mg/L.	
Ukwahluka kwendalo	EC	i-95th percentile yeenkcukacha mayibe ngu ≤ 43 mS/m.	
	pH	i- 5th ne-95th percentiles yeenkcukacha mayisuke ku- 4.5 ukuya ku7.5.	
	Ubushushu	Kwendalo ubukhulu becala ukuya kuphambuko oluncinane xa ukuthelekisa nolwaa luhlu lobushushu bendalo.	
	i-oksijini enyibilikisiweyo	i-5th percentile yeenkcukacha mayibe ngu ≥ 7.5 mg/L.	
	Ubukho bodaka	Yahluka kancinci kolwaa luhlu lobukho bodaka lwendalo; ukubakho kweentlenge kwiindawo zokuphilisana zangaphakathi komjelo kuvumelekile.	
Izondlo	TIN	i- 50th percentile yeenkcukacha mayibe ngu ≤ 0.15 mg/L.	
	PO_4-P	i- 50th percentile yeenkcukacha mayibe ngu ≤0.025 mg/L.	
Ukwahluka ngokwemvakalelo	Chl-a phytoplankton	i-50th percentile yeenkcukacha mayibe ngu <15 µg/L.	
	Chl-a periphyton	i- 50th percentile yeenkcukacha mayibe ngu ≤ 84 mg/m^{2}.	
Ilityhefu		i-95th percentile yeenkcukacha mayibe phakathi koluhlu lwekwaliti yamanzi engqaliweyo (i-Target Water Quality Range (TWQR) njengoko kubhaliwe ku DWAF (1996).	

* Ziza kufunyanwa ngokusebenzisa u-TEACHA xa ne-TPC ye-EC ibetha ngaphaya okanye ungcoliso lweetyuwa lulindelekile.

UTafile 5.55: Water quality Ii-TPCs zekwaliti yamanzi kumlambo iGouna kwi-WQSU 2

Umlambo: iGouna		**I-EWR: 2**	**Isikhundla sohlolo: K5H001Q01**
ii-metrics zekwaliti yamanzi		**i-TPC**	
Ilityuwa ezingezozendalo*	$MgSO_4$	i-95th percentile yeenkcukacha mayibe ngu- 18 – 23 mg/L.	
	Na_2SO_4	i- 95th percentile yeenkcukacha mayibe ngu- 16 – 20 mg/L.	
	$MgCl_2$	i-95th percentile yeenkcukacha mayibe ngu- 12 – 15 mg/L.	
	$CaCl_2$	i- 95th percentile yeenkcukacha mayibe ngu- 17 – 21 mg/L.	
	NaCl	i-95th percentile yeenkcukacha mayibe ngu- 36 – 45 mg/L.	
	$CaSO_4$	i-95th percentile yeenkcukacha mayibe ngu- 153 – 191 mg/L.	
Ukwahluka kwendalo	EC	i- 95th percentile yeenkcukacha mayibe ngu- 35 – 43 mS/m.	
	pH	i-5th ne-95th percentiles yeenkcukacha mayibe ngu- <4.7 and >7.3.	
	Ubushushu	Luncinci ukuya phakathi uphambuko ukusuka kolwaa luhlu lobushushu bendalo. Iintlobo eziboyika kunene ubushushu azikho ninzi kangako futhi zingaxhaphakanga kunokuba bekulindelekile ngokwemvelaphi. Kuncinci ukuya phakathi ukuphambuka kolwaa luhlu lobushushu bendalo.	
	i-oksijini enyibilikisiweyo	i-5th percentile of the mayibe ngu- 7.8 – 7.5 mg/L.	
	Ubukho bodaka	Iinguqu eziphakathi kusetyenziso lomhlaba wendawo yoboniselo ngamanzi, oko kubangela iingqumba zeentlenge eziphezulu ngokuqqithisileyo zexeshana nobukho bodaka obukumanqanaba aphezulu.	

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Umlambo: iGouna		**I-EWR: 2**	**Isikhundla sohlolo: K5H001Q01**
ii-metrics zekwaliti yamanzi		**i-TPC**	
Izondlo	TIN	i- 50th percentile yeenkcukacha mayibe ngu- 0.2 – 0.25 mg/L.	
	PO_4-P	i-50th percentile yeenkcukacha mayibe ngu -0.012 – 0.015 mg/L.	
Ukwahluka ngokwemvakalelo	Chl-a phytoplankton	i-50th percentile yeenkcukacha mayibe ngu- 12 – 15 µg/L.	
	Chl-a periphyton	i-50th percentile yeenkcukacha mayibe ngu- 67 – 84 mg/m^2.	
Ilityhefu		i-95th percentile yeenkcukacha mayibe phakathi koluhlu lwekwaliti yamanzi engqaliweyo (i-Target Water Quality Range (TWQR) njengoko kubhaliwe ku DWAF (1996).	

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6. ICANDELO LOBUNINZI BAMANZI ANGAPHANTSI KOMHLABA

Icandelo lobuninzi bamanzi angaphantsi komhlaba liqingqwe ngokuthi kusetyenziswe amaxabiso (okutsitsa ngokovuselelo nangokwamanzi angaphantsi komhlaba) afunyenwe ngelixa bekuqingqwa amahlelo emijelo yamanzi neenjongo ezibandakanyekayo ngokwekwaliti engqaliweyo yomjelo kwindawo yoboniselo ngamanzi i- Breede-Gouritz WMA, (DWS 2017), ebonisiweyo kuTafile 6.1.

Amaxabiso abemi afunyenwe kuvimba weenkcukacha weeNkonzo zaManzi ka2011 (i-Water Services dataset ka2011) kwindawo yoboniselo ngamanzi i-Breede, nkcukacha ezo zithatyathelwe kuphando lwamahlelo emijelo kwindawoyoboniselo ngamanzi i-Gouritz. UMjelo ohoyene neeMfuno zoLuntu (i-Basic Human Needs Reserve ngelasemzini) uhambisa iinkonzo ezisisiseko zabantu abafumana iinkonzo zamanzi kuloo mjelo uthile – s oko kuquka amanzi okusela, okupheka nawokuzicoca. Kwasetyenziswa umlinganiselo oyi- 25 litres ngomntu ngamnye ngemini.

UTafile 6.1: Umjelo wamanzi angaphantsi komhlaba iBreede-Gouritz

Ummandla woboniselo ngamanzi weminyaka emine	Vuselelo (Mm^3/a)	Abemi	iiMfuno ezisiSiseko zoluntu (Mm^3/a)	Amanzi angaphantsi komhlaba asisiseko (Mm^3/a)	Umjelo (Mm3/a)	Umjelo njenge % yovuselelo
G40A	13.06	15963	0.15	3.17	3.32	25.39
G40B	19.19	4612	0.04	5.33	5.37	27.99
G40C	45.16	38379	0.35	6.25	6.60	14.62
G40D	59.72	15963	0.15	14.45	14.60	24.44
G40E	13.19	7670	0.07	4.41	4.48	33.97
G40F	11.28	28422	0.26	2.12	2.38	21.09
G40G	16.02	17112	0.16	3.72	3.88	24.20
G40H	6.53	32767	0.30	1.58	1.88	28.77
G40J	6.92	1574	0.01	2.53	2.54	36.77
G40K	9.13	15963	0.15	4.67	4.82	52.75
G40L	13.96	15963	0.15	1.63	1.78	12.72
G40M	10.57	355	0.003	5.17	5.17	48.94
G50A	7.37	1370	0.01	2.61	2.62	35.58
G50B	6.59	1507	0.01	3.47	3.48	52.86
G50C	8.56	1748	0.02	2.05	2.07	24.13
G50D	5.39	9430	0.09	2.55	2.64	48.91
G50E	4.92	14355	0.13	1.37	1.50	30.51
G50F	6.64	1989	0.02	1.27	1.29	19.40
G50G	2.40	844	0.01	1.43	1.44	59.90
G50H	5.75	736	0.01	3.28	3.29	57.16
G50J	6.07	3325	0.03	1.90	1.93	31.80
G50K	2.72	1748	0.02	0.76	0.78	28.53
H10A	13.15	12494	0.11	0.76	0.87	6.65
H10B	12.20	12494	0.11	0.48	0.59	4.87
H10C	21.28	57300	0.52	2.00	2.52	11.86
H10D	14.89	12494	0.11	2.05	2.16	14.53
H10E	20.35	12494	0.11	3.20	3.31	16.29
H10F	25.24	20720	0.19	1.39	1.58	6.26
H10G	31.82	12494	0.11	0.44	0.55	1.74
H10H	28.48	12494	0.11	2.80	2.91	10.23

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Ummandla woboniselo ngamanzi weminyaka emine	Vuselelo (Mm^3/a)	Abemi	iiMfuno ezisiSiseko zoluntu (Mm^3/a)	Amanzi angaphantsi komhlaba asisiseko (Mm^3/a)	Umjelo (Mm3/a)	Umjelo njenge % yovuselelo
H10J	61.45	1035	0.01	7.94	7.95	12.94
H10K	43.17	12494	0.11	7.40	7.51	17.41
H10L	2.76	4268	0.04	0.00	0.04	1.41
H20A	2.42	427	0.00	0.47	0.47	19.58
H20B	5.37	17136	0.16	0.17	0.33	6.08
H20C	2.84	1266	0.01	0.05	0.06	2.17
H20D	8.74	1266	0.01	2.11	2.12	24.27
H20E	14.68	1266	0.01	2.01	2.02	13.77
H20F	8.65	875	0.01	0.32	0.33	3.79
H20G	4.83	1266	0.01	0.47	0.48	9.97
H20H	1.56	140420	1.28	0.07	1.35	86.62
H30A	5.17	1102	0.01	0.33	0.34	6.58
H30B	6.04	39573	0.36	0.16	0.52	8.63
H30C	10.59	1317	0.01	0.07	0.08	0.77
H30D	3.18	926	0.01	0.06	0.07	2.15
H30E	2.95	9784	0.09	0.31	0.40	13.53
H40A	3.74	2233	0.02	0.87	0.89	23.81
H40B	12.26	2152	0.02	0.87	0.89	7.26
H40C	4.90	2233	0.02	0.86	0.88	17.97
H40D	4.18	2233	0.02	1.85	1.87	44.75
H40E	10.91	2233	0.02	0.20	0.22	2.02
H40F	1.07	1798	0.02	0.58	0.60	55.74
H40G	3.22	2233	0.02	0.23	0.25	7.78
H40H	4.71	1217	0.01	0.13	0.14	3.00
H40J	4.44	26455	0.24	0.18	0.42	9.49
H40K	2.99	3916	0.04	0.24	0.28	9.22
H40L	2.47	2290	0.02	0.42	0.44	17.85
H50A	1.42	3842	0.04	0.26	0.30	20.78
H50B	5.04	5825	0.05	0.78	0.83	16.53
H60A	30.87	10083	0.09	2.49	2.58	8.36
H60B	42.43	7900	0.0720875	7.28	7.35	17.33
H60C	30.89	15284	0.14	1.64	1.78	5.76
H60D	14.76	511	0.00	0.95	0.95	6.47
H60E	9.73	10305	0.09	0.71	0.80	8.26
H60F	7.65	3321	0.03	0.66	0.69	9.02
H60G	4.11	10083	0.09	0.64	0.73	17.81
H60H	7.49	10083	0.09	1.14	1.23	16.45
H60J	8.17	10083	0.09	1.31	1.40	17.16
H60K	3.59	10083	0.09	1.04	1.13	31.53
H60L	2.88	10083	0.09	0.87	0.96	33.40
H70A	5.55	4786	0.04	1.47	1.51	27.27
H70B	22.83	19350	0.18	4.17	4.35	19.04

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Ummandla woboniselo ngamanzi weminyaka emine	Vuselelo (Mm^3/a)	Abemi	iiMfuno ezisiSiseko zoluntu (Mm^3/a)	Amanzi angaphantsi komhlaba asisiseko (Mm^3/a)	Umjelo (Mm3/a)	Umjelo njenge % yovuselelo
H70C	3.99	4915	0.04	0.23	0.27	6.89
H70D	20.70	4786	0.04	5.53	5.57	26.93
H70E	26.55	6729	0.06	5.16	5.22	19.67
H70F	15.50	2721	0.02	2.31	2.33	15.06
H70G	3.92	4786	0.04	1.26	1.30	33.26
H70H	2.80	746	0.01	1.89	1.90	67.74
H70J	3.95	4786	0.04	1.43	1.47	37.31
H70K	3.03	772	0.01	1.21	1.22	40.17
H80A	16.34	0	0.00	7.21	7.21	44.12
H80B	24.01	0	0.00	6.45	6.45	26.86
H80C	5.75	10 110	0.09	0.61	0.70	12.21
H80D	2.57	0	0.00	1.23	1.23	47.86
H80E	7.66	392	0.00	2.11	2.11	27.59
H80F	5.96	585	0.01	2.72	2.73	45.73
H90A	19.62	0	0.00	9.04	9.04	46.08
H90B	12.96	0	0.00	6.02	6.02	46.45
H90C	5.51	18 526	0.17	1.93	2.10	38.10
H90D	10.38	1 697	0.02	3.29	3.31	31.84
H90E	9.70	6 253	0.06	4.88	4.94	50.90
J11A	2.98	0	0.00	0.00	0.00	0.00
J11B	3.11	0	0.00	0.00	0.00	0.00
J11C	0.22	192	0.00	0.00	0.00	0.80
J11D	3.74	48	0.00	0.00	0.00	0.01
J11E	1.40	4 773	0.04	0.00	0.04	3.11
J11F	0.43	734	0.01	0.00	0.01	1.56
J11G	0.12	84	0.00	0.00	0.00	0.64
J11H	4.01	885	0.01	0.00	0.01	0.20
J11J	6.02	1 333	0.01	0.00	0.01	0.20
J11K	2.52	11 732	0.11	0.00	0.11	4.25
J12A	3.15	0	0.00	0.02	0.02	0.63
J12B	1.55	7 857	0.07	0.00	0.07	4.63
J12C	1.59	152	0.00	0.01	0.01	0.72
J12D	6.32	535	0.00	0.02	0.02	0.39
J12E	1.93	507	0.00	0.02	0.02	1.28
J12F	6.15	336	0.00	0.03	0.03	0.54
J12G	5.66	294	0.00	0.01	0.01	0.22
J12H	4.53	0	0.00	0.02	0.02	0.44
J12J	4.59	0	0.00	0.01	0.01	0.22
J12K	2.44	0	0.00	0.01	0.01	0.41
J12L	6.59	681	0.01	0.05	0.06	0.85
J12M	3.04	0	0.00	0.06	0.06	1.97
J13A	4.10	0	0.00	0.02	0.02	0.49

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Ummandla woboniselo ngamanzi weminyaka emine	Vuselelo (Mm^3/a)	Abemi	iiMfuno ezisiSiseko zoluntu (Mm^3/a)	Amanzi angaphantsi komhlaba asisiseko (Mm^3/a)	Umjelo (Mm3/a)	Umjelo njenge % yovuselelo
J13B	2.86	660	0.01	0.03	0.04	1.26
J13C	2.91	0	0.00	0.03	0.03	1.03
J21A	4.28	34 661	0.32	0.00	0.32	7.39
J21B	0.56	389	0.00	0.00	0.00	0.63
J21C	0.12	406	0.00	0.00	0.00	3.09
J21D	0.24	0	0.00	0.00	0.00	0.00
J21E	0.26	0	0.00	0.00	0.00	0.00
J22A	3.04	0	0.00	0.00	0.00	0.00
J22B	1.12	0	0.00	0.00	0.00	0.00
J22C	1.27	241	0.00	0.00	0.00	0.17
J22D	1.22	133	0.00	0.00	0.00	0.10
J22E	1.31	0	0.00	0.00	0.00	0.00
J22F	0.12	1 237	0.01	0.00	0.01	9.41
J22G	2.92	0	0.00	0.00	0.00	0.00
J22H	4.19	919	0.01	0.00	0.01	0.20
J22J	0.90	0	0.00	0.00	0.00	0.00
J22K	0.35	0	0.00	0.00	0.00	0.00
J23A	0.28	2 080	0.02	0.00	0.02	6.78
J23B	0.50	47	0.00	0.00	0.00	0.09
J23C	0.25	12	0.00	0.00	0.00	0.04
J23D	0.70	12	0.00	0.00	0.00	0.02
J23E	2.03	674	0.01	0.18	0.19	9.17
J23F	1.33	6 901	0.06	0.00	0.06	4.73
J23G	0.00	0	0.00	0.00	0.00	0.00
J23H	1.11	0	0.00	0.00	0.00	0.00
J23J	1.82	0	0.00	0.97	0.97	53.30
J24A	2.58	193	0.00	0.00	0.00	0.07
J24B	0.51	1 521	0.01	0.00	0.01	2.72
J24C	0.21	0	0.00	0.00	0.00	0.00
J24D	0.08	314	0.00	0.00	0.00	3.58
J24E	0.39	0	0.00	0.00	0.00	0.00
J24F	1.37	0	0.00	0.00	0.00	0.00
J25A	2.42	200	0.00	1.02	1.02	42.22
J25B	4.45	4 135	0.04	1.23	1.27	28.49
J25C	1.04	1 342	0.01	0.02	0.03	3.10
J25D	2.94	5 170	0.05	0.61	0.66	22.35
J25E	1.12	402	0.00	0.04	0.04	3.90
J31A	7.88	0	0.00	1.13	1.13	14.34
J31B	1.57	0	0.00	0.48	0.48	30.57
J31C	1.87	0	0.00	0.35	0.35	18.72
J31D	2.07	266	0.00	0.38	0.38	18.47
J32A	0.08	50	0.00	0.00	0.00	0.57

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Ummandla woboniselo ngamanzi weminyaka emine	Vuselelo (Mm^3/a)	Abemi	iiMfuno ezisiSiseko zoluntu (Mm^3/a)	Amanzi angaphantsi komhlaba asisiseko (Mm^3/a)	Umjelo (Mm3/a)	Umjelo njenge % yovuselelo
J32B	0.01	881	0.01	0.00	0.01	80.39
J32C	0.01	77	0.00	0.00	0.00	7.03
J32D	0.00	0	0.00	0.00	0.00	0.00
J32E	1.76	719	0.01	0.00	0.01	0.37
J33A	4.81	130	0.00	1.44	1.44	29.96
J33B	8.98	680	0.01	1.47	1.48	16.44
J33C	2.83	76	0.00	0.01	0.01	0.38
J33D	3.82	255	0.00	1.24	1.24	32.52
J33E	8.22	13 522	0.12	1.98	2.10	25.59
J33F	4.50	34 154	0.31	2.19	2.50	55.59
J34A	3.08	7 465	0.07	1.48	1.55	50.26
J34B	6.44	1 850	0.02	2.85	2.87	44.52
J34C	9.60	669	0.01	3.51	3.52	36.63
J34D	4.06	1 915	0.02	1.80	1.82	44.77
J34E	2.29	1 321	0.01	1.13	1.14	49.87
J34F	3.44	2 928	0.03	0.47	0.50	14.44
J35A	8.47	31 018	0.28	1.20	1.48	17.51
J35B	8.12	5 831	0.05	1.24	1.29	15.93
J35C	1.98	3 633	0.03	0.88	0.91	46.12
J35D	9.82	5 284	0.05	3.65	3.70	37.66
J35E	1.33	1 224	0.01	0.21	0.22	16.63
J35F	6.67	2 796	0.03	2.02	2.05	30.67
J40A	9.73	970	0.01	5.03	5.04	51.79
J40B	5.45	0	0.00	2.71	2.71	49.72
J40C	15.81	1 076	0.01	6.58	6.59	41.68
J40D	10.21	8 056	0.07	4.20	4.27	41.86
J40E	7.48	1 908	0.02	3.45	3.47	46.36
K10A	2.34	53 970	0.49	1.16	1.65	70.62
K10B	1.96	4 727	0.04	1.20	1.24	63.43
K10C	4.43	0	0.00	2.33	2.33	52.60
K10D	2.53	1 579	0.01	1.10	1.11	44.05
K10E	13.70	4 122	0.04	4.30	4.34	31.66
K10F	2.82	7 002	0.06	0.99	1.05	37.37
K20A	19.85	9 650	0.09	6.15	6.24	31.43
K30A	28.06	6 994	0.06	7.15	7.21	25.71
K30B	21.52	6 334	0.06	5.03	5.09	23.64
K30C	27.80	146 970	1.34	7.83	9.17	32.99
K30D	18.44	9 839	0.09	7.43	7.52	40.78
K40A	8.99	512	0.00	3.79	3.79	42.21
K40B	13.52	0	0.00	4.85	4.85	35.87
K40C	17.00	6 256	0.06	4.32	4.38	25.75
K40D	17.74	20 130	0.18	3.71	3.89	21.95

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Ummandla woboniselo ngamanzi weminyaka emine	Vuselelo (Mm^3/a)	Abemi	iiMfuno ezisiSiseko zoluntu (Mm^3/a)	Amanzi angaphantsi komhlaba asisiseko (Mm^3/a)	Umjelo (Mm3/a)	Umjelo njenge % yovuselelo
K40E	26.56	13 515	0.12	10.61	10.73	40.41
K50A	27.43	49	0.00	10.09	10.09	36.79
K50B	24.71	14 745	0.13	8.58	8.71	35.27
K60A	6.43	154	0.00	4.20	4.20	65.34
K60B	8.43	43	0.00	5.70	5.70	67.62
K60C	10.95	1 668	0.02	6.60	6.62	60.41
K60D	23.54	681	0.01	12.43	12.44	52.83
K60E	6.39	2 392	0.02	3.95	3.97	62.16
K60F	14.35	10 113	0.09	9.35	9.44	65.80
K60G	11.31	23 053	0.21	5.02	5.23	46.25
K70A	14.30	5 364	0.05	6.84	6.89	48.17
K70B	20.46	852	0.01	4.46	4.47	21.84

UMJELO OPHAKANYISWAYO WAMANZI ANGAPHANTSI KOMHLABA – IBAKALA LEKWALITI YAMANZI

Ikwaliti yamanzi angaphantsi komhlaba kwiindawo zoboniselo ngamanzi zeminyaka emine – xa sijonge ezi nkcukacha zikhoyo zekhemisti yamanzi – yavavanywa kusetyenziswa olwaa luhlu lomlinganiselo ongqaliweyo wamanzi nekwaliti yamanzi, njengoko kubonisiwe kuTafile 6.2 apha ngezantsi. Isishwankathelo seziphumo zohlelo lwekwaliti yamanzi angaphantsi komhlaba kwinqanaba leminyaka eminye ngokweemfuno ezisisiseko zoluntu sifakiwe kwiitafile ezilandelayo.

UTafile 6.2: ikwaliti yamanzi yendalo naleyo yenziwe ngeekhemikhali

Umda	Uluhlu olungqaliweyo lwekwaliti yamanzi [1)]				
	ii-Unithi	Ihlelo 0	Ihlelo I	Ihlelo II	Ihlelo III
i-pH	ii-unithi ze-pH	6 – 9	5 – 6 & 9 – 9.5	4 – 5 & > 9.5 – 10	<4 & > 10
Ukutsala umbane	mS/m	< 70	70 - 150	150 – 370	> 370
I-Calcium njenge-Ca	mg/l	< 80	80 - 150	150 – 300	> 300
I-Magnesium as Mg	mg/l	< 70	70 - 100	100 – 200	> 200
I-Sodium as Na	mg/l	< 100	100 - 200	200 – 400	> 400
I-Chloride as Cl	mg/l	< 100	100 - 200	200 – 600	> 600
I-Sulphate as SO_4	mg/l	< 200	200 - 400	400 – 600	> 600
I-Nitrate as NO_x-N	mg/l	< 6	6 - 10	10 – 20	> 20
I-Fluoride as F	mg/l	<0.7	0.7 – 1.0	1.0 – 1.5	> 1.5

1) Uluhlu lweencwadi ezisetyenzisiweyo: Ubugcisa bokuhlela ngokweNgxelo yeKomishoni yoPhando ngezaManzi– i-Water Research Commission: Quality of Domestic Water Supplies – Volume 1. Report No. TT 101/98, Second Edition, 1998.

Iqondo lekwaliti yamanzi zange livavanywe kwezi ndawo zoboniselo ngamanzi zilandelayo ngenxa yeenkcukacha ezinganelanga zolwazi olunekayo (oko kukuthi azikho iinkcukacha malunga nekwaliti yobumeli yamanzi angaphantsi komhlaba):

- G40B; G40D; G40E; G40G; G40K
- G50A; G50B; G50C; G50D; G50G; G50J
- H10D; H10E; H10J; H10K
- H20C; H20G; H20H
- H30B; H30E
- H40C; H40D; H40E; H40G; H40J; H40K; H40L
- H50A; H50B
- H60A; H60B; H60C; H60D; H60E; H60F; H60G; H60H; H60J; H60K; H60L
- H70A; H70C; H70D; H70E; H70F; H70G; H70H; H70J

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- J11A; J11C; J11D; J11F; J11H; J11J; J11K
- J12A; J12C; J12E; J12J; J12M
- J13A; J13C, J22A; J22G; J22K, J23B; J23E; J23J, J24, J25B; J25D; J25E
- J31A; J31B; J31C, J32D, J33A; J33B; J33C, J34C; J34E, J35C; J35E; J35F
- J40A; J40B; J40C
- K10C; K10E; K10F
- K20A
- K30A; K30C; K30D
- K40A; K40B; K40C; K40D; K40E
- K50A
- K60A; K60B; K60C; K60D; K60E; K60F; K60G
- K70A; K70B

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UTafile 6.3. UMjelo weKwaliti yaManzi angaPhantsi komhlaba: kuMmandla woLawulo lwaManzi iBreede Gouritz

Umda wekhemikhali	I-Unithi	liNdawo zoBoniselo ngaManzi: G40C, G40F, G40J, G40L												
		INani leeSampulu				Inkangeleko yeKwaliti yeGW okanye ixabiso eliphakathi layo [1]				Umjelo i-BHN [2]	UMjelo weKwaliti yaManzi[3]			
		G40C	G40F	G40J	G40L	G40C	G40F	G40J	G40L		G40C	G40F	G40J	G40L
i-pH		39	61	45	43	7.09	7.26	7.01	8.16	5.0 – 9.5	6.38–7.80	6.53–7.99	6.31–7.71	7.34–8.97
ukutsala umbane	mS/m	39	61	45	43	20.70	20.90	21.20	208.00	<150	22.77	22.99	23.32	228.80
i-Calcium njengo- Ca	mg/l	36	57	42	40	7.94	7.67	7.68	105.32	<150	8.73	8.43	8.45	115.85
i-Magnesium njengo- Mg	mg/l	36	57	42	40	3.30	3.30	3.40	33.40	<100	3.63	3.63	3.74	36.74
i-Sodium njengo- Na	mg/l	36	55	42	38	18.08	18.40	18.32	**253.05**	<200	19.89	20.24	20.16	**253.05**
i-Chloride njengo-Cl	mg/l	36	58	42	40	31.94	32.69	32.57	**391.39**	<200	35.13	35.96	35.83	**391.39**
i-Sulphate njengo- SO_4	mg/l	36	58	42	40	5.71	5.35	5.81	78.14	<400	6.28	5.89	6.39	85.95
i-Nitrate njengo- NO_x-N	mg/l	36	57	42	38	0.04	0.05	0.06	5.17	<10	0.04	0.06	0.07	5.68
i-Fluoride njengo- F	mg/l	36	54	42	35	0.30	0.31	0.29	0.28	<1.0	0.33	0.34	0.32	0.31
Umda wekhemikhali	**I-Unithi**	**liNdawo zoBoniselo ngaManzi G40M, G50E, G50F, G50H**												
		INani leeSampulu				**Inkangeleko yeKwaliti yeGW okanye ixabiso eliphakathi layo [1]**				**Umjelo we-BHN[2]**	**Umjelo wekwaliti yamanzi angaphantsi komhlaba[3]**			
		G40M	**G50E**	**G50F**	**G50H**	**G40M**	**G50E**	**G50F**	**G50H**		**G40M**	**G50E**	**G50F**	**G50H**
i-pH		37	49	45	23	8.17	6.21	8.17	8.02	5.0 – 9.5	7.35–8.99	5.59–6.83	7.35–8.99	7.22–8.82
ukutsala umbane	mS/m	37	49	45	23	109.10	54.90	91.90	**1630.00**	<150	120.01	60.39	101.09	**1630.00**
i-Calcium njengo- Ca	mg/l	37	44	42	23	88.34	4.37	84.20	**182.00**	<150	97.18	4.81	92.62	**182.00**
i-Magnesium njengo- Mg	mg/l	37	44	42	23	15.03	8.91	12.37	**358.00**	<100	16.54	9.81	13.61	**358.00**
i-Sodium njengo- Na	mg/l	37	42	40	23	113.15	80.39	85.23	**3107.18**	<200	124.47	88.43	93.76	**3107.18**
i-Chloride njengo-Cl	mg/l	37	44	42	23	**203.98**	143.85	153.44	**5302.10**	<200	**203.98**	158.24	168.79	**5302.10**
i-Sulphate njengo- SO_4	mg/l	37	44	41	23	31.52	20.58	25.59	**742.40**	<400	34.67	22.64	28.15	**742.40**
i-Nitrate njengo- NO_x-N	mg/l	37	43	40	23	1.70	0.06	0.26	0.13	<10	1.87	0.07	0.29	0.14
i-Fluoride njengo- F	mg/l	37	40	39	23	0.18	0.11	0.22	1.35	<1.0	0.20	0.12	0.25	1.49

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Umda wekhemikhali	I-Unithi	IiNdawo zoBoniselo ngaManzi G50J, H10A, H10B, H10C												
		INani leeSampulu				Inkangeleko yeKwaliti yeGW okanye ixabiso eliphakathi layo [1]				Umjelo we-BHN[2]	Umjelo wekwaliti yamanzi angaphantsi komhlaba[3]			
		G50J	H10A	H10B	H10C	G50J	H10A	H10B	H10C		G50J	H10A	H10B	H10C
i-pH		9	34	73	60	7.58	7.69	7.88	7.33	5.0 – 9.5	6.82–8.34	6.92–8.46	7.09–8.67	6.60–8.06
ukutsala umbane	mS/m	9	34	73	60	**142.90**	**180.00**	49.00	45.60	<150	**157.19**	**180.00**	53.90	50.16
i-Calcium njengo- Ca	mg/l	9	34	70	60	92.00	65.00	46.98	20.35	<150	101.20	71.50	51.67	22.39
i-Magnesium njengo- Mg	mg/l	9	34	70	60	23.40	54.25	6.72	12.85	<100	25.74	59.68	7.39	14.14
i-Sodium njengo- Na	mg/l	9	34	68	60	194.60	219.35	36.21	49.80	<200	**200.00**	241.29	39.83	54.78
i-Chloride njengo-Cl	mg/l	9	34	70	60	**338.90**	380.55	80.09	106.25	<200	**338.90**	418.61	88.10	116.88
i-Sulphate njengo- SO_4	mg/l	9	34	70	60	38.70	153.60	21.75	22.30	<400	42.57	168.96	23.92	24.53
i-Nitrate njengo- NO_x-N	mg/l	9	34	70	60	1.04	0.42	0.17	0.44	<10	1.14	0.46	0.19	0.48
i-Fluoride njengo- F	mg/l	9	34	68	60	0.16	0.34	0.18	0.17	<1.0	0.18	0.37	0.20	0.19
Umda wekhemikhali	**I-Unithi**	**IiNdawo zoBoniselo ngaManzi H10F, H10G, H10H, H10L**												
		INani leeSampulu				**Inkangeleko yeKwaliti yeGW okanye ixabiso eliphakathi layo [1]**				**Umjelo we-BHN[2]**	**Umjelo wekwaliti yamanzi angaphantsi komhlaba[3]**			
		H10F	**H10G**	**H10H**	**H10L**	**H10F**	**H10G**	**H10H**	**H10L**		**H10F**	**H10G**	**H10H**	**H10L**
i-pH		15	117	54	82	7.29	7.05	7.59	6.98	5.0 – 9.5	6.56–8.02	6.35–7.76	6.83–8.35	6.28–7.68
ukutsala umbane	mS/m	15	117	54	82	24.70	13.40	117.70	9.87	<150	27.17	14.74	129.47	10.85
i-Calcium njengo- Ca	mg/l	15	111	53	78	6.10	7.49	28.50	3.70	<150	6.71	8.24	31.35	4.07
i-Magnesium njengo- Mg	mg/l	15	112	53	78	12.00	2.80	28.30	2.12	<100	13.20	3.08	31.13	2.34
i-Sodium njengo- Na	mg/l	12	107	52	76	18.85	12.10	176.10	8.60	<200	20.74	13.31	193.71	9.46
i-Chloride njengo-Cl	mg/l	15	114	54	79	30.50	18.45	**308.75**	14.80	<200	33.55	20.30	**308.75**	16.28
i-Sulphate njengo- SO_4	mg/l	12	109	52	79	4.15	5.50	53.65	3.00	<400	4.57	6.05	59.02	3.30
i-Nitrate njengo- NO_x-N	mg/l	15	112	54	78	0.06	0.25	0.03	0.18	<10	0.07	0.28	0.03	0.20
i-Fluoride njengo- F	mg/l	15	110	54	75	0.31	0.16	0.57	0.12	<1.0	0.34	0.17	0.62	0.13

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Umda wekhemikhali	I-Unithi	IiNdawo zoBoniselo ngaManzi H20A, H20B, H20D, H20E												
		INani leeSampulu				Inkangeleko yeKwaliti yeGW okanye ixabiso eliphakathi layo [1]				Umjelo we-BHN[2]	Umjelo wekwaliti yamanzi angaphantsi komhlaba[3]			
		H20A	H20B	H20D	H20E	H20A	H20B	H20D	H20E		H20A	H20B	H20D	H20E
i-pH		85	344	12	15	7.20	7.09	6.77	6.46	5.0 – 9.5	6.48–7.92	6.38–7.79	6.09–7.44	5.81–7.11
ukutsala umbane	mS/m	85	344	12	15	50.60	40.75	12.75	2.30	<150	55.66	44.83	14.03	2.53
i-Calcium njengo- Ca	mg/l	85	344	12	15	34.80	23.45	9.70	0.50	<150	38.28	25.80	10.67	0.55
i-Magnesium njengo- Mg	mg/l	85	344	12	15	5.60	9.15	2.15	0.50	<100	6.16	10.07	2.37	0.55
i-Sodium njengo- Na	mg/l	85	344	11	15	25.70	31.80	7.70	2.60	<200	28.27	34.98	8.47	2.86
i-Chloride njengo-Cl	mg/l	85	344	12	15	55.00	50.55	13.90	1.50	<200	60.50	55.61	15.29	1.65
i-Sulphate njengo- SO_4	mg/l	85	344	11	15	81.20	39.65	4.00	2.00	<400	89.32	43.62	4.40	2.20
i-Nitrate njengo- NO_x-N	mg/l	85	344	12	15	0.05	0.90	0.33	0.05	<10	0.06	0.99	0.36	0.06
i-Fluoride njengo- F	mg/l	85	344	12	15	0.11	0.13	0.05	0.05	<1.0	0.12	0.14	0.06	0.06

Umda wekhemikhali	I-Unithi	IiNdawo zoBoniselo ngaManzi H20F, H30A, H30C, H30D												
		INani leeSampulu				Inkangeleko yeKwaliti yeGW okanye ixabiso eliphakathi layo [1]				Umjelo we-BHN[2]	Umjelo wekwaliti yamanzi angaphantsi komhlaba[3]			
		H20F	H30A	H30C	H30D	H20F	H30A	H30C	H30D		H20F	H30A	H30C	H30D
i-pH		302	9	21	45	7.10	7.95	7.70	7.81	5.0 – 9.5	6.39–7.80	7.16–8.75	6.93–8.47	7.03–8.59
ukutsala umbane	mS/m	302	9	21	45	29.00	**142.00**	41.70	19.50	<150	31.90	**156.20**	45.87	21.45
i-Calcium njengo- Ca	mg/l	302	9	21	42	22.80	63.80	36.40	17.10	<150	25.08	70.18	40.04	18.81
i-Magnesium njengo- Mg	mg/l	302	9	21	42	4.70	32.50	6.00	3.31	<100	5.17	35.75	6.60	3.64
i-Sodium njengo- Na	mg/l	302	9	21	40	24.90	191.90	37.00	10.94	<200	27.39	**200.00**	40.70	12.04
i-Chloride njengo-Cl	mg/l	302	9	21	43	28.30	**273.50**	82.00	18.08	<200	31.13	**300.85**	90.20	19.89
i-Sulphate njengo- SO_4	mg/l	302	9	21	43	28.00	121.90	48.00	4.30	<400	30.80	134.09	52.80	4.73
i-Nitrate njengo- NO_x-N	mg/l	302	9	21	42	0.11	0.02	0.02	0.13	<10	0.12	0.02	0.02	0.14
i-Fluoride njengo- F	mg/l	302	9	16	40	0.10	0.55	0.23	0.16	<1.0	0.11	0.61	0.25	0.18

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Umda wekhemikhali	I-Unithi	IiNdawo zoBoniselo ngaManzi H40A, H40B, H40F, H70B											
		INani leeSampulu				Inkangeleko yeKwaliti yeGW okanye ixabiso eliphakathi layo [1]				Umjelo we-BHN[2]	Umjelo wekwaliti yamanzi angaphantsi komhlaba[3]		
		H40A	H40B	H40F	H70B	H40A	H40B	H40F	H70B		H40A	H40B	H40F	H70B
i-pH		54	14	17	9	7.86	7.35	6.54	8.21	5.0 – 9.5	7.07–8.65	6.62–8.09	5.89–7.19	7.39–9.03
ukutsala umbane	mS/m	55	14	17	9	112.50	10.88	28.90	**925.00**	<150	123.75	11.97	31.79	**925.00**
i-Calcium njengo- Ca	mg/l	48	14	17	9	92.38	2.24	14.80	98.9	<150	101.62	2.47	16.28	108.79
i-Magnesium njengo- Mg	mg/l	49	14	17	9	44.90	0.93	7.00	**259.10**	<100	49.39	1.02	7.70	**259.10**
i-Sodium njengo- Na	mg/l	47	12	17	9	88.94	21.43	26.30	**1722.90**	<200	97.83	23.57	28.93	**1722.90**
i-Chloride njengo-Cl	mg/l	50	14	17	9	127.45	21.15	35.90	**2741.20**	<200	140.20	23.27	39.49	**2741.20**
i-Sulphate njengo- SO_4	mg/l	50	14	17	9	229.91	3.50	20.70	338.60	<400	252.90	3.85	22.77	372.46
i-Nitrate njengo- NO_x-N	mg/l	50	14	17	9	0.06	0.18	4.70	0.02	<10	0.06	0.20	5.27	0.02
i-Fluoride njengo- F	mg/l	46	13	17	9	0.43	0.36	0.05	**1.75**	<1.0	0.47	0.39	0.06	**1.75**
Umda wekhemikhali	**I-Unithi**	**IiNdawo zoBoniselo ngaManzi H70K, H90D, H90E, J11B**											
		INani leeSampulu				**Inkangeleko yeKwaliti yeGW okanye ixabiso eliphakathi layo [1]**				**Umjelo we-BHN[2]**	**Umjelo wekwaliti yamanzi angaphantsi komhlaba[3]**		
		H70K	**H90D**	**H90E**	**J11B**	**H70K**	**H90D**	**H90E**	**J11B**		**H70K**	**H90D**	**H90E**	**J11B**
i-pH		29	21	85	37	7.50	8.12	8.09	7.80	5.0 – 9.5	6.75–8.25	7.31–8.94	7.28–8.90	7.02–8.58
ukutsala umbane	mS/m	29	21	85	37	121.00	102.70	**179.00**	81.30	<150	133.10	112.97	**179.00**	89.43
i-Calcium njengo- Ca	mg/l	26	21	81	37	46.20	53.66	87.18	60.50	<150	50.82	59.02	95.89	66.55
i-Magnesium njengo- Mg	mg/l	26	21	82	37	19.20	17.40	28.50	18.40	<100	21.12	19.14	31.35	20.24
i-Sodium njengo- Na	mg/l	26	21	80	37	166.95	144.96	**208.48**	79.20	<200	183.65	159.45	**208.48**	87.12
i-Chloride njengo-Cl	mg/l	26	20	81	37	**273.10**	**247.79**	**358.72**	94.70	<200	**273.10**	**247.79**	**358.72**	104.17
i-Sulphate njengo- SO_4	mg/l	26	21	82	37	29.88	33.16	36.65	68.60	<400	32.87	36.47	40.31	75.46
i-Nitrate njengo- NO_x-N	mg/l	26	20	79	37	0.02	0.83	3.40	1.41	<10	0.02	0.91	3.74	1.55
i-Fluoride njengo- F	mg/l	26	20	77	37	0.52	0.14	0.18	0.82	<1.0	0.57	0.15	0.19	0.90

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Umda wekhemikhali	I-Unithi	IiNdawo zoBoniselo ngaManzi J11E, J11G, J12B, J12D												
		INani leeSampulu				Inkangeleko yeKwaliti yeGW okanye ixabiso eliphakathi layo [1]				Umjelo we-BHN[2]	Umjelo wekwaliti yamanzi angaphantsi komhlaba[3]			
		J11E	J11G	J12B	J12D	J11E	J11G	J12B	J12D		J11E	J11G	J12B	J12D
i-pH		81	20	17	11	8.19	8.18	7.73	8.23	5.0 – 9.5	7.37–9.01	7.36–9.00	6.96–8.50	7.41–9.05
ukutsala umbane	mS/m	81	20	17	11	**174.30**	**164.50**	**368.00**	**195.00**	<150	**174.30**	**164.50**	**368.00**	**195.00**
i-Calcium njengo- Ca	mg/l	77	20	17	11	98.70	115.05	117.10	68.30	<150	108.57	126.56	128.81	75.13
i-Magnesium njengo- Mg	mg/l	77	20	17	11	45.00	44.65	**129.30**	50.60	<100	49.50	49.12	**129.30**	55.66
i-Sodium njengo- Na	mg/l	73	20	17	11	197.89	190.65	**335.70**	**252.80**	<200	217.68	**200.00**	**335.70**	**252.80**
i-Chloride njengo-Cl	mg/l	75	20	17	11	**250.10**	**294.70**	**726.10**	**415.00**	<200	**250.10**	**294.70**	**726.10**	**415.00**
i-Sulphate njengo- SO_4	mg/l	77	20	17	11	179.50	120.45	144.20	104.80	<400	197.45	132.50	158.62	115.28
i-Nitrate njengo- NO_x-N	mg/l	71	20	17	11	0.30	1.18	0.06	0.02	<10	0.33	1.29	0.07	0.02
i-Fluoride njengo- F	mg/l	67	20	17	11	0.88	0.92	0.80	0.53	<1.0	0.96	0.92	0.88	0.58
Umda wekhemikhali	**I-Unithi**	**IiNdawo zoBoniselo ngaManzi J12F, J12G, J12H, J12K**												
		INani leeSampulu				**Inkangeleko yeKwaliti yeGW okanye ixabiso eliphakathi layo [1]**				**Umjelo we-BHN[2]**	**Umjelo wekwaliti yamanzi angaphantsi komhlaba[3]**			
		J12F	**J12G**	**J12H**	**J12K**	**J12F**	**J12G**	**J12H**	**J12K**		**J12F**	**J12G**	**J12H**	**J12K**
i-pH		10	11	13	10	8.23	8.20	7.75	8.13	5.0 – 9.5	7.41–9.05	7.38–9.02	6.98–8.53	7.32–8.94
ukutsala umbane	mS/m	10	11	13	10	**306.50**	**323.00**	**157.00**	**462.00**	<150	**306.50**	**323.00**	**157.00**	**462.00**
i-Calcium njengo- Ca	mg/l	10	11	13	10	79.65	103.10	121.90	**212.95**	<150	87.62	113.41	134.09	**212.95**
i-Magnesium njengo- Mg	mg/l	10	11	13	10	81.35	91.80	26.00	112.55	<100	89.49	100.98	28.60	123.81
i-Sodium njengo- Na	mg/l	10	11	13	10	**406.70**	**262.30**	151.50	**703.25**	<200	**406.70**	**262.30**	166.65	**703.25**
i-Chloride njengo-Cl	mg/l	10	11	13	10	**691.30**	**795.60**	**258.70**	**1168.85**	<200	**691.30**	**795.60**	**258.70**	**1168.85**
i-Sulphate njengo- SO_4	mg/l	10	11	13	10	241.45	107.20	156.00	**459.80**	<400	265.60	117.92	171.60	**459.80**
i-Nitrate njengo- NO_x-N	mg/l	10	11	13	10	0.02	0.02	0.02	0.02	<10	0.02	0.02	0.02	0.02
i-Fluoride njengo- F	mg/l	10	11	13	10	0.56	0.50	0.39	0.55	<1.0	0.61	0.55	0.43	0.61

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Umda wekhemikhali	I-Unithi	IiNdawo zoBoniselo ngaManzi J12L, J13B, J21A, J21B												
		INani leeSampulu				Inkangeleko yeKwaliti yeGW okanye ixabiso eliphakathi layo [1]				Umjelo we-BHN[2]	Groundwater Quality Reserve[3]			
		J12L	J13B	J21A	J21B	J12L	J13B	J21A	J21B		J12L	J13B	J21A	J21B
i-pH		57	15	64	56	7.54	7.98	7.97	7.60	5.0 – 9.5	6.79–8.29	7.18–8.78	7.17–8.76	6.84–8.35
ukutsala umbane	mS/m	57	15	64	56	25.50	**418.00**	61.40	100.50	<150	28.05	**418.00**	67.54	110.55
i-Calcium njengo- Ca	mg/l	54	14	60	56	16.11	94.90	58.18	60.10	<150	17.72	104.39	64.00	66.11
i-Magnesium njengo- Mg	mg/l	54	15	59	56	2.89	93.80	18.81	19.45	<100	3.18	103.18	20.69	21.40
i-Sodium njengo- Na	mg/l	52	15	60	54	21.85	**623.60**	43.23	116.95	<200	24.03	**623.60**	47.55	128.65
i-Chloride njengo-Cl	mg/l	53	15	58	56	30.71	**906.39**	18.77	104.70	<200	33.78	**906.39**	20.64	115.17
i-Sulphate njengo- SO_4	mg/l	54	15	57	54	7.55	253.60	75.14	113.80	<400	8.31	278.96	82.65	125.18
i-Nitrate njengo- NO_x-N	mg/l	52	15	54	56	0.03	0.35	0.09	2.56	<10	0.03	0.39	0.09	2.81
i-Fluoride njengo- F	mg/l	51	15	54	56	0.21	0.72	0.46	0.87	<1.0	0.23	0.79	0.51	0.96

Umda wekhemikhali	I-Unithi	IiNdawo zoBoniselo ngaManzi J21C, J21D, J21E, J22B												
		INani leeSampulu				Inkangeleko yeKwaliti yeGW okanye ixabiso eliphakathi layo [1]				Umjelo we-BHN[2]	Umjelo wekwaliti yamanzi angaphantsi komhlaba[3]			
		J21C	J21D	J21E	J22B	J21C	J21D	J21E	J22B		J21C	J21D	J21E	J22B
i-pH		107	40	26	21	7.75	7.66	7.96	8.00	5.0 – 9.5	6.98–8.53	6.89–8.42	7.16–8.76	7.20–8.80
ukutsala umbane	mS/m	107	40	26	21	76.40	85.20	78.80	74.20	<150	84.04	93.72	86.68	81.62
i-Calcium njengo- Ca	mg/l	107	40	26	21	56.90	43.30	61.00	60.30	<150	62.59	47.63	67.10	66.33
i-Magnesium njengo- Mg	mg/l	107	40	26	21	16.40	17.70	16.00	24.80	<100	18.04	19.47	17.60	27.28
i-Sodium njengo- Na	mg/l	107	38	26	21	83.80	107.90	83.40	67.90	<200	92.18	118.69	91.74	74.69
i-Chloride njengo-Cl	mg/l	107	40	26	21	76.90	102.60	93.00	57.20	<200	84.59	112.86	102.30	62.92
i-Sulphate njengo- SO_4	mg/l	107	38	26	21	83.50	95.70	53.05	63.40	<400	91.85	105.27	58.36	69.74
i-Nitrate njengo- NO_x-N	mg/l	107	39	26	21	3.13	3.55	2.23	1.95	<10	3.44	3.91	2.45	2.15
i-Fluoride njengo- F	mg/l	107	40	26	21	0.68	**1.00**	0.95	0.91	<1.0	0.75	**1.00**	0.95	1.00

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Umda wekhemikhali	I-Unithi	liNdawo zoBoniselo ngaManzi J22C, J22D, J22E, J22F												
		INani leeSampulu				Inkangeleko yeKwaliti yeGW okanye ixabiso eliphakathi layo [1]				Umjelo we-BHN[2]	Umjelo wekwaliti yamanzi angaphantsi komhlaba[3]			
		J22C	J22D	J22E	J22F	J22C	J22D	J22E	J22F		J22C	J22D	J22E	J22F
i-pH		26	46	80	24	8.00	7.94	7.79	7.80	5.0 – 9.5	7.20–8.80	7.15–8.73	7.01–8.57	7.02–8.58
ukutsala umbane	mS/m	26	46	80	24	97.10	89.85	88.70	103.45	<150	106.81	98.84	97.57	113.80
i-Calcium njengo- Ca	mg/l	26	46	80	24	50.15	44.95	61.80	82.10	<150	55.17	49.45	67.98	90.31
i-Magnesium njengo- Mg	mg/l	26	46	80	24	27.00	24.80	21.00	18.95	<100	29.70	27.28	23.10	20.85
i-Sodium njengo- Na	mg/l	26	46	80	24	102.75	118.25	95.95	86.35	<200	113.03	130.08	105.55	94.99
i-Chloride njengo-Cl	mg/l	26	46	80	24	94.00	102.75	92.40	109.40	<200	103.40	113.03	101.64	120.34
i-Sulphate njengo- SO_4	mg/l	26	46	80	24	123.80	121.30	90.80	110.70	<400	136.18	133.43	99.88	121.77
i-Nitrate njengo- NO_x-N	mg/l	26	46	80	24	1.78	1.47	4.12	3.82	<10	1.95	1.61	4.53	4.20
i-Fluoride njengo- F	mg/l	26	46	80	24	**1.03**	**1.10**	**1.05**	0.89	<1.0	**1.03**	**1.10**	**1.05**	0.97
Umda wekhemikhali	I-Unithi	liNdawo zoBoniselo ngaManzi J22H, J22J, J23A, J23C												
		INani leeSampulu				Inkangeleko yeKwaliti yeGW okanye ixabiso eliphakathi layo [1]				Umjelo we-BHN[2]	Umjelo wekwaliti yamanzi angaphantsi komhlaba[3]			
		J22H	J22J	J23A	J23C	J22H	J22J	J23A	J23C		J22H	J22J	J23A	J23C
i-pH		32	26	39	10	7.79	7.83	7.93	7.78	5.0 – 9.5	7.01–8.56	7.05–8.61	7.14–8.72	7.00–8.56
ukutsala umbane	mS/m	32	26	39	10	145.05	83.20	**238.00**	136.00	<150	145.05	91.52	**238.00**	149.60
i-Calcium njengo- Ca	mg/l	32	26	36	10	105.60	50.75	125.25	126.75	<150	116.16	55.83	137.78	139.43
i-Magnesium njengo- Mg	mg/l	32	26	36	10	38.25	20.45	16.26	32.70	<100	42.08	22.50	17.89	35.97
i-Sodium njengo- Na	mg/l	32	26	35	10	158.05	86.90	**342.80**	143.70	<200	173.86	95.59	**342.80**	158.07
i-Chloride njengo-Cl	mg/l	32	26	35	10	**208.55**	82.15	**265.46**	159.05	<200	229.41	90.37	**265.46**	174.96
i-Sulphate njengo- SO_4	mg/l	32	26	36	10	225.10	117.50	**497.01**	112.50	<400	247.61	129.25	**497.01**	123.75
i-Nitrate njengo- NO_x-N	mg/l	32	26	35	10	3.31	3.02	0.04	1.10	<10	3.64	3.32	0.04	1.21
i-Fluoride njengo- F	mg/l	32	26	33	10	1.09	0.90	**2.14**	0.69	<1.0	1.19	0.99	**2.14**	0.76

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Umda wekhemikhali	I-Unithi	IiNdawo zoBoniselo ngaManzi J23D, J23F, J24A, J24B												
		INani leeSampulu				Inkangeleko yeKwaliti yeGW okanye ixabiso eliphakathi layo [1]				Umjelo we-BHN[2]	Umjelo wekwaliti yamanzi angaphantsi komhlaba[3]			
		J23D	J23F	J24A	J24B	J23D	J23F	J24A	J24B		J23D	J23F	J24A	J24B
i-pH		26	85	168	220	8.10	7.97	7.77	7.79	5.0 – 9.5	7.29–8.91	7.17–8.76	6.99–8.54	7.01–8.56
ukutsala umbane	mS/m	26	85	168	220	**155.00**	126.70	86.30	86.54	<150	**155.00**	139.37	94.93	95.19
i-Calcium njengo- Ca	mg/l	26	83	168	213	98.95	51.07	70.60	76.59	<150	108.85	56.17	77.66	84.24
i-Magnesium njengo- Mg	mg/l	26	83	168	214	40.65	28.60	18.55	17.15	<100	44.72	31.46	20.41	18.87
i-Sodium njengo- Na	mg/l	26	80	168	210	166.55	120.85	91.25	83.50	<200	183.21	132.94	100.38	91.85
i-Chloride njengo-Cl	mg/l	26	83	168	214	**208.95**	140.10	78.80	78.20	<200	**208.95**	154.11	86.68	86.02
i-Sulphate njengo- SO_4	mg/l	26	83	168	214	151.40	157.15	103.40	69.00	<400	166.54	172.86	113.74	75.90
i-Nitrate njengo- NO_x-N	mg/l	26	83	168	212	1.89	0.12	1.85	3.45	<10	2.08	0.13	2.04	3.80
i-Fluoride njengo- F	mg/l	26	81	168	209	0.79	0.48	0.92	0.81	<1.0	0.86	0.52	1.01	0.89

Umda wekhemikhali	I-Unithi	IiNdawo zoBoniselo ngaManzi J24C, J24D, J24E, J25A												
		INani leeSampulu				Inkangeleko yeKwaliti yeGW okanye ixabiso eliphakathi layo [1]				Umjelo we-BHN[2]	Umjelo wekwaliti yamanzi angaphantsi komhlaba[3]			
		J24C	J24D	J24E	J25A	J24C	J24D	J24E	J25A		J24C	J24D	J24E	J25A
i-pH		112	97	18	33	7.70	7.90	7.94	7.11	5.0 – 9.5	6.93–8.47	7.11–8.69	7.15–8.73	6.40–7.83
ukutsala umbane	mS/m	112	97	18	33	96.70	146.70	**161.50**	50.90	<150	106.37	146.70	**161.50**	55.99
i-Calcium njengo- Ca	mg/l	112	93	18	33	68.45	94.20	106.00	14.80	<150	75.30	103.62	116.60	16.28
i-Magnesium njengo- Mg	mg/l	112	93	18	33	18.00	28.80	30.95	10.90	<100	19.80	31.68	34.05	11.99
i-Sodium njengo- Na	mg/l	112	86	18	33	103.40	162.40	198.65	50.40	<200	113.74	178.64	198.65	55.44
i-Chloride njengo-Cl	mg/l	112	95	18	33	120.20	194.50	**213.80**	96.50	<200	132.22	194.50	**213.80**	106.15
i-Sulphate njengo- SO_4	mg/l	112	89	18	33	78.40	114.00	105.70	26.40	<400	86.24	125.40	116.27	29.04
i-Nitrate njengo- NO_x-N	mg/l	112	95	18	32	3.90	1.76	0.82	0.02	<10	4.28	1.94	0.90	0.02
i-Fluoride njengo- F	mg/l	112	93	18	32	0.79	0.81	1.05	0.31	<1.0	0.87	0.89	1.05	0.34

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Umda wekhemikhali	I-Unithi	IiNdawo zoBoniselo ngaManzi J25C, J31D, J32A, J32B												
		INani leeSampulu				Inkangeleko yeKwaliti yeGW okanye ixabiso eliphakathi layo [1]				Umjelo we-BHN[2]	Umjelo wekwaliti yamanzi angaphantsi komhlaba[3]			
		J25C	J31D	J32A	J32B	J25C	J31D	J32A	J32B		J25C	J31D	J32A	J32B
i-pH		31	48	19	15	7.11	6.54	7.68	7.86	5.0 – 9.5	6.40–7.83	5.89–7.19	6.91–8.45	7.07–8.65
ukutsala umbane	mS/m	31	48	19	15	50.90	14.06	**165.80**	**187.00**	<150	55.99	15.46	**165.80**	**187.00**
i-Calcium njengo- Ca	mg/l	31	43	19	15	14.80	4.92	85.60	99.50	<150	16.28	5.41	94.16	109.45
i-Magnesium njengo- Mg	mg/l	31	43	19	15	10.90	2.86	42.50	44.50	<100	11.99	3.14	46.75	48.95
i-Sodium njengo- Na	mg/l	31	41	19	15	50.40	9.30	172.20	175.10	<200	55.44	10.23	189.42	192.61
i-Chloride njengo-Cl	mg/l	31	43	19	15	96.50	23.80	**203.20**	**242.60**	<200	106.15	26.18	**203.20**	**242.60**
i-Sulphate njengo- SO_4	mg/l	31	43	19	15	26.40	9.90	180.30	170.80	<400	29.04	10.89	198.33	187.88
i-Nitrate njengo- NO_x-N	mg/l	31	41	19	15	0.02	0.03	3.80	0.88	<10	0.02	0.03	4.18	0.96
i-Fluoride njengo- F	mg/l	31	39	19	15	0.31	0.29	1.06	0.99	<1.0	0.34	0.32	1.06	0.99
Umda wekhemikhali	**I-Unithi**	**IiNdawo zoBoniselo ngaManzi J32C, J32E, J33D, J33E**												
		INani leeSampulu				**Inkangeleko yeKwaliti yeGW okanye ixabiso eliphakathi layo [1]**				**Umjelo we-BHN[2]**	**Umjelo wekwaliti yamanzi angaphantsi komhlaba[3]**			
		J32C	**J32E**	**J33D**	**J33E**	**J32C**	**J32E**	**J33D**	**J33E**		**J32C**	**J32E**	**J33D**	**J33E**
i-pH		29	41	40	149	7.76	7.55	7.53	6.64	5.0 – 9.5	6.98–8.54	6.80–8.30	6.78–8.29	6.98–7.30
ukutsala umbane	mS/m	29	41	40	149	127.40	19.80	19.80	12.10	<150	140.14	21.78	21.78	13.31
i-Calcium njengo- Ca	mg/l	29	40	39	148	80.80	11.07	11.00	2.76	<150	88.88	12.17	12.10	3.04
i-Magnesium njengo- Mg	mg/l	29	40	39	148	30.90	3.50	3.50	2.07	<100	33.99	3.85	3.85	2.27
i-Sodium njengo- Na	mg/l	29	39	38	146	143.90	12.40	12.39	13.40	<200	158.29	13.64	13.63	14.74
i-Chloride njengo-Cl	mg/l	29	40	38	147	170.70	23.87	23.64	22.99	<200	187.77	26.26	26.01	25.29
i-Sulphate njengo- SO_4	mg/l	29	39	38	146	121.00	5.72	5.58	6.34	<400	133.10	6.29	6.14	6.97
i-Nitrate njengo- NO_x-N	mg/l	29	39	38	147	2.15	0.04	0.04	0.19	<10	2.37	0.04	0.04	0.20
i-Fluoride njengo- F	mg/l	29	37	36	146	0.90	0.27	0.27	0.11	<1.0	0.99	0.30	0.30	0.12

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Umda wekhemikhali	I-Unithi	IiNdawo zoBoniselo ngaManzi J33F, J34A, J34B, J34D												
		INani leeSampulu				Inkangeleko yeKwaliti yeGW okanye ixabiso eliphakathi layo [1]				Umjelo we-BHN[2]	Umjelo wekwaliti yamanzi angaphantsi komhlaba[3]			
		J33F	J34A	J34B	J34D	J33F	J34A	J34B	J34D		J33F	J34A	J34B	J34D
i-pH		70	36	11	22	6.82	6.33	6.77	6.56	5.0 – 9.5	6.14–7.50	5.70–6.96	6.09–7.45	5.90–7.22
ukutsala umbane	mS/m	70	36	11	22	44.60	19.55	114.50	12.54	<150	49.06	21.51	125.95	13.79
i-Calcium njengo- Ca	mg/l	70	36	11	22	11.95	3.26	46.30	2.39	<150	13.15	3.58	50.93	2.63
i-Magnesium njengo- Mg	mg/l	70	36	11	22	7.05	3.44	21.80	1.73	<100	7.76	3.78	23.98	1.91
i-Sodium njengo- Na	mg/l	70	36	11	22	34.25	25.95	136.70	15.40	<200	37.68	28.55	150.37	16.94
i-Chloride njengo-Cl	mg/l	70	36	11	22	61.74	40.85	**252.50**	27.36	<200	67.92	44.94	**252.50**	30.10
i-Sulphate njengo- SO_4	mg/l	70	36	11	22	27.50	5.22	42.20	2.50	<400	30.25	5.74	46.42	2.75
i-Nitrate njengo- NO_x-N	mg/l	68	36	11	22	0.08	0.17	0.37	0.22	<10	0.09	0.19	0.41	0.24
i-Fluoride njengo- F	mg/l	69	36	11	22	0.22	0.11	0.29	0.08	<1.0	0.24	0.12	0.32	0.08
Umda wekhemikhali	**I-Unithi**	**IiNdawo zoBoniselo ngaManzi J34F, J35A, J35B, J35D**												
		INani leeSampulu				**Inkangeleko yeKwaliti yeGW okanye ixabiso eliphakathi layo [1]**				**Umjelo we-BHN[2]**	**Umjelo wekwaliti yamanzi angaphantsi komhlaba[3]**			
		J34F	**J35A**	**J35B**	**J35D**	**J34F**	**J35A**	**J35B**	**J35D**		**J34F**	**J35A**	**J35B**	**J35D**
i-pH		9	17	49	49	7.66	8.07	7.01	7.64	5.0 – 9.5	6.89–8.43	7.26–8.88	6.31–7.71	6.88–8.40
ukutsala umbane	mS/m	9	17	49	49	46.60	42.00	46.20	**173.10**	<150	51.26	46.20	50.82	**173.10**
i-Calcium njengo- Ca	mg/l	9	17	47	48	6.87	62.70	6.23	86.30	<150	7.55	68.97	6.85	94.93
i-Magnesium njengo- Mg	mg/l	9	17	47	48	7.70	6.30	8.70	35.65	<100	8.47	6.93	9.57	39.22
i-Sodium njengo- Na	mg/l	9	17	45	48	61.80	11.10	57.30	145.70	<200	67.98	12.21	63.03	160.27
i-Chloride njengo-Cl	mg/l	9	17	45	48	101.64	19.10	108.70	**239.50**	<200	111.81	21.01	119.57	**239.50**
i-Sulphate njengo- SO_4	mg/l	9	17	47	48	27.90	11.50	4.85	95.95	<400	30.69	12.65	5.34	105.55
i-Nitrate njengo- NO_x-N	mg/l	9	17	45	48	0.05	0.16	4.51	0.64	<10	0.06	0.18	4.96	0.70
i-Fluoride njengo- F	mg/l	9	17	43	47	0.48	0.16	0.10	0.52	<1.0	0.53	0.18	0.11	0.57

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Umda wekhemikhali	I-Unithi	IiNdawo zoBoniselo ngaManzi J40D, J40E, K10A, K10B												
		INani leeSampulu				Inkangeleko yeKwaliti yeGW okanye ixabiso eliphakathi layo [1]				Umjelo we-BHN[2]	Umjelo wekwaliti yamanzi angaphantsi komhlaba[3]			
		J40D	J40E	K10A	K10B	J40D	J40E	K10A	K10B		J40D	J40E	K10A	K10B
i-pH		48	63	20	14	7.30	7.52	7.88	7.51	5.0 – 9.5	6.57–8.03	6.77–8.28	7.09–8.67	6.76–8.26
ukutsala umbane	mS/m	48	63	20	14	83.15	**219.00**	**276.00**	**214.50**	<150	91.47	**219.00**	**276.00**	**214.50**
i-Calcium njengo- Ca	mg/l	48	63	20	14	12.41	59.40	52.50	32.87	<150	13.65	65.34	57.75	36.15
i-Magnesium njengo- Mg	mg/l	48	63	20	14	14.72	31.97	44.17	35.74	<100	16.19	35.17	48.58	39.32
i-Sodium njengo- Na	mg/l	45	63	20	14	131.41	**288.45**	**399.60**	**288.65**	<200	144.55	**288.45**	**399.60**	**288.65**
i-Chloride njengo-Cl	mg/l	48	63	20	13	**213.26**	**492.38**	**698.45**	**545.73**	<200	**213.26**	**492.38**	**698.45**	**545.73**
i-Sulphate njengo- SO_4	mg/l	45	63	20	14	31.69	65.21	97.08	59.60	<400	34.86	71.73	106.79	65.56
i-Nitrate njengo- NO_x-N	mg/l	47	62	20	12	0.09	0.04	0.05	0.27	<10	0.10	0.04	0.06	0.29
i-Fluoride njengo- F	mg/l	48	63	20	13	0.14	0.22	0.22	0.25	<1.0	0.16	0.24	0.24	0.28

Umda wekhemikhali	I-Unithi	IiNdawo zoBoniselo ngaManzi K10D, K30B, K50B												
		INani leeSampulu				Inkangeleko yeKwaliti yeGW okanye ixabiso eliphakathi layo [1]				Umjelo we-BHN[2]	Umjelo wekwaliti yamanzi angaphantsi komhlaba[3]			
		K10D	K30B	K50B		K10D	K30B	K50B			K10D	K30B	K50B	
i-pH		11	47	9		7.85	6.83	7.48		5.0 – 9.5	7.07–8.64	6.15–7.51	6.73–8.22	
ukutsala umbane	mS/m	11	47	9		**257.00**	27.72	61.90		<150	**257.00**	30.49	68.09	
i-Calcium njengo- Ca	mg/l	11	43	9		30.82	4.27	15.08		<150	33.90	4.70	16.58	
i-Magnesium njengo- Mg	mg/l	11	43	9		28.10	7.49	9.80		<100	30.91	8.24	10.78	
i-Sodium njengo- Na	mg/l	11	41	9		**426.18**	28.35	85.57		<200	**426.18**	31.19	94.13	
i-Chloride njengo-Cl	mg/l	11	42	9		**533.12**	41.92	139.99		<200	**533.12**	46.11	153.98	
i-Sulphate njengo- SO_4	mg/l	11	44	9		66.60	7.95	17.54		<400	73.26	8.74	19.29	
i-Nitrate njengo- NO_x-N	mg/l	10	43	9		0.09	7.99	0.48		<10	0.10	8.79	0.52	
i-Fluoride njengo- F	mg/l	10	23	9		0.84	0.16	0.34		<1.0	0.93	1.49	0.18	

[1] Oko kuxhomekeke koovimba beenkcukacha zekwaliti yamanzi angaphantsi komhlaba bexesha elide (isuka kwi-DWS Water Management System). Inani (ubuncikane) lohlalutyo elisetyenzisiweyo kuphononongo lwamanani ngu-nine (9).

[2] umda ophezulu wekwaliti yamanzi (okusela) yeHlelo I] (isuka kwi-WRC *et al*. 2nd Edition, 1998, Volume 1: Assessment Guide); futhi

[3] Ixabiso eliphakathi lidibene ne-10%. Apho umahluko kumaxabiso ekwaliti yamanzi ngokwenkangeleko yekwaliti yamanzi angaphantsi komhlaba neyeemfuno ezisisiseko zoluntu uye wafunyanwa, kulapho nexabiso lokhuselo elincinane okanye eliphezulu liye lakhethelwa loo Mjelo uthile wekwaliti yamanzi angaphantsi komhlaba. Apho ummandla wohlelo wathi abonisa inkangeleko yekwaliti yamanzi angaphantsi komhlaba, loo mmandla waye wakhethwa njengoMjelo wekwaliti yamanzi nexabiso lakhe lathiwa ukwenyuswa nge- 10 per cent kuphela xa nexabiso lingadlulanga kwelo loMjelo we- BHN.

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UTafile 6.4: Ushwankathelo lwehlelo lekwaliti yamanzi nemida ekhathazayo

Indawo yoboniselo ngamanzi yeminyaka emine	Ihlelo lekwaliti yamanzi (WRC, 1998)	imida ekhathazayo yekwaliti yamanzi
G40C	0	Ayikho
G40F	0	Ayikho
G40J	0	Ayikho
G40L	II	Sodium, Chloride
G40M	II	Chloride
G50E	I	Chloride
G50F	I	Chloride
G50H	III	Ukutsala umbane, Magnesium, Sodium, Chloride, Sulphate
G50J	II	Chloride, Sodium, ukutsala umbane
H10A	II	Sodium, Chloride, ukutsala umbane
H10B	0	Ayikho
H10C	I	Chloride
H10F	0	Ayikho
H10G	0	Ayikho
H10H	II	i-Chloride
H10L	0	Ayikho
H20A	0	Ayikho
H20B	0	Ayikho
H20D	0	Ayikho
H20E	0	Ayikho
H20F	0	Ayikho
H30A	II	iChloride
H30C	0	Ayikho
H30D	0	Ayikho
H40A	I	Ukutsala umbane, Calcium, iChloride
H40B	0	Ayikho
H40F	0	Ayikho
H70B	III	Ukutsala umbane, Magnesium, Sodium, Chloride
H70K	II	Chloride
H90D	II	Chloride
H90E	II	Ukutsala umbane, Sodium, Chloride
J11B	I	Ukutsala umbane
J11E	II	Ukutsala umbane, Chloride
J11G	II	Ukutsala umbane, Chloride
J12B	III	Ukutsala umbane, Magnesium, Sodium, Chloride
J12D	II	Ukutsala umbane, Sodium, Chloride
J12F	III	Ukutsala umbane, Sodium, Chloride
J12G	III	Ukutsala umbane, Sodium, Chloride
J12H	II	Ukutsala umbane, Chloride
J12K	III	Ukutsala umbane, Calcium, Sodium, Chloride, Sulphate
J12L	0	Ayikho
J13B	III	Ukutsala umbane, Sodium, Chloride
J21A	0	None
J21B	I	Ukutsala umbane, Sodium, Chloride
J21C	I	Ukutsala umbane
J21D	I	Ukutsala umbane, Sodium, Chloride
J21E	I	Ukutsala umbane
J22B	I	Ukutsala umbane
J22C	I	Ukutsala umbane, Sodium
J22D	I	Ukutsala umbane, Sodium, Chloride
J22E	I	Ukutsala umbane
J22F	I	Ukutsala umbane, Calcium, Chloride
J22H	II	Ukutsala umbane, Calcium, Sodium, Chloride
J22J	I	Ukutsala umbane
J23A	II	Ukutsala umbane, Sodium, Chloride, Sulphate
J23C	I	Ukutsala umbane, Calcium, Sodium, Chloride
J23D	II	Ukutsala umbane, Chloride
J23F	I	Ukutsala umbane, Sodium, Chloride

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Indawo yoboniselo ngamanzi yeminyaka emine	**Ihlelo lekwaliti yamanzi (WRC, 1998)**	**imida ekhathazayo yekwaliti yamanzi**
J24A	I	Ukutsala umbane
J24B	I	Ukutsala umbane
J24C	I	Ukutsala umbane, Sodium, Chloride
J24D	II	Ukutsala umbane, Chloride
J24E	II	Ukutsala umbane, Chloride
J25A	0	None
J25C	0	None
J31D	0	None
J32A	II	Ukutsala umbane, Chloride
J32B	II	Ukutsala umbane, Chloride
J32C	I	Ukutsala umbane, Calcium, Sodium, Chloride
J32E	0	Ayikho
J33D	0	Ayikho
J33E	0	Ayikho
J33F	0	Ayikho
J34A	0	Ayikho
J34B	II	Chloride
J34D	0	Ayikho
J34F	I	Chloride
J35A	0	Ayikho
J35B	I	Chloride
J35D	II	Ukutsala umbane, Chloride
J40D	II	Chloride, Sodium
J40E	II	Ukutsala umbane, Sodium, Chloride
K10A	III	Ukutsala umbane, Sodium, Chloride
K10B	II	Ukutsala umbane, Sodium, Chloride
K10D	III	Ukutsala umbane, Sodium, Chloride
K30B	0	Ayikho
K50B	I	Chloride

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7. AMACHWEBA (ICANDELO LEKWALITI YAMANZI)

UTafile 7.1 Umthamo wamanzi

Indawo yoboniselo ngamanzi yeminyaka emine	Igama lechweba	I-PES	I-REC	nMAR (MCM)	EWR (MCM nMAR)
G40B	Rooiels	B	B	***9.44**	n/a
G40D	Palmiet	C	B	***177.94**	n/a
G40G	Bot/Kleinmond	C	B	***77.67**	n/a
G40H	Onrus	E	D	***4.74**	n/a
G40L	Klein	C	B	***51.21**	n/a
G40M	Uilkraals	D	C	***6.82**	n/a
G40F	Heuningnes	C	A	29.53	n/a
H70K	Breede	B	B	1785.00	954.00
H80E	Duiwenhoks	B	A	89.29	73.01
H90C	Goukou	C	B	115.95	91.73
J40B	Gouritz	C	B	623.52	377.23
K10A	Blinde	C	C	n/a	n/a
K10B	Hartenbos	D	C	n/a	n/a
K10F	Klein Brak	C	C	50.67	37.66
K20A	Groot Brak	D	C	36.79	11.11
K30A	Maalgate	B	C	41.51	24.41
K30B	Gwaing	B	C	35.07	21.7

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Indawo yoboniselo ngamanzi yeminyaka emine	**Igama lechweba**	**I-PES**	**I-REC**	**nMAR (MCM)**	**EWR (MCM nMAR)**
K30C	Kaaimans	B	B	53.6	41.3
K30D	Indawo yentlango: Touws	B	A	29.66	25.15
K40D	Swartvlei	B	B	83.4	56.6
K40E	Goukamma	B	A	57.5	48.8
K50B	Kynsna	B	B	83.2	63.4
K60 E and F	Keurbooms	A/B	A/B	232	214.10
K60G	Noetsie	B	B	4.8	n/a
K60G	Piesang	D	B/C	n/a	n/a
K70A	Groot (Wes)	B	A	n/a	n/a
K70A	Matjie	B	B	5.10	n/a
K70A	Sout	A	A	11.22	n/a
K70B	Bloukrans	A	A	n/a	n/a

*** I-MAR yanamhla**

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IKWALITI YAMANZI ECHWEBA

UTafile 7.2: ii-EcoSpecs nomda wengxaki enokwehla kwiChweba iBlinde

Icandelo le-ikholoji (lofundo ngendawo yokuphilisana nonxulumano lwezinto eziphila kuloo ndawo)	ii-EcoSpecs	Imida yeengxaki ezinokwehla
I-Hydrology (Imeko yasemanzini)	Gcina imeko yokuhamba kwamanzi (iindawana zokuphila ezincinane zezona ziwadinga kakhulu amanzi ahambayo)	I-MAR ayiguquki ngaphezu kwe- 10% kuleyo yexesha langoku Iimpuphuma (ziboniswa yi- 1:10 yexesha lomnyaka) sukunciphisa ngaphezulu kwe- 5% kuleyo yexesha langoku Amanzi ahamba ezantsi akohluki ngaphezu kwe - 5% kulawo exesha langoku
I-Hydrodynamics (uguquguquko lwasemanzini)	Gcina isimo somlomo wechweba sisihle ukuze lendawo yokuphilisana izilungele iintaka, iintlanzi, ii- macrophytes, i-micro-algae (ubulembu obuncinanana) nekwaliti yamanzi	Isimo somlomo ovulekileyo wechweba Sanda/sincipha nge- 10% kweso sexesha sangoku Isimo somlomo wechweba sibuvaleka, siqhuba njalo sigalela amanzi elwandle. I-avareji yobunzulu bamanzi ngu <0.5 m (eli nani liza kuqinisekiswa luhlolo) Iqondo lokuguquka kwamanqana amanzi ngu > 30% kunelo lexesha langoku
Ikwaliti yamanzi	Ukusasazwa kwamanzi anetyuwa makungade kubangele ii-TPCs ezigqithileyo ezintlanzini, kwizinto eziphilayo ezingenamathambo, kwii- macrophytes nee-microalgae Ubukho bodaka ne-oksijini enyibilikisiweyo mabungade bubangele ii-TPCs ezigqithileyo kwii-biota Ubukho be-DIN)/be-DIP) mabungade bubangele ii-TPCs ezigqithileyo kwii-macrophytes nee-microalgae Izinto ezinetyhefu mazingade zibangele ii-TPCs ezigqithileyo kwii-biota	Iqondo lobukho betyuwa emanzini > 20 (uluhlu olulindelekileyo ngu-5-15) I-oksijini enyibilikisiweyo (DO) ngu< 5 mg/ℓ ecwhebeni Ubukho bodaka > 10 NTU kumanzi ahamba kancinci Ubunzulu be-Secchi: ukuya ezantsi DIN >100 µg/ℓ (i-avareji) DIP > 20 µg/ℓ (i-avareji) Iqondo lobukho bamanzi kweli candelo libetha ngaphaya kwamaxabiso angqaliweyo ngokubhaliweyo kwi- SA Water Quality Guidelines for coastal marine waters (DWAF, 1995) Iqondo lobukho beentlenge libetha ngaphaya kwamaxabiso angqaliweyo ngokubhaliweyo kwi-Indian Ocean (WIO) Region guidelines (UNEP/Nairobi Convention Secretariat and CSIR, 2009)
Uguquguquko lweentlenge	Imeko yeempuphuma mayilandele iipethini zosasazo lweentlenge nezeendawo zokuphilisana zasemanzini (zangaphakathi ngqo emjelweni) khonukuze ingade ibangele ii- TPCs ezigqithileyo ze-biota Iinguqu kubukhulu beepethini zosasazo lweenkozo zeentlenge mayingade ibangele ii- TPCs ezigqithileyo kwizinto eziphilayo ezingenamathambo zolwandle Inguqu kulwakhiwo lweentlenge (oluphakathi) neempawu Inguqu kwibathymetry e-avareji	I-avareji yokwakheka kweentlenge (i-% yamaqhezu) iphaya kwinguqu elindelekileyo echwebeni ukusuka kuleyo yesiqhelo (uza kuthatyathwa umlinganiselo wayo) ngo-30% (kuphando ngalunye) I-avareji yobunzulu phaya ngakwinguqu elindelekileyo kwelona-lona jelo ukusuka ku-30% waleyo yesiqhelo (iza kuqingqwa) (kwezi meko kulindeleke ukuba kubekho uguquguquko olubalaseleyo kwi-bathymetry ephakathi kweempuphuma namaxesha ovaleleko awandisiweyo)
I-Microalgae (ubulembu obuncinanana)	Gcina ubukhulu bendalo bobulembu be-phytoplankton/bolwandle bebusezantsi /buphakathi Thintela ukuvela kwee-phytoplankton ezidubulayo	i-Phytoplankton ngu > 3.5 µg/ℓ (phakathi) i-Benthic microalgae ngu >23 mg/m^2 (phakathi) i-Phytoplankton ngu >20 µg/ℓ /okanye ukushinyana kweeseli ngu >10 000 iiseli/ml (kanye nje)
Ii-Macrophytes	Gcina iindawo zokuphila ze-macrophyte zikwimeko entle. Thintela iingcongolo ukuze zinganabeli emanzini avulekileyo	Kukho inguqu kangange-20% kummandla we-macrophyte. (iingcongolo zigqume ummandla kangange- 0.04 ha.)

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Icandelo le-ikholoji (lofundo ngendawo yokuphilisana nonxulumano lwezinto eziphila kuloo ndawo)	**ii-EcoSpecs**	**Imida yeengxaki ezinokwehla**
	Thintela ukwanda kwezondlo nobulembu obudubulayo Thintela ukunaba kwemithi engeyoyomthonyama (njengomnga) kummandla wonxweme	Iingcongolo zithabatha ummandla kangange > 0.5 ha ii-Macro-algal ezidubulayo zigqume kangange > 50% yommandla ovulekileyo wamanzi ubukho bee-macrophytes ezitshabalalisayo zasemanzini, umzekelo i-*Azolla*, i- hyacinth yamanzi, njalo-njalo. Imithi etshabalalisayo yogqume i- > 50% yomda wonxweme
Izinto eziphilayo ezingenamathambo	Phanda ngobukho beeproni zentlabathi ze-Callichirus kraussi kunxweme lwentlabathi olusechwebeni elisemazantsi Phanda ngobukho bee- Pseudodiaptomus hessei okanye ii- congeneric zechweba kwi- zooplankton yechweba	Ukuba imigqeku yangoku iphambuka kwimo yesiqhelo (njengoko kufunyanisiwe kula matyelelo mathathu okuqala) ngaphaya kwe-30%
Iintlanzi	Iimigqeku yeentlanzi mayiquke amabakala anxulunyaniswa nechweba amahlanu nabonisa iimpawu ezifanayo (ngokwahluka nangobuninzi) kwezo ziphantsi kohlolo. Ngokwamanani, ubugqeku mabuquke oku kulandelayo: Abahlali basechwebeni (i-50-80% lobuninzi babo bedibene) i-Ib yemigqeku yasemanzini nasechwebeni (i-5-20%) i-IIa yaleyo impilo yayo ixhomekeke echwebeni (i-10-20%) i-IIb yemigqeku enxulunyaniswa nechweba (i-5-15%), i-IIc yezo zixhamla emanzini (i-20-80%) i-III yezibhadubhadu zasemanzini (ezingekho ngaphezulu kwe- 5%) i-IV yeentlanzi zomthonyama (i-1-5%) i-V yeentlobo ze-catadromous (i-1-5%) iintlobo zamabakala mazibe nemigqeku ezinzileyo eziintlobo ezingekho ngaphantsi kwesibini (umzekelo i-G.aestuaria & ne-Hyporamphus capensis). Amabakala aloo migqeku ampilo yayo ixhomekeke echwebeni makabenabameli abaziintlobo ezisetyenziswa kakhulu ezingekho ngaphantsi kwesibini (umzekelo ii- L. lithognathus, nee-Lichia amia). Iintlobo ze-REI (zasekudibaneni komlambo nechweba (i-River Estuary Interface) ezonganyelwe zizo zombini ii- Myxus capensis nee-G. aestuaria.	i-Ia yemigqeku yasechwebeni ngu<50% i-Ib yemigqeku yasemanzini nasechwebeni ngu-<10% i-IIa yemigqeku empilo yawo ixhomekeke echwebeni ngu <10% i-IIb yemigqeku ebandakanyeka echwebeni ngu <5% i-IIc yaloo migqeku ixhamla emanzini ngu < 20% i-III yezibhadu-bhadu zasemanzini ngu > 5% i-IV yeentlanzi zomthonyama ngu <1% i-V yezo ntlobo zifudukayo ukusuka emanzini ziye elwandle ukuya kuzala ngu <1%
Iintaka	Gcina imigqeku yamaqela okuqala eentaka ezikhoyo echwebeni.	Amanani eentaka kulo naliphi na iqela (ngaphandle kwezo ntlobo zanda ngokwengingqi, njengedada laseYiphutha) ehla aye kutsho ngaphantsi kwemeko ephakathi yesiqhelo (oku kuqinisekiswa ziinkcukacha zexesha elidlulileyo okanye uphando lwakuqala/lwangaphambili) Amanani eentlobo ezithile / eentaka ezibalwa izihlandlo ezithathu ezilandelelanayo zehlobo okanye zobusika

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UTafile 7.3: ii-EcoSpecs nemida yeengxaki ezisenokwehla kwichweba iHartenbos

Icandelo le-ikholoji (lofundo ngendawo yokuphilisana nonxulumano lwezinto eziphila kuloo ndawo)	**ii-EcoSpecs**	**Imida yeengxaki ezisenokwehla**
I-Hydrology (Imeko yasemanzini)	Gcina ubuncikane isimo sexesha langoku sokuhamba kwamanzi (iza kuqinisekiswa)	I-MAR ayiguquki ngaphezu kwe- 10% kuleyo yexesha langoku Iimpuphuma (ziboniswa yi- 1:10 yexesha lomnyaka) sukunciphisa ngaphezulu kwe- 5% kuleyo yexesha langoku Amanzi ahamba ezantsi akohluki ngaphezu kwe - 50% kulawo exesha langoku
I-Hydrodynamics (uguquguquko lwasemanzini)	Gcina isimo somlomo wechweba sisihle ukuze lendawo yokuphilisana izilungele iintaka, iintlanzi, ii- macrophytes, i-micro-algae (ubulembu obuncinanana) nekwaliti yamanzi	Isimo somlomo ovalekileyo wechweba asinciphi nge- 10% kweso sexesha sangoku I-avareji yobunzulu bamanzi ngu < 10% kunaleyo yexesha langoku Iqondo lokudlanyaza kwamaza (xa umlomo wechweba uvulekile) ngu > 20%
Ikwaliti yamanzi	Ukusasazwa kwamanzi anetyuwa makungade kubangele ii-TPCs ezigqithileyo ezintlanzini, kwizinto eziphilayo ezingenamathambo, kwii-macrophytes nee-microalgae Ubukho bodaka ne-oksijini enyibilikisiweyo mabungade bubangele ii-TPCs ezigqithileyo kwii-biota Ubukho be-DIN)/be-DIP) mabungade bubangele ii-TPCs ezigqithileyo kwii-macrophytes nee-microalgae Izinto ezinetyhefu mazingade zibangele ii-TPCs ezigqithileyo kwii-biota	I-avareji yobukho betyuwa emanzini ngasechwebeni incipha ngo> 5 ngaphantsi kwe-avareji yesiqhelo (iza kuqingqwa) I-oksijini enyibilikisiweyo (DO) ngu< 5 mg/ℓ ecwhebeni Ubukho bodaka ngu > 20 NTU kumanzi ahamba kancinci i-Secchi kwiindawo ezibuhlaziyeka ngu: 0.5 m DIN >200 µg/ℓ i-avareji (iza kuqinisekiswa) DIP > 50 µg/ℓ i-avareji (iza kuqinisekiswa) Iqondo lobukho bamanzi kweli candelo libetha ngaphaya kwamaxabiso angqaliweyo ngokubhaliweyo kwi- SA Water Quality Guidelines for coastal marine waters (DWAF, 1995) Iqondo lobukho beentlenge libetha ngaphaya kwamaxabiso angqaliweyo ngokubhaliweyo kwi-Indian Ocean (WIO) Region guidelines (UNEP/Nairobi Convention Secretariat and CSIR, 2009)
Uguquguquko lweentlenge	Imeko yeempuphuma mayilandele iipethini zosasazo lweentlenge nezeendawo zokuphilisana zasemanzini (zangaphakathi ngqo emjelweni) khonukuze ingade ibangele ii- TPCs ezigqithileyo ze-biota Iinguqu kubukhulu beepethini zosasazo lweenkozo zeentlenge mayingade ibangele ii- TPCs ezigqithileyo kwizinto eziphilayo ezingenamathambo zolwandle Inguqu kulwakhiwo lweentlenge (oluphakathi) neempawu Inguqu kwibathymetry e-avareji	I-avareji yokwakheka kweentlenge (i-% yamaqhezu) iphaya kwinguqu elindelekileyo echwebeni ukususka kuleyo yesiqhelo (uza kuthatyathwa umlinganiselo wayo) ngo-30% (kuphando ngalunye) I-avareji yobunzulu phaya ngakwinguqu elindelekileyo kwelona-lona jelo ukususka ku-30% waleyo yesiqhelo (iza kuqingqwa) (kwezi meko kulindeleke ukuba kubekho uguquguquko olubalaseleyo kwi-bathymetry ephakathi kweempuphuma namaxesha ovaleleko awandisiweyo)
I-Microalgae (ubulembu obuncinanana)	Gcina ubukhulu bendalo bobulembu be-phytoplankton/bolwandle /buphakathi Thintela ukuvela kwee-phytoplankton ezidubulayo	i-Phytoplankton ngu > 8 µg/ℓ (phakathi) i-Benthic microalgae >42 mg/m^2 (phakathi) i-Phytoplankton ngu >20 µg/ℓ /okanye ukushinyana kweeseli ngun>10 000 iiseli/ml (kanye nje) i-Dinoflagellates, i-chlorophytes ne/okanye i-cyanobacteria ngu >10% yobuninzi obubalulekayo

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Icandelo le-ikholoji (lofundo ngendawo yokuphilisana nonxulumano lwezinto eziphila kuloo ndawo)	ii-EcoSpecs	Imida yeengxaki ezisenokwehla
Ii-Macrophytes	Gcina iindawo zokuphila ze-macrophyte zikwimeko entle. Thintela iingcongolo ukuze zinganabeli emanzini avulekileyo Thintela ukwanda kwezondlo nobulembu obudubulayo Thintela ukunaba kwemithi engeyoyomthonyama (njengomnga) kummandla wonxweme Gcina imfezeko yomgxobhozo weetyuwa	Kukho inguqu kangange-20% kummandla we-macrophyte. (iingcongolo zigqume ummandla kangange- 9 ha, umgxobhozo weetyuwa kangange-47 ha) ii-Macroalgal ezidubulayo zithabatha i- > 50% yommandla wamanzi avulelekileyo ii-Macro-algal ezidubulayo zigqume kangange > 50% yommandla ovulekileyo wamanzi Ubukho bee-macrophytes ezitshabalalisayo zasemanzini (umzekelo, i- *Azolla*, i-water hyacinth) Bugquma i- > 10% yethafa leempuphuma Iqondo lokwanda kwemimandla engenayo imigxobhozo yeetyuwa ngenxa yokuncipha kobumanzi nokunyuka kwamaqondo obukho beetyuwa emanzini yi- >30% yomgxobhozo weetyuwa
Izinto eziphilayo ezingenamathambo	Phanda ngobukho beeproni zentlabathi ze-Callichirus kraussi kunxweme lwentlabathi olusechwebeni elisemazantsi Phanda ngobukho bee- Pseudodiaptomus hessei okanye ii- congeneric zechweba kwi- zooplankton yechweba	Ukuba ngaba iintlobo zexesha langoku ziphambuka kwi-avareji yesiqhelo (njengoko utyelelo lwezihlandlo ezithathu lubonisile) malunga nangaphaya kwe-30%

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Icandelo le-ikholoji (lofundo ngendawo yokuphilisana nonxulumano lwezinto eziphila kuloo ndawo)	ii-EcoSpecs	Imida yeengxaki ezisenokwehla
iintlanzi	Iimigqeku yeentlanzi mayiquke amabakala anxulunyaniswa nechweba amahlanu nabonisa iimpawu ezifanayo (ngokwahluka nangobuninzi) kwezo ziphantsi kohlolo. Ngokwamanani, ubugqeku mabuquke oku kulandelayo: Abahlali basechwebeni (i-20-60% lobuninzi babo bedibene) i-Ib yemigqeku yasemanzini nasechwebeni (i-10-30%) i-IIa yaleyo impilo yayo ixhomekeke echwebeni (i-20-40%) i-IIb yemigqeku enxulunyaniswa nechweba (i-5- 20%), i-IIc yezo zixhamla emanzini (i-20-80%) i-III yezibhadubhadu zasemanzini (ezingekho ngaphezulu kwe- 5%) i-IV yeentlanzi zomthonyama (i-1-5%) i-V yeentlobo ze-catadromous (i-1-5%) Iintlobo zamabakala mazibe nemigqeku ezinzileyo eziintlobo ezingekho ngaphantsi kwesibini (umzekelo i- *G.aestuaria, i-Hyporamphus capensis, Omobranchus woodii*). Amabakala aloo migqeku ampilo yayo ixhomekeke echwebeni makabenabameli abaziintlobo ezisetyenziswa kakhulu ezingekho ngaphantsi kwesibini (umzekelo, i- *A. japonicus, i-L. lithognathus, i-P. commersonnii, i-Lichia amia*). Iintlobo ze-REI (zasekudibaneni komlambo nechweba (i-River Estuary Interface) ezonganyelwe zizo zombini ii- Myxus capensis nee-G. aestuaria.	i-Ia yemigqeku yasechwebeni ngu <20% i-Ib yemigqeku yasemanzini nasechwebeni ngu-<10% i-IIa yemigqeku empilo yawo ixhomekeke echwebeni ngu <20% i-IIb yemigqeku ebandakanyeka echwebeni ngu <5% i-IIc yaloo migqeku ixhamla emanzini ngu < 20% i-IV yeentlanzi zomthonyama ngu <1% i-V yezo ntlobo zifudukayo ukusuka emanzini ziye elwandle ukuya kuzala ngu <1% i-Ia imelwe ngu- *G. aestuaria* kuphela i-IIa yeentlanzi ezixhatshazwayo ikumanani asezantsi kakhulu okanye ayikho iintlobo ze-REI zimelwe ngu- *G. aestuaria* kuphela*. Ii-aestuaria*, nee-*Myxus capensis* azikho
Iintaka	Gcina imigqeku yamaqela okuqala eentaka ezikhoyo echwebeni.	Amanani eentaka kulo naliphi na iqela (ngaphandle kwezo ntlobo zanda ngokwengingqi, njengedada laseYiphutha) ehla aye kutsho ngaphantsi kwemeko ephakathi yesiqhelo (oku kuqinisekiswa ziinkcukacha zexesha elidlulileyo okanye uphando lwakuqala/lwangaphambili) Amanani eentlobo ezithile / eentaka ezibalwa izihlandlo ezithathu ezilandelelanayo zehlobo okanye zobusika

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UTafile 7.4: ii-Eco-Specs nemida yeengxaki ezisenokwehla kwichweba iPiesang

Icandelo le-ikholoji (lofundo ngendawo yokuphilisana nonxulumano lwezinto eziphila kuloo ndawo)	**ii-EcoSpecs**	**Imida yeengxaki ezisenokwehla**
I-Hydrology (Imeko yasemanzini)	Gcina ubuncikane isimo sexesha langoku sokuhamba kwamanzi (iza kuqinisekiswa)	I-MAR ayiguquki ngaphezu kwe- 10% kuleyo yexesha langoku Iimpuphuma (ziboniswa yi- 1:10 yexesha lomnyaka) azinciphi ngaphezulu kwe- 5% kwezo zexesha langoku Amanzi ahamba ezantsi akohluki ngaphezu kwe - 50% kulawo exesha langoku
I-Hydrodynamics (ugugugugugu lwasemanzini)	Gcina isimo somlomo wechweba sisihle ukuze lendawo yokuphilisana izilungele iintaka, iintlanzi, ii- macrophytes, i-micro-algae (ubulembu obuncinanana) nekwaliti yamanzi	Isimo somlomo ovalekileyo wechweba asinciphi nge-10% kweso sexesha sangoku I-avareji yobunzulu bamanzi ngu < 10% kunaleyo yexesha langoku Iqondo lokudlanyaza kwamaza (xa umlomo wechweba uvulekile) ngu > 20%
Ikwaliti yamanzi	Ukusasazwa kwamanzi anetyuwa makungade kubangele ii-TPCs ezigqithileyo ezintlanzini, kwizinto eziphilayo ezingenamathambo, kwii-macrophytes nee-microalgae Ubukho bodaka ne-oksijini enyibilikisiweyo mabungade bubangele ii-TPCs ezigqithileyo kwii-biota Ubukho be-DIN)/be-DIP) mabungade bubangele ii-TPCs ezigqithileyo kwii-macrophytes nee-microalgae Izinto ezinetyhefu mazingade zibangele ii-TPCs ezigqithileyo kwii-biota	Iqondo lobukho betyuwa emanzini ngu > 20 (uluhlu olulindelekileyo ngu10-20) Iqondo lobukho betyuwa emanzini ngu < 5 (uluhlu olulindelekileyo ngu10-20) I-oksijini enyibilikisiweyo (DO) ngu< 5 mg/ℓ ecwhebeni Ubukho bodaka ngu > 10 NTU kumanzi ahamba kancinci i-Secchi: iya ezantsi DIN >100 µg/ℓ kanye nje DIP > 20 µg/ℓ kanye nje Iqondo lobukho bamanzi kweli candelo libetha ngaphaya kwamaxabiso angqaliweyo ngokubhaliweyo kwi- SA Water Quality Guidelines for coastal marine waters (DWAF, 1995) Iqondo lobukho beentlenge libetha ngaphaya kwamaxabiso angqaliweyo ngokubhaliweyo kwi- Indian Ocean (WIO) Region guidelines (UNEP/Nairobi Convention Secretariat and CSIR, 2009)
Ugugugugugu kweentlenge	Imeko yeempuphuma mayilandele iipethini zosasazo lweentlenge nezeendawo zokuphilisana zasemanzini (zangaphakathi ngqo emjelweni) khonukuze ingade ibangele ii- TPCs ezigqithileyo ze-biota Iinguqu kubukhulu beepethini zosasazo lweenkozo zeentlenge mayingade ibangele ii- TPCs ezigqithileyo kwizinto eziphilayo ezingenamathambo zolwandle Inguqu kulwakhiwo lweentlenge (oluphakathi) neempawu Inguqu kwibathymetry e-avareji	I-avareji yokwakheka kweentlenge (i-% yamaqhezu) iphaya kwinguqu elindelekileyo echwebeni ukusuka kuleyo yesiqhelo (uza kuthatyathwa umlinganiselo wayo) ngo-30% (kuphando ngalunye) I-avareji yobunzulu phaya ngakwinguqu elindelekileyo kwelona-lona jelo ukusuka ku-30% waleyo yesiqhelo (iza kuqingqwa) (kwezi meko kulindeleke ukuba kubekho ugugugugugu olubalaseleyo kwi-bathymetry ephakathi kweempuphuma namaxesha ovaleleko awandisiweyo)
I-Microalgae (ubulembu obuncinanana)	Gcina ubukhulu bendalo bobulembu be-phytoplankton/bolwandle buphakathi Thintela ukuvela kwee-phytoplankton ezidubulayo	i-Phytoplankton ngu > 3.5 µg/ℓ (phakathi) i-Benthic microalgae >11 mg/m^2 (phakathi) i-Phytoplankton ngu >20 µg/ℓ /okanye ukushinyana kweeseli ngun>10 000 iiseli/ml (kanye nje)
Ii-Macrophytes	Gcina iindawo zokuphila ze-macrophyte zikwimeko entle. Thintela ukwanda kwezondlo eziya kudala ubulembu obudubulayo Beka iliso kwizityalo ezitshabalalisayo kumda wonxweme	Inguqu engaphezu kwe-20 % kummandla owogqunywe zii-macrophytes (iingcongolo neentlenga zigquma ummandla oyi-3.14 ha, ii-macrophytes ezigubungelweyo nemigxobhozo yeetyuwa ekhoyo Izityalo ezitshabalalisayo zogqume malunga ne- >5% yeendawo zokuphila zizonke

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Icandelo le-ikholoji (lofundo ngendawo yokuphilisana nonxulumano lwezinto eziphila kuloo ndawo)	**ii-EcoSpecs**	**Imida yeengxaki ezisenokwehla**
Izinto eziphilayo ezingenamathambo	Phanda ngobukho beeproni zentlabathi ze-Callichirus kraussi kunxweme lwentlabathi olusechwebeni elisemazantsi Phanda ngobukho bee- Pseudodiaptomus hessei okanye ii- congeneric zechweba kwi-zooplankton yechweba	Imigqeku iphambuka kwi-avareji yesiqhelo (njengo uphando lwezihlandlo ezintathu lubonisa) malunga nangaphaya kwe- 30%
Iintlanzi	Iimigqeku yeentlanzi mayiquke amabakala anxulunyaniswa nechweba amahlanu nabonisa iimpawu ezifanayo (ngokwahluka nangobuninzi) kwezo ziphantsi kohlolo. Ngokwamanani, ubugqeku mabuquke oku kulandelayo: Imigqeky yasechwebeni (i-50-80% lobuninzi babo bedibene) i-Ib yemigqeku yasemanzini nasechwebeni (i-5-20%) i-IIa yaleyo impilo yayo ixhomekeke echwebeni (i-10-20%) i-IIb yemigqeku enxulunyaniswa nechweba (i-5- 15%), i-IIc yezo zixhamla emanzini (i-20-80%) i-III yezibhadubhadu zasemanzini (ezingekho ngaphezulu kwe- 5%) i-IV yeentlanzi zomthonyama (i-1-5%) i-V yeentlobo ze-catadromous (ezo zifudukela elwandle ukuya kuzala (i-1-5%) Iintlobo zamabakala mazibe nemigqeku ezinzileyo eziintlobo ezingekho ngaphantsi kwesibini (umzekelo i- *G.aestuaria, i-Hyporamphus capensis*). Amabakala aloo migqeku ampilo yayo ixhomekeke echwebeni makabenabameli abaziintlobo ezisetyenziswa kakhulu ezingekho ngaphantsi kwesibini (umzekelo, *i-L. lithognathus, , i-Lichia amia*). Iintlobo ze-REI (zasekudibaneni komlambo nechweba (i-River Estuary Interface) ezonganyelwe zizo zombini ii- Myxus capensis nee-G. aestuaria.	i-Ia yemigqeku yasechwebeni ngu <50% i-Ib yemigqeku yasemanzini nasechwebeni ngu- <10% i-IIa yemigqeku empilo yawo ixhomekeke echwebeni ngu <10% i-IIb yemigqeku ebandakanyeka echwebeni ngu <5% i-IIc yaloo migqeku ixhamla emanzini ngu < 20% i-III yezibhadu-bhadu zasemanzini ngu <5% i-IV yeentlanzi zomthonyama ngu <1% i-V yezo ntlobo zifudukayo ukusuka emanzini ziye elwandle ukuya kuzala ngu <1%
iintaka	Gcina imigqeku yeqela lokuqala leentaka ezilapho echwebeni.	Amanani eentaka kulo naliphi na iqela (ngaphandle kwezo ntlobo zanda ngokwengingqi, njengedada laseYiphutha) ehla aye kutsho ngaphantsi kwemeko ephakathi yesiqhelo (oku kuqinisekiswa ziinkcukacha zexesha elidlulileyo okanye uphando lwakuqala/lwangaphambili) Amanani eentlobo ezithile / eentaka ezibalwa izihlandlo ezithathu ezilandelelanayo zehlobo okanye zobusika

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UTafile 7.5: ii-EcoSpecs kwichweba iGroot (Wes)

Icandelo le-ikholoji (lofundo ngendawo yokuphilisana nonxulumano lwezinto eziphila kuloo ndawo)	ii-EcoSpecs	Imida yeengxaki ezisenokwehla
I-Hydrology (Imeko yasemanzini)	Gcina ubuncikane isimo sexesha langoku sokuhamba kwamanzi (iza kuqinisekiswa)	I-MAR ayiguquki ngaphezu kwe- 10% kuleyo yexesha langoku Iimpuphuma (ziboniswa yi- 1:10 yexesha lomnyaka) azinciphi ngaphezulu kwe- 5% kwezo zexesha langoku Amanzi ahamba ezantsi akohluki ngaphezu kwe - 50% kulawo exesha langoku
I-Hydrodynamics (uguquguquko lwasemanzini)	Gcina isimo somlomo wechweba sisihle ukuze lendawo yokuphilisana izilungele iintaka, iintlanzi, ii- macrophytes, i-micro-algae (ubulembu obuncinanana) nekwaliti yamanzi	Isimo somlomo ovalekileyo wechweba asinciphi nge- 10% kweso sexesha sangoku I-avareji yobunzulu bamanzi ngu < 10% kunaleyo yexesha langoku Iqondo lokudlanyaza kwamaza (xa umlomo wechweba uvulekile) ngu > 20%
Ikwaliti yamanzi	Ukusasazwa kwamanzi anetyuwa makungade kubangele ii-TPCs ezigqithileyo ezintlanzini, kwizinto eziphilayo ezingenamathambo, kwii- macrophytes nee-microalgae Ubukho bodaka ne-oksijini enyibilikisiweyo mabungade bubangele ii-TPCs ezigqithileyo kwii-biota Ubukho be-DIN)/be-DIP) mabungade bubangele ii-TPCs ezigqithileyo kwii-macrophytes nee-microalgae Izinto ezinetyhefu mazingade zibangele ii-TPCs ezigqithileyo kwii-biota	Iqondo lobukho betyuwa ngasechwebeni lincipha ngo-5 ngaphantsi kwe-avareje yesiqhelo 9iza kuqingqwa) Iqondo lobukho betyuwa emanzini ngu < 10 kumphezulu wechweba (uluhlu olulindelekileyo ngu5-10 ikakhulu kuyo yonke le ndawo) I-oksijini enyibilikisiweyo (DO) ngu< 5 mg/ℓ ecwhebeni Ubukho bodaka ngu > 10 NTU kumanzi ahamba kancinci i-Secchi: iya ezantsi DIN >100 μg/ℓ kanye nje DIP > 20 μg/ℓ kanye nje Iqondo lobukho bamanzi kweli candelo libetha ngaphaya kwamaxabiso angqaliweyo ngokubhaliweyo kwi- SA Water Quality Guidelines for coastal marine waters (DWAF, 1995) Iqondo lobukho beentlenge libetha ngaphaya kwamaxabiso angqaliweyo ngokubhaliweyo kwi-Indian Ocean (WIO) Region guidelines (UNEP/Nairobi Convention Secretariat and CSIR, 2009)
Uguquguquko kweentlenge	Imeko yeempuphuma mayilandele iipethini zosasazo lweentlenge nezeendawo zokuphilisana zasemanzini (zangaphakathi ngqo emjelweni) khonukuze ingade ibangele ii- TPCs ezigqithileyo ze-biota Iinguqu kubukhulu beepethini zosasazo lweenkozo zeentlenge mayingade ibangele ii- TPCs ezigqithileyo kwizinto eziphilayo ezingenamathambo zolwandle Inguqu kulwakhiwo lweentlenge (oluphakathi) neempawu Inguqu kwibathymetry e-avareji	I-avareji yokwakheka kweentlenge (i-% yamaqhezu) iphaya kwinguqu elindelekileyo echwebeni ukusuka kuleyo yesiqhelo (uza kuthatyathwa umlinganiselo wayo) ngo-30% (kuphando ngalunye) I-avareji yobunzulu phaya ngakwinguqu elindelekileyo kwelona-lona jelo ukusuka ku-30% waleyo yesiqhelo (iza kuqingqwa) (kwezi meko kulindeleke ukuba kubekho uguquguquko olubalaseleyo kwi-bathymetry ephakathi kweempuphuma namaxesha ovaleleko awandisiweyo)

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Printed by and obtainable from the Government Printer, Bosman Street, Private Bag X85, Pretoria, 0001
Contact Centre Tel: 012-748 6200. eMail: info.egazette@gpw.gov.za
Publications: Tel: (012) 748 6053, 748 6061, 748 6065

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Government Gazette
Staatskoerant

REPUBLIC OF SOUTH AFRICA
REPUBLIEK VAN SUID AFRIKA

Vol. 686 26 August Augustus 2022 No. 46798

PART 4 OF 4

N.B. The Government Printing Works will not be held responsible for the quality of "Hard Copies" or "Electronic Files" submitted for publication purposes

ISSN 1682-5845



AIDS HELPLINE: 0800-0123-22 Prevention is the cure

Icandelo le-ikholoji (lofundo ngendawo yokuphilisana nonxulumano lwezinto eziphila kuloo ndawo)	ii-EcoSpecs	Imida yeengxaki ezisenokwehla
I-Microalgae (ubulembu obuncinanana)	Gcina ubukhulu bendalo bobulembu be-phytoplankton/bolwandle buphakathi Thintela ukuvela kwee-phytoplankton ezidubulayo	i-Phytoplankton ngu > 3.5 µg/ℓ (phakathi) i-Benthic microalgae >11 mg/m^2 (phakathi) i-Phytoplankton ngu >20 µg/ℓ /okanye ukushinyana kweeseli ngun>10 000 iiseli/ml (kanye nje)
Ii-Macrophytes	Gcina iindawo zokuphila ze-macrophyte zikwimeko entle. Thintela ukwanda kwezondlo eziya kudala ubulembu obudubulayo Beka iliso kwizityalo ezitshabalalisayo kumda wonxweme	Inguqu engaphezu kwe-20 % kummandla owogqunywe zii-macrophytes (iingcongolo neentlenga zigquma ummandla oyi-2.54 ha, nemigxobhozo yeetyuwa eyi-0.76 ha Iimacro-algal ezidubulayo zigquma kangange- > 50% yommandla wamanzi avulekileyo kwezo meko zomlomo wechweba ovalekileyo Izityalo ezitshabalalisayo zogqume malunga ne->5% yeendawo zokuphila zizonke
Izinto eziphilayo ezingenamathambo	Phanda ngobukho beeproni zentlabathi ze-Callichirus kraussi kunxweme lwentlabathi olusechwebeni elisemazantsi Phanda ngobukho bee- copepod Pseudodiaptomus hessei okanye ii-congeneric zechweba kwi- zooplankton yechweba	Imigqeku iphambuka kwi-avareji yesiqhelo (njengo uphando lwezihlandlo ezintathu lubonisa) malunga nangaphaya kwe- 30%

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Icandelo le-ikholoji (lofundo ngendawo yokuphilisana nonxulumano lwezinto eziphila kuloo ndawo)	**ii-EcoSpecs**	**Imida yeengxaki ezisenokwehla**
Iintlanzi	Iimigqeku yeentlanzi mayiquke amabakala anxulunyaniswa nechweba amahlanu nabonisa iimpawu ezifanayo (ngokwahluka nangobuninzi) kwezo ziphantsi kohlolo. Ngokwamanani, ubugqeku mabuquke oku kulandelayo: Imigqeky yasechwebeni (i-50-80% lobuninzi babo bedibene) i-Ib yemigqeku yasemanzini nasechwebeni (i-5-20%) i-IIa yaleyo impilo yayo ixhomekeke echwebeni (i-10-20%) i-IIb yemigqeku enxulunyaniswa nechweba (i-5- 15%), i-IIc yezo zixhamla emanzini (i-20-80%) i-III yezibhadubhadu zasemanzini (ezingekho ngaphezulu kwe- 5%) i-IV yeentlanzi zomthonyama (i-1-5%) i-V yeentlobo ze-catadromous (ezo zifudukela elwandle ukuya kuzala (i-1-5%) Iintlobo zamabakala mazibe nemigqeku ezinzileyo eziintlobo ezingekho ngaphantsi kwesibini (umzekelo i- *G.aestuaria, i-Hyporamphus capensis*). Amabakala aloo migqeku ampilo yayo ixhomekeke echwebeni makabenabameli abaziintlobo ezisetyenziswa kakhulu ezingekho ngaphantsi kwesibini (umzekelo, *i-L. lithognathus, , i-Lichia amia*). Iintlobo ze-REI (zasekudibaneni komlambo nechweba (i-River Estuary Interface) ezonganyelwe zizo zombini ii- Myxus capensis nee-G. aestuaria.	i-Ia yemigqeku yasechwebeni ngu <50% i-Ib yemigqeku yasemanzini nasechwebeni ngu-<10% i-IIa yemigqeku empilo yawo ixhomekeke echwebeni ngu <10% i-IIb yemigqeku ebandakanyeka echwebeni ngu <5% i-IIc yaloo migqeku ixhamla emanzini ngu < 20% i-III yezibhadu-bhadu zasemanzini ngu <5% i-IV yeentlanzi zomthonyama ngu <1% i-V yezo ntlobo zifudukayo ukusuka emanzini ziye elwandle ukuya kuzala ngu <1%
Iintaka	Gcina imigqeku yeqela lokuqala leentaka ezilapho echwebeni	Amanani eentaka kulo naliphi na iqela (ngaphandle kwezo ntlobo zanda ngokwengingqi, njengedada laseYiphutha) ehla aye kutsho ngaphantsi kwemeko ephakathi yesiqhelo (oku kuqinisekiswa ziinkcukacha zexesha elidlulileyo okanye uphando lwakuqala/lwangaphambili) Amanani eentlobo ezithile / eentaka ezibalwa izihlandlo ezithathu ezilandelelanayo zehlobo okanye zobusika

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UTafile 7.6: ii-EcoSpecs nemida yeengxaki ezisenokwehla kwichweba iBloukrans

Icandelo le-ikholoji (lofundo ngendawo yokuphilisana nonxulumano lwezinto eziphila kuloo ndawo)	ii-EcoSpecs	Imida yeengxaki ezisenokwehla
I-Hydrology (Imeko yasemanzini)	Gcina ubuncikane isimo sexesha langoku sokuhamba kwamanzi	yahluka malunga nangaphaya kwe- 10% ye-MAR
I-Hydrodynamics (ugugugugugu lwasemanzini)	Gcina isimo somlomo wechweba sisihle ukuze lendawo yokuphilisana izilungele iintaka, iintlanzi, ii- macrophytes, i-micro-algae (ubulembu obuncinanana) nekwaliti yamanzi	Umlomo wechweba uyavala
Ikwaliti yamanzi	Ukusasazwa kwamanzi anetyuwa makungade kubangele ii-TPCs ezigqithileyo ezintlanzini, kwizinto eziphilayo ezingenamathambo, kwii- macrophytes nee-microalgae Ubukho bodaka ne-oksijini enyibilikisiweyo mabungade bubangele ii-TPCs ezigqithileyo kwii-biota Ubukho be-DIN)/be-DIP) mabungade bubangele ii-TPCs ezigqithileyo kwii-macrophytes nee-microalgae Izinto ezinetyhefu mazingade zibangele ii-TPCs ezigqithileyo kwii-biota	Iqondo lobukho betyuwa emanzini ngu < 10 kumphezulu wechweba (uluhlu olulindelekileyo ngu >30 ikakhulu kuyo yonke le ndawo) I-oksijini enyibilikisiweyo (DO) ngu< 5 mg/ℓ ecwhebeni Ubukho bodaka ngu > 10 NTU kumanzi ahamba kancinci i-Secchi: iya ezantsi DIN >100 µg/ℓ kanye nje DIP > 20 µg/ℓ kanye nje Iqondo lobukho bamanzi kweli candelo libetha ngaphaya kwamaxabiso angqaliweyo ngokubhaliweyo kwi- SA Water Quality Guidelines for coastal marine waters (DWAF, 1995) Iqondo lobukho beentlenge libetha ngaphaya kwamaxabiso angqaliweyo ngokubhaliweyo kwi-Indian Ocean (WIO) Region guidelines (UNEP/Nairobi Convention Secretariat and CSIR, 2009)
Ugugugugugu lweentlenge	Imeko yeempuphuma mayilandele iipethini zosasazo lweentlenge nezeendawo zokuphilisana zasemanzini (zangaphakathi ngqo emjelweni) khonukuze ingade ibangele ii- TPCs ezigqithileyo ze-biota linguqu kubukhulu beepethini zosasazo lweenkozo zeentlenge mayingade ibangele ii- TPCs ezigqithileyo kwizinto eziphilayo ezingenamathambo zolwandle Inguqu kulwakhiwo lweentlenge (oluphakathi) neempawu Inguqu kwibathymetry e-avareji	I-avareji yokwakheka kweentlenge (i-% yamaqhezu) iphaya kwinguqu elindelekileyo echwebeni ukusuka kuleyo yesiqhelo (uza kuthatyathwa umlinganiselo wayo) ngo-30% (kuphando ngalunye) I-avareji yobunzulu phaya ngakwinguqu elindelekileyo kwelona-lona jelo ukusuka ku-30% waleyo yesiqhelo (iza kuqingqwa) (kwezi meko kulindeleke ukuba kubekho ugugugugugu olubalaseleyo kwi-bathymetry ephakathi kweempuphuma namaxesha ovaleleko awandisiweyo)
I-Microalgae (ubulembu obuncinanana)	Gcina ubukhulu bendalo bobulembu be-phytoplankton/bolwandle buphakathi Thintela ukuvela kwee-phytoplankton ezidubulayo	i-Phytoplankton ngu > 1.0 µg/ℓ (phakathi) i-Benthic microalgae >11 mg/m^2 (phakathi) i-Phytoplankton ngu >20 µg/ℓ /okanye ukushinyana kweeseli ngun>10 000 iiseli/ml (kanye nje)
Ii-Macrophytes	Iindawo zokuphila ezisechwebeni zinamanxweme entlabathi/odaka kuphela (kangange-0.63 ha) nemijelo (kangange-2.88 ha), azikho ii-macrophytes	N/A

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Icandelo le-ikholoji (lofundo ngendawo yokuphilisana nonxulumano lwezinto eziphila kuloo ndawo)	ii-EcoSpecs	Imida yeengxaki ezisenokwehla
Izinto eziphilayo ezingenamathambo	Phanda ngobukho beeproni zentlabathi ze-Callichirus kraussi kunxweme lwentlabathi olusechwebeni elisemazantsi Phanda ngobukho bee- copepod Pseudodiaptomus hessei okanye ii-congeneric zechweba kwi- zooplankton yechweba	Ukuba imigqeku iphambuka kwi-avareji yesiqhelo (njengoko uphando lwezihlandlo ezintathu lubonisa) malunga nangaphaya kwe-30%
Iintlanzi	Iimigqeku yeentlanzi mayiquke amabakala anxulunyaniswa nechweba amahlanu nabonisa iimpawu ezifanayo (ngokwahluka nangobuninzi) kwezo ziphantsi kohlolo. Ngokwamanani, ubugqeku mabuquke oku kulandelayo: Imigqeky yasechwebeni (i-50-80% lobuninzi babo bedibene) i-Ib yemigqeku yasemanzini nasechwebeni (i-5-20%) i-IIa yaleyo impilo yayo ixhomekeke echwebeni (i-10-20%) i-IIb yemigqeku enxulunyaniswa nechweba (i-5- 15%), i-IIc yezo zixhamla emanzini (i-20-80%) i-III yezibhadubhadu zasemanzini (ezingekho ngaphezulu kwe- 5%) i-IV yeentlanzi zomthonyama (i-1-5%) i-V yeentlobo ze-catadromous (ezo zifudukela elwandle ukuya kuzala (i-1-5%) Iintlobo zamabakala mazibe nemigqeku ezinzileyo eziintlobo ezingekho ngaphantsi kwesibini (umzekelo i- *G.aestuaria, i-Hyporamphus capensis, Omobranchus woodii*). Amabakala aloo migqeku ampilo yayo ixhomekeke echwebeni makabenabameli abaziintlobo ezisetyenziswa kakhulu ezingekho ngaphantsi kwesibini (umzekelo, *i-L. lithognathus, P. commersonii, i-Lichia amia*). Iintlobo ze-REI (zasekudibaneni komlambo nechweba (i-River Estuary Interface) ezonganyelwe zizo zombini ii- Myxus capensis nee-G. aestuaria.	i-Ia yemigqeku yasechwebeni ngu <50% i-Ib yemigqeku yasemanzini nasechwebeni ngu-<10% i-IIa yemigqeku empilo yawo ixhomekeke echwebeni ngu <10% i-IIb yemigqeku ebandakanyeka echwebeni ngu <5% i-IIc yaloo migqeku ixhamla emanzini ngu < 20% i-III yezibhadu-bhadu zasemanzini ngu <5% i-IV yeentlanzi zomthonyama ngu <1% i-V yezo ntlobo zifudukayo ukusuka emanzini ziye elwandle ukuya kuzala ngu <1%
Iintaka	Gcina imigqeku yeqela lokuqala leentaka ezilapho echwebeni	Amanani eentaka kulo naliphi na iqela (ngaphandle kwezo ntlobo zanda ngokwengingqi, njengedada laseYiphutha) ehla aye kutsho ngaphantsi kwemeko ephakathi yesiqhelo (oku kuqinisekiswa ziinkcukacha zexesha elidlulileyo okanye uphando lwakuqala/lwangaphambili) Amanani eentlobo ezithile / eentaka ezibalwa izihlandlo ezithathu ezilandelelanayo zehlobo okanye zobusika

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UTafile 7.7: ii-EcoSpecs nee-TPCs kwichweba iGoukou

ii-EcoSpecs	i-TPC
Ikwaliti yamanzi	
Usasazo lobukho beetyuwa emanzini malungade lubangele ii-TPCs ezigqithileyo kwi-biota.	▪ Ubukho betyuwa emanzini ngu > 0 kumphezulu wechweba. ▪ I-avareji yobukho betyuwa emanzini kuMda D ngu> 5. ▪ I-avareji yobukho betyuwa emanzini kuMda C ngu > 20. ▪ I-avareji yobukho betyuwa emanzini ukusuka kwi- 5 km kumphezulu womjelo ukusukaemlonyeni wechweba ngu > 20 ngaphezu kweenyanga ezintathu enyakeni.
Ukwahluka kweemeko (ngokwe-pH, i-oksijini enyibilikileyo nobukho bodaka) makungade kubangele ii-TPCs ezigqithileyo kwi-biota.	Amanzi angena emlanjeni: ▪ Nge-6.0 < yepH > ngu-7.5. ▪ i-DO ngu < 5 mg/L. ▪ Izinto eziqinileyo ezirhoxiswayo ngu>5 mg/L (ngamanzi ahamba kancinci). Echwebeni: ▪ I-avareji yobukho bodaka ngu>10 Nephelometric Turbidity Units (NTU) (ngamanzi ahamba kancinci). ▪ I-avareji nge- 6.0 < yepH > ngu-8.5 (isanda ngokwenyuka kweqondo lobukho beetyuwa). ▪ I-avareji ye- DO ngu< 5 mg/L.
Ubukho bezondlo ezingezozendalo (njenge-NO_3-N, i-NH_3-N ne- PO_4-P) mabungade bubangele ii-TPCs ezigqithileyo kwii-macrophytes ne-microalgae.	Amanzi angena emlanjeni: ▪ i-NO_x-N ngu >150 µg/L kwiinyanga ezimbini ezilandelelanayo. ▪ i-NH_3-N ngu > 20 µg/L kwiinyanga ezimbini ezilandelelanayo.. ▪ I-PO_4-PP ngu> 20 µg/L kwiinyanga ezimbini ezilandelelanayo.. Echwebeni (ngaphandle kwamaxa kukho iimpuphuma): ▪ I-avareji ye- NO_x-N ngu >150 µg/L ngomlinganiselo omnye > 200 µg/L. ▪ I-avareji ye-NH_3-N ngu > 20 µg/L ngethuba lophando, ngomlinganiselo omnye > 100 µg/L. ▪ I-avareji ye- PO_4-P ngu > 20 µg/L ngethuba lophando, ngomlinganiselo omnye > 50 µg/L.
Ubukho bezinto ezinetyhefu (umzekelo iimethali zokuchonga, izibulala zinambuzane namayeza athile) mabungade bubangele ii-TPCs ezigqithileyo kwi-biota.	Amanzi angena emlanjeni: ▪ Iimethali zokuchonga (mazicokiswe futhi ziqinisekiswe kuhlolo lwexesha elizayo). ▪ Izibulala-vumba namayeza athile (mazicokiswe futhi ziqinisekiswe kuhlolo lwexesha elizayo)). Echwebeni: ▪ Iqondo lobukho bamanzi kweli candelo libetha ngaphaya kwamaxabiso angqaliweyo ngokubhaliweyo kwi- SA Water Quality Guidelines for coastal marine waters (DWAF, 1995) ▪ Iqondo lobukho beentlenge libetha ngaphaya kwamaxabiso angqaliweyo ngokubhaliweyo kwi- Indian Ocean (WIO) Region guidelines (UNEP/Nairobi Convention Secretariat and CSIR, 2009)

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UTafile 7.8: ii-EcoSpecs zekwaliti yamanzi nee-TPCs kwichweba iGouritz

Icandelo	ii-EcoSpecs	Imida yengxaki esenokwehla
Ikwaliti yamanzi	Usasazo lobukho beetyuwa emanzini malungade lubangele ii-TPCs ezigqithileyo kwi-biota.	▪ Ubukho betyuwa emanzini ngu > 0 kumphezulu wechweba. ▪ I-avareji yobukho betyuwa emanzini kwiSikhundla 11.1 km ngu> 5. ▪ I-avareji yobukho betyuwa emanzini kuMda C ngu > 20. ▪ I-avareji yobukho betyuwa emanzini ukusuka kwi- 11 km kumphezulu womjelo ukusukaemlonyeni wechweba ngu > 20 ngaphezu kweenyanga ezintathu enyakeni. ▪ Ubukho betyuwa emanzini ngu > 40 kwiintlenge zomgxobhozo weetyuwa (oku kunxulunyaniswa nokuncipha kobumanzi nokoma kwendawo yokuphila elithafa leempuphuma
	Ukwahluka kweemeko (ngokwe-pH, i-oksijini enyibilikileyo nobukho bodaka) makungade kubangele ii-TPCs ezigqithileyo kwi-biota.	Amanzi angena emlanjeni: ▪ Nge-7.0 < yepH > ngu-8.3. ▪ i-DO ngu < 5 mg/L. ▪ Izinto eziqinileyo ezirhoxiswayo ngu>5 mg/L (ngamanzi ahamba kancinci). Echwebeni: ▪ I-avareji yobukho bodaka ngu>10 NTU (ngamanzi ahamba kancinci, azolileyo, xa kuxube nomoya kungalinyusa iqondo lobukho bodaka liye ku- 20-40 NTU). ▪ I-avareji nge- 7.0 < yepH > ngu-8.5 (isanda ngokwenyuka kweqondo lobukho beetyuwa). ▪ I-avareji ye- DO ngu< 5 mg/L.
	Ubukho bezondlo ezingezozendalo (njenge-NO_3-N, i-NH_3-N ne- PO_4-P) mabungade bubangele ii-TPCs ezigqithileyo kwii-macrophytes ne-microalgae.	Amanzi angena emlanjeni: ▪ i-NO_x-N ngu >100 µg/L kwiinyanga ezimbini ezilandelelanayo. ▪ i-NH_3-N ngu > 20 µg/L kwiinyanga ezimbini ezilandelelanayo.. ▪ I-PO_4-PP ngu> 20 µg/L kwiinyanga ezimbini ezilandelelanayo. Echwebeni (ngaphandle kwamaxa kukho iimpuphuma): ▪ I-avareji ye- NO_x-N ngu >100 µg/L ngomlinganiselo omnye ngu > 100 µg/L. ▪ I-avareji ye-NH_3-N ngu > 20 µg/L ngethuba lophando, ngomlinganiselo omnye > 100 µg/L. ▪ I-avareji ye- PO_4-P ngu > 20 µg/L ngethuba lophando, ngomlinganiselo omnye > 50 µg/L.
	Ubukho bezinto ezinetyhefu (umzekelo iimethali zokuchonga, izibulala zinambuzane namayeza athile) mabungade bubangele ii-TPCs ezigqithileyo kwi-biota.	Amanzi angena emlanjeni: ▪ Iimethali zokuchonga (ziza kuqinisekiswa) ▪ Izibulala-zinambuzane namayeza athile (ziza kuqinisekiswa)) Echwebeni: ▪ Iqondo lobukho bamanzi kweli candelo libetha ngaphaya kwamaxabiso angqaliweyo ngokubhaliweyo kwi- SA Water Quality Guidelines for coastal marine waters (DWAF, 1995) ▪ Iqondo lobukho beentlenge libetha ngaphaya kwamaxabiso angqaliweyo ngokubhaliweyo kwi-Indian Ocean (WIO) Region guidelines (UNEP/Nairobi Convention Secretariat and CSIR, 2009)

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UTafile 7.9: ii-Eco Specs nee-TPCs kwichweba iKlein Brak

Icandelo	ii-EcoSpecs	Imida yengxaki enokwehla
Ikwaliti yamanzi	Usasazo lobukho beetyuwa emanzini malungade lubangele ii-TPCs ezigqithileyo kwi-biota.	▪ Akukho bungqina babukho beetyuwa emanzini kumphezulu wonxweme (kwiMida D no-F) ▪ Akukho REI kumphezulu wonxweme (kwiMida D no-F) ▪ Iqondo lobukho beetyuwa emanzini ngu > 35
	Ukwahluka kweemeko (ngokwe-pH, i-oksijini enyibilikileyo nobukho bodaka) makungade kubangele ii-TPCs ezigqithileyo kwi-biota.	Amanzi angena emlanjeni: ▪ I-7.0 < ye-pH > ngu- 8.5 ▪ I-DO < ngu5 mg/ℓ ▪ Izinto eziqinileyo ezirhoxiswayo ngu > 5 mg/ ℓ (kumanzi ahamba kancinci) Echwebeni: ▪ I-avareji yobukho bodaka ngu>10 NTU (ngamanzi ahamba kancinci, azolileyo, xa kuxube nomoya kungalinyusa iqondo lobukho bodaka liye ku- 20-40 NTU). ▪ I-avareji nge- 7.0 < yepH > ngu-8.5 (isanda ngokwenyuka kweqondo lobukho beetyuwa). ▪ I-avareji ye- DO ngu< 5 mg/ℓ
	Ubukho bezondlo ezingezozendalo (njenge-NO_3-N, i-NH_3-N ne- PO_4-P) mabungade bubangele ii-TPCs ezigqithileyo kwii-macrophytes ne-microalgae.	Amanzi angena emlanjeni: ▪ i-NO_x-N ngu >150 µg/L kwiinyanga ezimbini ezilandelelanayo. ▪ i-NH_3-N ngu > 20 µg/L kwiinyanga ezimbini ezilandelelanayo.. ▪ I-PO_4-PP ngu> 20 µg/L kwiinyanga ezimbini ezilandelelanayo. Echwebeni (ngaphandle kwamaxa kukho iimpuphuma): ▪ I-avareji ye- NO_x-N ngu >150 µg/L ngomlinganiselo omnye ngu > 200 µg/L. ▪ I-avareji ye-NH_3-N ngu > 20 µg/L ngethuba lophando, ngomlinganiselo omnye > 100 µg/L. ▪ I-avareji ye- PO_4-P ngu > 20 µg/L ngethuba lophando, ngomlinganiselo omnye > 50 µg/L.
	Ubukho bezinto ezinetyhefu (umzekelo iimethali zokuchonga, izibulala zinambuzane namayeza athile) mabungade bubangele ii-TPCs ezigqithileyo kwi-biota.	Amanzi angena emlanjeni: ▪ Iimethali zokuchonga (ziza kuqinisekiswa) ▪ Izibulala-zinambuzane namayeza athile (ziza kuqinisekiswa)) Echwebeni: ▪ Iqondo lobukho bamanzi kweli candelo libetha ngaphaya kwamaxabiso angqaliweyo ngokubhaliweyo kwi- SA Water Quality Guidelines for coastal marine waters (DWAF, 1995) ▪ Iqondo lobukho beentlenge libetha ngaphaya kwamaxabiso angqaliweyo ngokubhaliweyo kwi-Indian Ocean (WIO) Region guidelines (UNEP/Nairobi Convention Secretariat and CSIR, 2009)

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UTafile 7.10: ii-EcoSpecs nee-TPCs kwi-Wilderness System

Icandelo	ii-EcoSpecs	Imida yengxaki esenokwehla
Ikwaliti yamanzi	Ubukho betyuwa emanzini	Ichweba likwimo yovaleko: ▪ I-avareji yobukho betyuwa emanzini kuMda A ngu < 12, ▪ I-avareji yobukho betyuwa emanzini kuMda B ngu: < 10 ▪ I-avareji yobukho betyuwa emanzini kuMda C ngu < 5 i-avareji yobukho betyuwa emanzini kumachibi ngu- +2 ukusuka kuleyo yesiqhelo (yango2013) futhi ke ukwahluka kona akwandi, njengalapha ezantsi: ▪ iSerpentine: 12 ± 10 ▪ iEilandvlei: 8 ± 5 ▪ iLangvlei: 10 ± 4 ▪ iRondevlei: 10 ± 5
	Ukwahluka kweemeko (ngokwe-pH, i-oksijini enyibilikileyo nobukho bodaka) makungade kubangele ii-TPCs ezigqithileyo kwi-biota.	Amanzi angena emlanjeni: ▪ I-6.0 < ye-pH > ngu- 7.0 (kwiTouw) ▪ I-7.0 < ye-pH > ngu- 8.0 (kwiDuiwe) ▪ I-DO < ngu5 mg/ℓ ▪ Izinto eziqinileyo ezirhoxiswayo ngu > 5 mg/ ℓ (kumanzi ahamba kancinci) Echwebeni: ▪ I-avareji yobukho bodaka ngu>5 NTU (ngamanzi ahamba kancinci. ▪ I-avareji nge- 6.0 < yepH > ngu-8.5 (isanda ngokwenyuka kweqondo lobukho beetyuwa). ▪ I-avareji ye- DO ngu< 5 mg/ℓ ▪ DO < 5 mg/ℓ Kumachibi: ▪ I-avareji yobukho bodaka ngu>5 NTU ▪ I-avareji nge7.0 < yepH ngu> 8.5 ▪ I-avareji ye- DO ngu< 5 mg/ℓ
	Ubukho bezondlo ezingezozendalo (njenge-NO_3-N, i-NH_3-N ne- PO_4-P) mabungade bubangele ii-TPCs ezigqithileyo kwii-macrophytes ne-microalgae.	Amanzi angena emlanjeni: ▪ i-NO_x-N ngu >50 µg/L kwiinyanga ezimbini ezilandelelanayo. ▪ i-NH_3-N ngu > 10 µg/L kwiinyanga ezimbini ezilandelelanayo.. ▪ I-PO_4-PP ngu> 10 µg/L kwiinyanga ezimbini ezilandelelanayo. Echwebeni (ngaphandle kwamaxa kukho iimpuphuma): ▪ I-avareji ye- NO_x-N ngu >50 µg/L ngomlinganiselo omnye ngu > 100 µg/L. ▪ I-avareji ye-NH_3-N ngu > 10 µg/L ngethuba lophando, ngomlinganiselo omnye > 100 µg/L. ▪ I-avareji ye- PO_4-P ngu > 10 µg/L ngethuba lophando, ngomlinganiselo omnye > 50 µg/L. Kumachibi: ▪ I-avareji ye- NO_x-N ngu >50 µg/L ngethuba lophando, ngomlinganiselo omnye ngu > 100 µg/L. ▪ I-avareji ye-NH_3-N ngu > 20 µg/ℓ ngethuba lophando (iza kuqinisekiswa) ▪ I-avareji ye- PO_4-P ngu> 20 µg/ℓ ngethuba lophando (iza kuqinisekiswa)
	Ubukho bezinto ezinetyhefu (umzekelo iimethali zokuchonga, izibulala zinambuzane	Amanzi angena emlanjeni: ▪ Iimethali zokuchonga (ziza kuqinisekiswa)

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	namayeza athile) mabungade bubangele ii-TPCs ezigqithileyo kwi-biota.	▪ Izibulala-zinambuzane namayeza athile (ziza kuqinisekiswa)) Echwebeni: ▪ Iqondo lobukho bamanzi kweli candelo libetha ngaphaya kwamaxabiso angqaliweyo ngokubhaliweyo kwi- SA Water Quality Guidelines for coastal marine waters (DWAF, 1995) ▪ Iqondo lobukho beentlenge libetha ngaphaya kwamaxabiso angqaliweyo ngokubhaliweyo kwi- Indian Ocean (WIO) Region guidelines (UNEP/Nairobi Convention Secretariat and CSIR, 2009)

UTafile 7.11: Uvavanyo lwesimo sangoku sekwaliti yamanzi kwi-H8DUIW-EWR1

lZithako zeKwaliti yaManzi	Ixabiso le-PES	lBakala/Amagqabantshintshi
Ii-ioni zeetyuwa ezingezozendalo (mg/l)		
Sulphate as SO_4	N/A	-
Sodium as Na	382.2	Ibetha ngaphaya ko ≤ 70 mg/L (TWQR) osetyenziswa kwezolimo: kunkcunkceshelo.
Magnesium as Mg	67.4	Asikho isikhokelo.
Calcium as Ca	55.0	Asikho isikhokelo.
Chloride as Cl	805.4	Ibetha ngaphaya ko ≤ 100 mg/L (TWQR) osetyenziswa kwezolimo: kunkcunkceshelo.
Potassium as K	9.25	Asikho isikhokelo.
Ukutsala umbane (mS/m)		
	272	E/F: RC = 80 mS/m.
Izondlo (mg/l)		
SRP	0.014	A
TIN	0.118	A
Ukwahluka kwendalo		
pH (5^{th} + 95^{th} %ile)	u-6.6 no- 8.1	B
Ubushushu (ºC)	N/A	A/B. likho ifuthe elilindelekileyo kumanzi ahamba kancinci.
i-oksijini enyibilikisiweyo (mg/L)	N/A	A/B. likho ifuthe elilindelekileyo kumanzi ahamba kancinci.
Ubukho bodaka (NTU)	N/A	B. iinguqu kwiqondo lobukho bodaka zinxulunyaniswa ikakhulu nezendalo, apho kuye kubekho neenguqulelo ezenziwa ngabantu ezingephi - umzekelo olwaa shishino ngegraveli phaya emantla omjelo
Ukwahluka ngokwemvakalelo		
Chl-*a*: phytoplankton (ug/L)	N/A	N/A
Inqaku lobukhulu bezinto eziphilayo ezingenamathatho (i-MIRAI) Inqaku le-SASS Inqaku le-ASPT	50.7% 78 56	D
ii-Diatoms	11.1	C/D (n = 1, Jan 2014)
Inqaku leentlanzi (i-FRAI)	51.6%	D (zonke ezo zechweba ezafudukela kumanzi ahlaziyekileyo nezo ke ingezizo zomthonyama).
lityhefu		
Ammonia (as N)	0.003	A
Fluoride (as F)	0.33	A
LULONKE UHLELO LWESIKHUNDLA		**C (73.2%)**

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lZithako zeKwaliti yaManzi	Ixabiso le-PES	lBakala/Amagqabantshintshi
(Umzekelo we-PAI)		

(a) N/A- bezingekho iinkcukacha kolu vavanyo.

UTafile 7.12: H8DUlW-EWR1: ii-EcoSpecs nee- TPCs zekwaliti yamanzi (iBakala C)

ii-Metrics	ii-EcoSpecs	ii-TPCs
ii-ioni zeetyuwa ezingezozendalo		
Sulphate as SO_4	N/A	N/A
Sodium as Na	i-95th percentile yeenkcukacha mayibe ngu- ≤ 380 mg/L.	i-95th percentile yeenkcukacha mayibe ngu- 300 - 380 mg/L.
Magnesium as Mg	i-95th percentile yeenkcukacha mayibe ngu- ≤ 67 mg/L.	i-95th percentile yeenkcukacha mayibe ngu- 53.5 - 67 mg/L.
Calcium as Ca	i- 95th percentile yeenkcukacha mayibe ngu- ≤ 55 mg/L.	i- 95th percentile yeenkcukacha mayibe ngu- 44 - 55 mg/L.
Chloride as Cl	i- 95th percentile yeenkcukacha mayibe ngu- ≤ 800 mg/L.	i-95th percentile yeenkcukacha mayibe ngu- 640 - 800 mg/L.
Potassium as K	i-95th percentile yeenkcukacha mayibe ngu- ≤ 9 mg/L.	i- 95th percentile yeenkcukacha mayibe ngu- 7 - 9 mg/L.
Ukwahluka kwendalo		
Ukutsala umbane (mS/m)	i- 95th percentile yeenkcukacha mayibe ngu- ≤ 270 mS/m.	i-95th percentile yeenkcukacha mayibe ngu- 210 - 270 mS/m.
ipH	i- 5th percentile yeenkcukacha mayibe ngu- 6.5. – 8.0, ze i- 95th percentile ibe ngu-8.0 - 8.8.	i- 5th percentile yeenkcukacha - ≤ 6.3 ze i-95th percentile ibe ngu- ≥ 8.6.
ubushushu[(a)]	Uluhlu lobushushu bendalo.	Qalisa uhlolo lwesiqhelo loku kwahluka.
i-oksijini enyibilikisiweyo[(a)](DO)	i-5th percentile yeenkcukacha mayibe ngu- ≥ 7.0 mg/L.	i-5th percentile yeenkcukacha mayibe ngu- 7.2 - 7.0 mg/L. Qalisa uhlolo lwesiqhelo loku kwahluka.
Ubukho bodaka[(a)]	linguqu kwiqondo lobukho bodaka bunxulunyaniswa ikakhulu neenguqulelo ezenziwa ngabantu ezingephi (umzekelo olwaa shishino lwegraveli kumantla omjelo gravel mining upstream). Iintlenge zilindelekile kwiindawo zokuphila.	Qalisa uhlolo lwesiqhelo loku kwahluka.
Izondlo		
TIN	i-50th percentile yeenkcukacha mayibe ngu ≤ 0.25 mg/L.	i- 50th percentile yeenkcukacha mayibe ngu 0.2 - 0.25 mg/L.
PO_4-P	i-50th percentile yeenkcukacha mayibe ngu ≤ 0.015 mg/L.	i-50th percentile yeenkcukacha mayibe ngu 0.012 - 0.015 mg/L.
Ukwahluka ngokwemvakalelo		
Chl-a phytoplankton	i-50th percentile yeenkcukacha mayibe ngu < 15 µg/L.	i- 50th percentile yeenkcukacha mayibe ngu 12 - 15 µg/L.
Chl-a periphyton	i-50th percentile yeenkcukacha mayibe ngu ≤ 12 mg/m^2.	i-50th percentile yeenkcukacha mayibe ngu 10 - 12 mg/m^2.
lityhefu		
Fluoride	i-50th yeenkcukacha mayibe ngu ≤ 1.5 mg/L.	i-50th percentile yeenkcukacha mayibe ngu 1.2 - 1.5 mg/L.
Ammonia (NH_3-N)	i-50th percentile yeenkcukacha mayibe ngu ≤ 0.015 mg/L.	i- 50th percentile yeenkcukacha mayibe ngu 0.012 - 0.015 mg/L.
Other toxics	i- 95th percentile yeenkcukacha mayibe phakathi koluhlu lwekwaliti yamanzi	Likho ifuthe elilindelekileyo ukuba i- 95th percentile yeenkcukacha ibetha ngaphaya

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ii-Metrics	ii-EcoSpecs	ii-TPCs
	engqaliweyo (i-Target Water Quality Range (TWQR) njengoko kubhaliwe kuDWAF (1996) okanye umda weBakala A njengoko kubhaliwe kuDWAF (2008).	kwe- TWQR njengoko kubhaliwe kuDWAF (1996) okanye kumda ophezulu weBakala A njengoko kubhaliwe kuDWAF (2008).

(a) N/A- Bezingekho iinkcukacha kolu vavanyo

UTafile 7.13: ii-EcoSpecs nee-TPCs kwichweba iDuiwenhoks

Icandelo	ii-EcoSpecs	Imida yengxaki esenokwehla
Ikwaliti yamanzi	Usasazo lobukho beetyuwa emanzini malungade lubangele ii-TPCs ezigqithileyo kwi-biota.	▪ Ubukho betyuwa emanzini ngu > 0 kumphezulu wechweba. ▪ I-avareji yobukho betyuwa emanzini kuMda D ngu > 5 ▪ I-avareji yobukho betyuwa emanzini kuMda C ngu > 20. ▪ I-avareji yobukho betyuwa emanzini ukusuka kwi- 5 km kumphezulu womjelo ukusuka emlonyeni wechweba ngu > 20 ngaphezu kweenyanga ezintathu enyakeni.
	Ukwahluka kweemeko (ngokwe-pH, i-oksijini enyibilikileyo nobukho bodaka) makungade kubangele ii-TPCs ezigqithileyo kwi-biota.	Amanzi angena emlanjeni: ▪ I-6.0 < ye-pH > ngu- 7.5 ▪ I-DO < ngu5 mg/ℓ ▪ Izinto eziqinileyo ezirhoxiswayo ngu > 5 mg/ℓ (kumanzi ahamba kancinci) Echwebeni: ▪ I-avareji yobukho bodaka ngu>10 NTU (ngamanzi ahamba kancinci. ▪ I-avareji nge- 6.0 < yepH > ngu-8.5 (isanda ngokwenyuka kweqondo lobukho beetyuwa). ▪ I-avareji ye- DO ngu< 5 mg/ℓ
	Ubukho bezondlo ezingezozendalo (njenge-NO_3-N, i-NH_3-N ne- PO_4-P) mabungade bubangele ii-TPCs ezigqithileyo kwii-macrophytes ne-microalgae.	Amanzi angena emlanjeni: ▪ i-NO_x-N ngu >150 µg/L kwiinyanga ezimbini ezilandelelanayo. ▪ i-NH_3-N ngu > 20 µg/L kwiinyanga ezimbini ezilandelelanayo.. ▪ I-PO_4-PP ngu> 20 µg/L kwiinyanga ezimbini ezilandelelanayo. Echwebeni (ngaphandle kwamaxa kukho iimpuphuma): ▪ I-avareji ye- NO_x-N ngu >150 µg/L ngomlinganiselo omnye ngu > 200 µg/L. ▪ I-avareji ye-NH_3-N ngu > 20 µg/L ngethuba lophando, ngomlinganiselo omnye > 100 µg/L. ▪ I-avareji ye- PO_4-P ngu > 20 µg/L ngethuba lophando, ngomlinganiselo omnye > 50 µg/L.

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	Ubukho bezinto ezinetyhefu (umzekelo iimethali zokuchonga, izibulala zinambuzane namayeza athile) mabungade bubangele ii-TPCs ezigqithileyo kwi-biota.	Amanzi angena emlanjeni: ▪ Iimethali zokuchonga (ziza kuqinisekiswa) ▪ Izibulala-zinambuzane namayeza athile (ziza kuqinisekiswa)) Echwebeni: ▪ Iqondo lobukho bamanzi kweli candelo libetha ngaphaya kwamaxabiso angqaliweyo ngokubhaliweyo kwi- SA Water Quality Guidelines for coastal marine waters (DWAF, 1995) ▪ Iqondo lobukho beentlenge libetha ngaphaya kwamaxabiso angqaliweyo ngokubhaliweyo kwi- Indian Ocean (WIO) Region guidelines (UNEP/Nairobi Convention Secretariat and CSIR, 2009)

UTafile 7.14: ii-EcoSpecs nee-TPCs kwichweba iGoukou

ii-EcoSpecs	i-TPC
Ikwaliti yamanzi	
Usasazo lobukho beetyuwa emanzini malungade lubangele ii-TPCs ezigqithileyo kwi-biota.	▪ Ubukho betyuwa emanzini ngu > 0 kumphezulu wechweba. ▪ I-avareji yobukho betyuwa emanzini kuMda D ngu > 5 ▪ I-avareji yobukho betyuwa emanzini kuMda C ngu > 20. ▪ I-avareji yobukho betyuwa emanzini ukusuka kwi- 5 km kumphezulu womjelo ukusuka emlonyeni wechweba ngu > 20 ngaphezu kweenyanga ezintathu enyakeni.
Ukwahluka kweemeko (ngokwe-pH, i-oksijini enyibilikileyo nobukho bodaka) makungade kubangele ii-TPCs ezigqithileyo kwi-biota.	Amanzi angena emlanjeni: ▪ I-6.0 < ye-pH > ngu- 7.5 ▪ I-DO < ngu5 mg/ℓ ▪ Izinto eziqinileyo ezirhoxiswayo ngu > 5 mg/ ℓ (kumanzi ahamba kancinci) Echwebeni: ▪ I-avareji yobukho bodaka ngu>10 NTU (ngamanzi ahamba kancinci. ▪ I-avareji nge- 6.0 < yepH > ngu-8.5 (isanda ngokwenyuka kweqondo lobukho beetyuwa). ▪ I-avareji ye- DO ngu< 5 mg/ℓ
Ubukho bezondlo ezingezozendalo (njenge-NO_3-N, i-NH_3-N ne- PO_4-P) mabungade bubangele ii-TPCs ezigqithileyo kwii-macrophytes ne-microalgae.	Amanzi angena emlanjeni: ▪ i-NO_x-N ngu >150 µg/L kwiinyanga ezimbini ezilandelelanayo. ▪ i-NH_3-N ngu > 20 µg/L kwiinyanga ezimbini ezilandelelanayo.. ▪ I-PO_4-PP ngu> 20 µg/L kwiinyanga ezimbini ezilandelelanayo. Echwebeni (ngaphandle kwamaxa kukho iimpuphuma): ▪ I-avareji ye- NO_x-N ngu >150 µg/L ngomlinganiselo omnye ngu > 200 µg/L. ▪ I-avareji ye-NH_3-N ngu > 20 µg/L ngethuba lophando, ngomlinganiselo omnye > 100 µg/L. ▪ I-avareji ye- PO_4-P ngu > 20 µg/L ngethuba lophando, ngomlinganiselo omnye > 50 µg/L.

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ii-EcoSpecs	i-TPC
Ubukho bezinto ezinetyhefu (umzekelo iimethali zokuchonga, izibulala zinambuzane namayeza athile) mabungade bubangele ii-TPCs ezigqithileyo kwi-biota.	Amanzi angena emlanjeni: ▪ Iimethali zokuchonga (mazicokiswe futhi ziqinisekiswe kuhlolo lwexesha elizayo). ▪ Izibulala-vumba namayeza athile (mazicokiswe futhi ziqinisekiswe kuhlolo lwexesha elizayo)). Echwebeni: ▪ Iqondo lobukho bamanzi kweli candelo libetha ngaphaya kwamaxabiso angqaliweyo ngokubhaliweyo kwi- SA Water Quality Guidelines for coastal marine waters (DWAF, 1995) ▪ Iqondo lobukho beentlenge libetha ngaphaya kwamaxabiso angqaliweyo ngokubhaliweyo kwi-Indian Ocean (WIO) Region guidelines (UNEP/Nairobi Convention Secretariat and CSIR, 2009)

UTafile 7.15: ii- EcoSpecs zekwaliti yamanzi nee-TPCs kwichweba iGouritz

Icandelo	ii-EcoSpecs	Imida yengxaki esenokwehla
Ikwaliti yamanzi	Usasazo lobukho beetyuwa emanzini malungade lubangele ii-TPCs ezigqithileyo kwi-biota.	▪ Ubukho betyuwa emanzini ngu > 0 kumphezulu wechweba. ▪ I-avareji yobukho betyuwa emanzini kwiSikhundla 11, 1 km kumphezulu womjelo webhulorho ngu > 5 ▪ I-avareji yobukho betyuwa emanzini kuMda C ngu > 20. ▪ I-avareji yobukho betyuwa emanzini ukusuka kwi- 11 km kumphezulu womjelo ukusuka emlonyeni wechweba ngu > 20 ngaphezu kweenyanga ezintathu enyakeni. ▪ Iqondo lobukho betyuwa emanzini ngu > 40 kwiintlenge zomgxobhozo weetyuwa (linxulunyaniswa nokuncipha kobumanzi nokoma kwendawo yokuphila kwithafa leempuphuma.
	Ukwahluka kweemeko (ngokwe-pH, i-oksijini enyibilikileyo nobukho bodaka) makungade kubangele ii-TPCs ezigqithileyo kwi-biota.	Amanzi angena emlanjeni: ▪ I-7.0 < ye-pH > ngu- 8.3 ▪ I-DO < ngu5 mg/ℓ ▪ Izinto eziqinileyo ezirhoxiswayo ngu > 5 mg/ ℓ (kumanzi ahamba kancinci) Echwebeni: ▪ I-avareji yobukho bodaka ngu>10 NTU (ngamanzi ahamba kancinci, azolileyo, xa kuxube nomoya kungalinyusa iqondo lobukho bodaka liye ku- 20-40 NTU). ▪ I-avareji nge- 7.0 < yepH > ngu-8.5 (isanda ngokwenyuka kweqondo lobukho beetyuwa). ▪ I-avareji ye- DO ngu< 5 mg/ℓ

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Icandelo	ii-EcoSpecs	Imida yengxaki esenokwehla
	Ubukho bezondlo ezingezozendalo (njenge-NO_3-N, i-NH_3-N ne- PO_4-P) mabungade bubangele ii-TPCs ezigqithileyo kwii-macrophytes ne-microalgae.	Amanzi angena emlanjeni: ▪ i-NO_x-N ngu >100 µg/L kwiinyanga ezimbini ezilandelelanayo. ▪ i-NH_3-N ngu > 20 µg/L kwiinyanga ezimbini ezilandelelanayo.. ▪ I-PO_4-PP ngu> 20 µg/L kwiinyanga ezimbini ezilandelelanayo. Echwebeni (ngaphandle kwamaxa kukho iimpuphuma): ▪ I-avareji ye- NO_x-N ngu >100 µg/L ngomlinganiselo omnye ngu > 150 µg/L. ▪ I-avareji ye-NH_3-N ngu > 20 µg/L ngethuba lophando, ngomlinganiselo omnye > 100 µg/L. ▪ I-avareji ye- PO_4-P ngu > 20 µg/L ngethuba lophando, ngomlinganiselo omnye > 50 µg/L.
	Ubukho bezinto ezinetyhefu (umzekelo iimethali zokuchonga, izibulala zinambuzane namayeza athile) mabungade bubangele ii-TPCs ezigqithileyo kwi-biota.	Amanzi angena emlanjeni: ▪ Iimethali zokuchonga (ziza kuqinisekiswa) ▪ Izibulala-zinambuzane namayeza athile (ziza kuqinisekiswa)) Echwebeni: ▪ Iqondo lobukho bamanzi kweli candelo libetha ngaphaya kwamaxabiso angqaliweyo ngokubhaliweyo kwi- SA Water Quality Guidelines for coastal marine waters (DWAF, 1995) ▪ Iqondo lobukho beentlenge libetha ngaphaya kwamaxabiso angqaliweyo ngokubhaliweyo kwi- Indian Ocean (WIO) Region guidelines (UNEP/Nairobi Convention Secretariat and CSIR, 2009)

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UTafile 7.16: ii-EcoSpecs nee- TPCs kwi- Wilderness System

Icandelo	ii-EcoSpecs	Imida yengxaki esenokwehla
Ikwaliti yamanzi	Ubukho beetyuwa emanzini	Ichweba likwimo yovaleko: ▪ I-avareji yobukho betyuwa emanzini kuMda A ngu < 12, ▪ I-avareji yobukho betyuwa emanzini kuMda B ngu: < 10 ▪ I-avareji yobukho betyuwa emanzini kuMda C ngu < 5 i-avareji yobukho betyuwa emanzini kumachibi ngu- +2 ukususka kuleyo yesiqhelo (yango2013) futhi ke ukwahluka kona akwandi, njengalapha ezantsi: ▪ iSerpentine: 12 ± 10 ▪ iEilandvlei: 8 ± 5 ▪ iLangvlei: 10 ± 4 ▪ iRondevlei: 10 ± 5
	Ukwahluka kweemeko (ngokwe-pH, i-oksijini enyibilikileyo nobukho bodaka) makungade kubangele ii-TPCs ezigqithileyo kwi-biota.	Amanzi angena emlanjeni: ▪ I-6.0 < ye-pH > ngu- 7.0 (kwiTouw) ▪ I-7.0 < ye-pH > ngu- 8.0 (kwiDuiwe) ▪ I-DO < ngu5 mg/ℓ ▪ Izinto eziqinileyo ezirhoxiswayo ngu > 5 mg/ ℓ (kumanzi ahamba kancinci) Echwebeni: ▪ I-avareji yobukho bodaka ngu>5 NTU (ngamanzi ahamba kancinci. ▪ I-avareji nge- 6.0 < yepH > ngu-8.5 (isanda ngokwenyuka kweqondo lobukho beetyuwa). ▪ I-avareji ye- DO ngu< 5 mg/ℓ ▪ DO < 5 mg/ℓ Kumachibi: ▪ I-avareji yobukho bodaka ngu>5 NTU ▪ I-avareji nge7.0 < yepH ngu> 8.5 ▪ I-avareji ye- DO ngu< 5 mg/ℓ
	Ubukho bezondlo ezingezozendalo (njenge-NO_3-N, i-NH_3-N ne- PO_4-P) mabungade bubangele ii-TPCs ezigqithileyo kwii-macrophytes ne-microalgae.	Amanzi angena emlanjeni: ▪ i-NO_x-N ngu >50 µg/L kwiinyanga ezimbini ezilandelelanayo. ▪ i-NH_3-N ngu > 10 µg/L kwiinyanga ezimbini ezilandelelanayo.. ▪ I-PO_4-PP ngu> 10 µg/L kwiinyanga ezimbini ezilandelelanayo. Echwebeni (ngaphandle kwamaxa kukho iimpuphuma): ▪ I-avareji ye- NO_x-N ngu >50 µg/L ngomlinganiselo omnye ngu > 100 µg/L. ▪ I-avareji ye-NH_3-N ngu > 10 µg/L ngethuba lophando, ngomlinganiselo omnye > 100 µg/L. ▪ I-avareji ye- PO_4-P ngu > 10 µg/L ngethuba lophando, ngomlinganiselo omnye > 50 µg/L. Kumachibi: ▪ I-avareji ye- NO_x-N ngu >50 µg/L ngethuba lophando, ngomlinganiselo omnye ngu > 100 µg/L. ▪ I-avareji ye-NH_3-N ngu > 20 µg/ℓ ngethuba lophando (iza kuqinisekiswa)

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		▪ I-avareji ye- PO_4-P ngu> 20 µg/ℓ ngethuba lophando (iza kuqinisekiswa)
	Ubukho bezinto ezinetyhefu (umzekelo iimethali zokuchonga, izibulala zinambuzane namayeza athile) mabungade bubangele ii-TPCs ezigqithileyo kwi-biota.	Amanzi angena emlanjeni: ▪ Iimethali zokuchonga (ziza kuqinisekiswa) ▪ Izibulala-zinambuzane namayeza athile (ziza kuqinisekiswa)) Echwebeni: ▪ Iqondo lobukho bamanzi kweli candelo libetha ngaphaya kwamaxabiso angqaliweyo ngokubhaliweyo kwi- SA Water Quality Guidelines for coastal marine waters (DWAF, 1995) ▪ Iqondo lobukho beentlenge libetha ngaphaya kwamaxabiso angqaliweyo ngokubhaliweyo kwi-Indian Ocean (WIO) Region guidelines (UNEP/Nairobi Convention Secretariat and CSIR, 2009)

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8. IMIWONYO

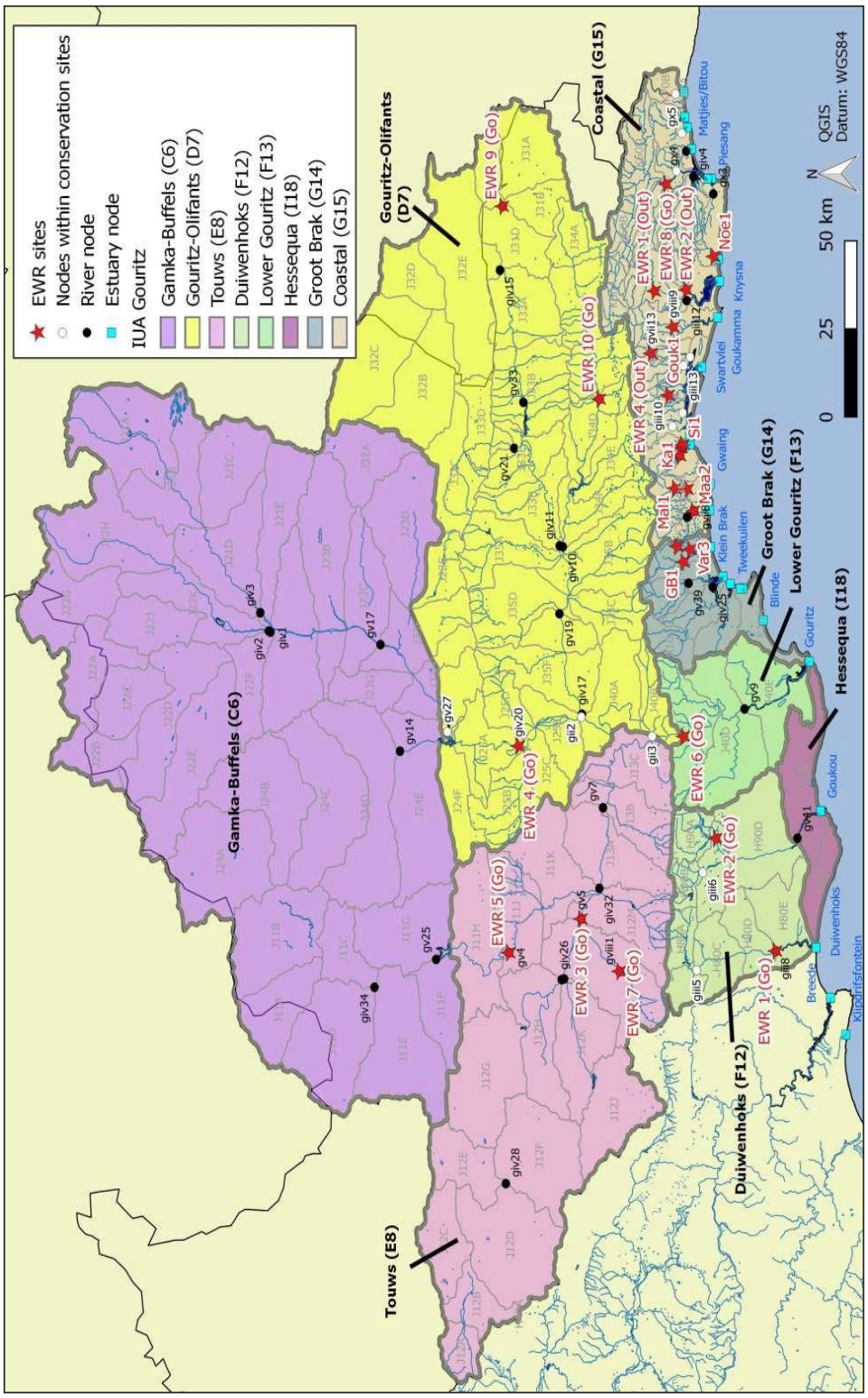
UTafile 8.1: Imiwonyo – Umqathango wokhuselo lwendawo yoboniselo ngamanzi yeminyaka emine

Indawo yoboniselo ngamanzi yeminyaka emine	i-EIS	i-PES	i-REC	Ungayizuza njani i- REC
K10A	Phakathi	C	C	Beka iliso kutyani oluzizityalo ezingezizo zomthonyama nezitshabalalisayo, kukhukuliso lomhlaba nezinye izinto ezingenelelayo kusetyenziso lomhlaba.
K10B	Phakathi	C	C	
K10C	Phakathi	B/C	B/C	
K10D	Phakathi	B/C	B/C	
K10E	Phakathi	B/C	B/C	
K10F	Phakathi	C	C	
K20A	Phakathi	C	C	
K30A	Phezulu	C	C	
K30B	Phezulu	D	C/D	Kubekho izidambisi kwimimandla yeeedolophu neyezolimo; beka iliso kwikwaliti yamanzi, kukhukuliso lomhlaba nakutyani olutshabalalisayo.
K30C	Phakathi	D	D	Beka iliso kutyani oluzizityalo ezingezizo zomthonyama nezitshabalalisayo, kukhukuliso lomhlaba nezinye izinto ezingenelelayo kusetyenziso lomhlaba.
K30D	Phezulu kakhulu	B	B	
K40A	Phakathi	D	D	
K40B	Phakathi	C	C	
K40C	Phakathi	C	C	
K40D	Phezulu kakhulu	B	B	
K40E	Phakathi	B/C	B/C	
K50A	Phakathi	B/C	B/C	
K50B	Phezulu	C/D	C	Khusela uphucule imeko yaloo mabala emiwonyo , beka iliso kutyani olutshabalalisayo.
K60A	Phakathi	B	B	Beka iliso kutyani oluzizityalo ezingezizo zomthonyama nezitshabalalisayo, kukhukuliso lomhlaba nezinye izinto ezingenelelayo kusetyenziso lomhlaba.
K60B	Phakathi	B	B	
K60C	Phakathi	B	B	
K60D	Phezulu	A	A	
K60E	Phezulu	C	C	
K60F	Phezulu	C	C	
K60G	Phakathi	C	C	
K70A	Phakathi	C	C	
K70B	Phantsi	A	A	
H80A	Phezulu	C/D	C	
H80B	Phakathi	C	C	
H80C	Phakathi	D	D	
H80D	Phakathi	D	D	

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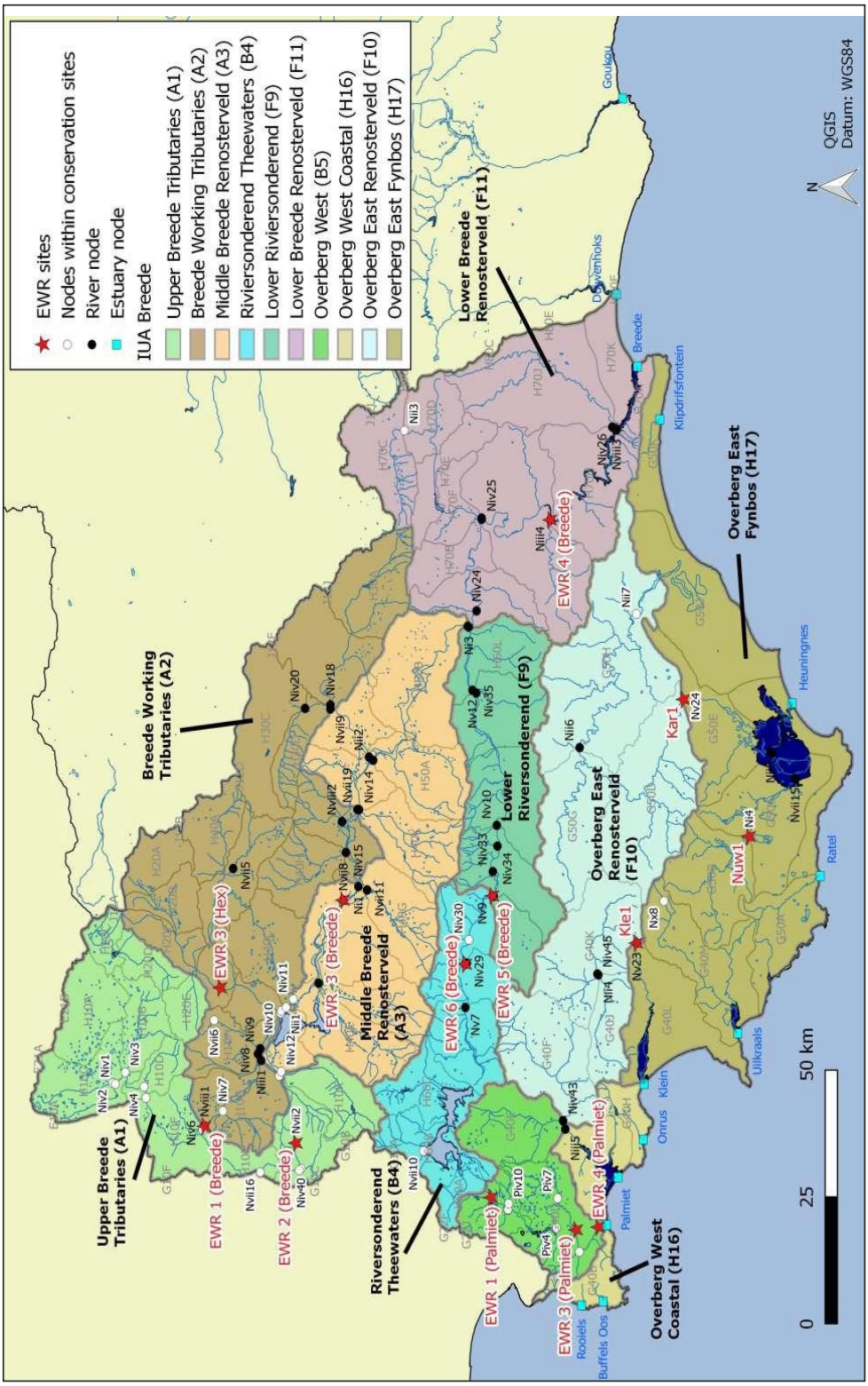
Indawo yoboniselo ngamanzi yeminyaka emine	i-EIS	i-PES	i-REC	Ungayizuza njani i- REC
H80E	Phakathi	C/D	C/D	
H90A	Phakathi	C	C	
H90B	Phakathi	D	D	Control invasive alien vegetation, erosion and land-use encroachment.
H90C	Phakathi	D	D	
H90D	Phakathi	C	C	
H90E	Phakathi	C/D	C/D	
J11D	Phantsi	C	C	
J11F	Phakathi	C	C	
J11G	Phakathi	B	B	
J12A	Phakathi	B	B	
J12B	Phakathi	B	B	
J12J	Phakathi	B	B	
J12K	Phakathi	B	B	
J12L	Phakathi	C	C	
J21A	Phakathi	B/C	B/C	
J21B	Phakathi	B	B	
J22B	Phakathi	B	B	
J22G	Phakathi	B	B	
J22K	Phantsi	B/C	B/C	
J23E	Phantsi	C	C	
J23J	Phakathi	B	B	
J24F	Phantsi	C	C	
J25A	Phantsi	B	B	
J33B	Phantsi	C	C	
J33E	Phantsi	C	C	
J34C	Phantsi	C	C	
J34D	Phantsi	C	C	
J34E	Phantsi	C/D	C/D	
J34F	Phantsi	D	D	
J40B	Phantsi	B	B	
J40C	Phakathi	C/D	C/D	
J40D	Phakathi	D	D	
J40E	Phezulu	C	C	

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Umzobo 1: iindawo ngeendawo zengingqi i- Gouritz, imilambo/iindawo adibana kuzo amachweba nezikhundla ze-EWR sites

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Umzobo 2: iindawo ngeendawo zengingqi i-Breede-Overberg, imilambo/iindawo adibana kuzo amachweba nezikhundla ze-EWR sites

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GENERAL NOTICES • ALGEMENE KENNISGEWINGS

DEPARTMENT OF AGRICULTURE, LAND REFORM AND RURAL DEVELOPMENT

NOTICE 1245 OF 2022

GENERAL NOTICE IN TERMS OF THE RESTITUTION OF LAND RIGHTS ACT, 1994 (ACT NO. 22 OF 1994)

Notice is hereby given in terms of Section 11 (1) of the Restitution of Land Rights Act, 1994 (Act No. 22 of 1994) that a claim for the restitution of land rights on the following properties have been lodged with the Regional Land Claims Commissioner: KwaZulu-Natal and that the Commission on Restitution of Land Rights will further investigate the claim in terms of provisions of the Act in due course:

Property	:	**see attached schedule**
Extent of property	:	**see attached schedule**
Magisterial District	:	**Pietermaritzburg**
Administrative District:	:	**KwaZulu-Natal**
Current Title Deed No.	:	**see attached schedule**
Current Owner	:	**see attached schedule**
Bonds & Restrictive Conditions (Interdicts)	:	**see attached schedule**
Claimant	:	**Mandlakayise Cyprian Mjwara on behalf of the Maguswana Group**
Date claim lodged	:	**27 October 1995**
Reference number	:	**KRN6/2/2/E/38/0/0/295**

Any party/parties who have an interest in the above-mentioned properties is hereby invited to submit, within **30 days** from the date of publication of this notice, any representations and/ or information which shall assist the Commissioner in proving or disproving this claim.

Should no information and/ or representations from the affected party/ parties be forthcoming within the stipulated period, the affected party/parties shall be *ipso facto* barred from further doing so and the Commission shall continue with the subsequent processes towards completion of the investigation.

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Any comments and information should be submitted to:

The Regional Land Claims Commissioner: KwaZulu-Natal
Private Bag X9120
Pietermaritzburg 3200

Tel: (033) 355 - 8400
Fax: (033) 342 - 3409

Submissions may also be delivered to Second Floor, African Life Building, 200 Church Street, Pietermaritzburg.

LEBJANE MAPHUTHA
REGIONAL LAND CLAIMS COMMISSIONER: KWAZULU NATAL
DATE:

SCHEDULE

NO.	PROPERTY DESCRIPTION	EXTENT	CURRENT TITLE DEED NO.	CURRENT OWNER	BONDS & RESTRICTIVE CONDITIONS (INTERDICTS)
1	Remainder of Portion 0 of the farm Stepmore No. 14871	555, 8765 ha	T3902/1997	Sappi Manufacturing (Pty) Ltd	B4038/2009 B4039/2009
2	Portion 1 of the farm Stepmore No. 14871	555, 0859 ha	T2583/1997 T6209/2009	Sappi Southern Africa Limited Sappi Manufacturing (Pty) Ltd	B4066/2009 B4067/2009
3	Portion 0 of the farm Lot FP 155A No. 5821	83, 4335 ha	T14663/2013	Ossie Marx Family Trust	B10285/2016 B8171/2013

DEPARTMENT OF AGRICULTURE, LAND REFORM AND RURAL DEVELOPMENT

NOTICE 1246 OF 2022

GENERAL NOTICE IN TERMS OF THE RESTITUTION OF LAND RIGHTS ACT, 1994 (ACT NO. 22 OF 1994)

Notice is hereby given in terms of Section 11 (1) of the Restitution of Land Rights Act, 1994 (Act No. 22 of 1994) that a claim for the restitution of land rights on the following properties have been lodged with the Regional Land Claims Commissioner: KwaZulu-Natal and that the Commission on Restitution of Land Rights will further investigate the claim in terms of provisions of the Act in due course:

Property	:	**Portion 0 (Remaining Extent) of the farm Kliprif No. 111**
Extent of property	:	**492, 0147 hectares**
Magisterial District	:	**Vryheid**
Administrative District:	:	**KwaZulu-Natal**
Current Title Deed No.	:	**T56587/2003**
Current Owner	:	**Sibonelo Communal Property Association**
Bonds & Restrictive Conditions (Interdicts)	:	**K1070/1990S**
Claimant	:	**Gambushe Ndhlovu**
Date claim lodged	:	**31 December 1998**
Reference number	:	**KRN6/2/2/E/50/0/0/281**

Any party/parties who have an interest in the above-mentioned properties is hereby invited to submit, within **30 days** from the date of publication of this notice, any representations and/ or information which shall assist the Commissioner in proving or disproving this claim.

Should no information and/ or representations from the affected party/ parties be forthcoming within the stipulated period, the affected party/parties shall be *ipso facto* barred from further doing so and the Commission shall continue with the subsequent processes towards completion of the investigation.

Any comments and information should be submitted to:

The Regional Land Claims Commissioner: KwaZulu-Natal
Private Bag X9120
Pietermaritzburg 3200

Tel: (033) 355 - 8400
Fax: (033) 342 - 3409

Submissions may also be delivered to Second Floor, African Life Building, 200 Church Street, Pietermaritzburg.

LEBJANE MAPHUTHA
REGIONAL LAND CLAIMS COMMISSIONER: KWAZULU NATAL

DEPARTMENT OF AGRICULTURE, LAND REFORM AND RURAL DEVELOPMENT

NOTICE 1247 OF 2022

GENERAL NOTICE IN TERMS OF SECTION 11 A (4) OF THE RESTITUTION OF LAND RIGHTS ACT, NO. 22 OF 1994 (AS AMENDED).

WHEREAS a land claim was lodged by Bhekithemba Ndlovu, which claim was published in the gazette, in terms of section 11 of the Restitution of Land Rights Act, No. 22 of 1994, under Notice No. 872 in Government Gazette No. 22223 dated 20 April 2001,

and

WHEREAS during further investigation of the land claim in so far as it relates to the properties described as Portion 182 of the farm Vaalkop and Dadelfontein No. 885, the Regional Land Claims Commissioner, has reason to believe that feasibility of restoration of the said property in not possible due to the mining activities taking place thereon,

NOW THEREFORE NOTICE is hereby given in terms of Section 11A (4) of the Act that the said Notice No. 872 in Government Gazette No. 22223 dated 20 April 2001 is hereby amended to exclude the said property from the said Notice and the KwaXimba Community hereby abandon their claim for any form of restitution in respect of Portion 182 of the farm Vaalkop and Dadelfontein No. 885.

The details of the Gazette No. 22223, under Notice 872 dated 20 April 2001, relevant for this notice include the following:

Reference No:	KRN/6//2/2/E/4/0/0/1
Claimant:	KwaXimba Community represented by Bhekithemba Ndlovu
Property Description:	Portion 182 of the farm Vaalkop and Dadelfontein No. 885
Total extent:	2 Hectares
Owner:	Noel Whitridge Boast
Date Submitted:	3 July 1995

The reasons the Regional Land Claims Commissioner believes that the properties should be excluded in terms of section 11 (4) of the Act is that:

(a) Restoration of Portion 182 of the farm Vaalkop and Dadelfontein No. 885 is not feasible due to the mining activities taking place thereon.

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HARRY LEBJANE MAPHUTHA
REGIONAL LAND CLAIMS COMMISSIONER, KZN

DEPARTMENT OF AGRICULTURE, LAND REFORM AND RURAL DEVELOPMENT

NOTICE 1248 OF 2022

GENERAL NOTICE IN TERMS OF THE RESTITUTION OF LAND RIGHTS ACT 1994, (ACT No. 22 OF 1994) AS AMENDED.

Notice is hereby given in terms of Section 11 (1) of the Restitution of Land Rights Act 1994 (Act 22 of 1994) as amended, that a Land Claim for Restitution of Land Rights has been lodged by Richard Barnard Volks on behalf of his Grandfathers Business B. Volks & Sons (pty) ltd (now B Volks & Sons CC(CK85/04574/23) for various properties in Paarl situated in the Drakenstein Local Municipality and the Cape Winelands District Municipality in the Western Cape.

Reference Number : V241

Dispossessed Party : B. Volks & Sons (pty) ltd (Now B Volks & Sons CC(CK85/04574/23)

Claimant : Mr Richard Gordon Volks

Capacity : Ownership

Current Owners : Republic of South Africa

Date Submitted : 23 December 1998

No.	Ref No.	Surname & Initial	Property Description	Extent	Area	Dispossessed Person
1	V241	R.G Volks	6186	488m²	Paarl	B Volks and Sons Pty Ltd
2	V241	R.G Volks	6237	498m²	Paarl	B Volks and Sons Pty Ltd
3	V241	R.G Volks	6238	498m²	Paarl	B Volks and Sons Pty Ltd
4	V241	R.G Volks	6239	497m²	Paarl	B Volks and Sons Pty Ltd
5	V241	R.G Volks	6240	513m²	Paarl	B Volks and Sons Pty Ltd
6	V241	R.G Volks	6241	513m²	Paarl	B Volks and Sons Pty Ltd
7	V241	R.G Volks	6242	503m²	Paarl	B Volks and Sons Pty Ltd
8	V241	R.G Volks	5083	831m²	Paarl	B Volks and Sons Pty Ltd
9	V241	R.G Volks	5084	834m²	Paarl	B Volks and Sons Pty Ltd
10	V241	R.G Volks	5085	834m²	Paarl	B Volks and Sons Pty Ltd
11	V241	R.G Volks	5086	834m²	Paarl	B Volks and Sons Pty Ltd
12	V241	R.G Volks	5087	834m²	Paarl	B Volks and Sons Pty Ltd
13	V241	R.G Volks	5088	834m²	Paarl	B Volks and Sons Pty Ltd
14	V241	R.G Volks	5089	834m²	Paarl	B Volks and Sons Pty Ltd
15	V241	R.G Volks	5090	834m²	Paarl	B Volks and Sons Pty Ltd
16	V241	R.G Volks	11730	834m²	Paarl	B Volks and Sons Pty Ltd
17	V241	R.G Volks	11729	834m²	Paarl	B Volks and Sons Pty Ltd
18	V241	R.G Volks	5109	834m2	Paarl	B Volks and Sons Pty Ltd
19	V241	R.G Volks	5110	845m2	Paarl	B Volks and Sons Pty Ltd
20	V241	R.G Volks	5111	845m2	Paarl	B Volks and Sons Pty Ltd
21	V241	R.G Volks	5112	8525sf	Paarl	B Volks and Sons Pty Ltd
22	V241	R.G Volks	5113	845m2	Paarl	B Volks and Sons Pty Ltd
23	V241	R.G Volks	5114	845m2	Paarl	B Volks and Sons Pty Ltd
24	V241	R.G Volks	5115	882m2	Paarl	B Volks and Sons Pty Ltd
25	V241	R.G Volks	5092	811m2	Paarl	B Volks and Sons Pty Ltd
26	V241	R.G Volks	5095	823m2	Paarl	B Volks and Sons Pty Ltd
27	V241	R.G Volks	5096	823m2	Paarl	B Volks and Sons Pty Ltd
28	V241	R.G Volks	5099	823m2	Paarl	B Volks and Sons Pty Ltd

29	V241	R.G Volks	11722	834m²	Paarl	B Volks and Sons Pty Ltd
30	V241	R.G Volks	11723	834m²	Paarl	B Volks and Sons Pty Ltd
31	V241	R.G Volks	11724	834m²	Paarl	B Volks and Sons Pty Ltd
32	V241	R.G Volks	11725	834m²	Paarl	B Volks and Sons Pty Ltd
33	V241	R.G Volks	11726	834m²	Paarl	B Volks and Sons Pty Ltd
34	V241	R.G Volks	11727	834m²	Paarl	B Volks and Sons Pty Ltd
35	V241	R.G Volks	11852	2,7991ha	Paarl	B Volks and Sons Pty Ltd
36	V241	R.G Volks	5123	812m²	Paarl	B Volks and Sons Pty Ltd
37	V241	R.G Volks	5124	950m²	Paarl	B Volks and Sons Pty Ltd
38	V241	R.G Volks	5125	812m²	Paarl	B Volks and Sons Pty Ltd
39	V241	R.G Volks	5126	812m²	Paarl	B Volks and Sons Pty Ltd
40	V241	R.G Volks	5127	812m²	Paarl	B Volks and Sons Pty Ltd
41	V241	R.G Volks	5130	812m²	Paarl	B Volks and Sons Pty Ltd
42	V241	R.G Volks	5131	1080m²	Paarl	B Volks and Sons Pty Ltd
43	V241	R.G Volks	5132	1018m²	Paarl	B Volks and Sons Pty Ltd
44	V241	R.G Volks	5129	740m²	Paarl	B Volks and Sons Pty Ltd
45	V241	R.G Volks	5128	963m²	Paarl	B Volks and Sons Pty Ltd
46	V241	R.G Volks	5187	844m²	Paarl	B Volks and Sons Pty Ltd
47	V241	R.G Volks	5137	844m²	Paarl	B Volks and Sons Pty Ltd
48	V241	R.G Volks	5138	788m²	Paarl	B Volks and Sons Pty Ltd
49	V241	R.G Volks	5139	647m²	Paarl	B Volks and Sons Pty Ltd
50	V241	R.G Volks	5140	706m²	Paarl	B Volks and Sons Pty Ltd
51	V241	R.G Volks	5141	577m²	Paarl	B Volks and Sons Pty Ltd
52	V241	R.G Volks	5142	576m²	Paarl	B Volks and Sons Pty Ltd
53	V241	R.G Volks	5143	818m²	Paarl	B Volks and Sons Pty Ltd
54	V241	R.G Volks	5144	818m²	Paarl	B Volks and Sons Pty Ltd
55	V241	R.G Volks	5145	818m²	Paarl	B Volks and Sons Pty Ltd
56	V241	R.G Volks	5146	818m²	Paarl	B Volks and Sons Pty Ltd
57	V241	R.G Volks	5147	818m²	Paarl	B Volks and Sons Pty Ltd
58	V241	R.G Volks	5148	818m²	Paarl	B Volks and Sons Pty Ltd
59	V241	R.G Volks	5149	804m²	Paarl	B Volks and Sons Pty Ltd
60	V241	R.G Volks	5150	362m²	Paarl	B Volks and Sons Pty Ltd
61	V241	R.G Volks	5183	802m²	Paarl	B Volks and Sons Pty Ltd
62	V241	R.G Volks	5182	807m²	Paarl	B Volks and Sons Pty Ltd
63	V241	R.G Volks	5181	796m²	Paarl	B Volks and Sons Pty Ltd
64	V241	R.G Volks	5180	796m²	Paarl	B Volks and Sons Pty Ltd
65	V241	R.G Volks	5179	769m²	Paarl	B Volks and Sons Pty Ltd
66	V241	R.G Volks	5178	785m²	Paarl	B Volks and Sons Pty Ltd
67	V241	R.G Volks	5177	883m²	Paarl	B Volks and Sons Pty Ltd
68	V241	R.G Volks	5176	765m²	Paarl	B Volks and Sons Pty Ltd
69	V241	R.G Volks	5175	812m²	Paarl	B Volks and Sons Pty Ltd
70	V241	R.G Volks	5174	757m²	Paarl	B Volks and Sons Pty Ltd
71	V241	R.G Volks	5171	701m²	Paarl	B Volks and Sons Pty Ltd
72	V241	R.G Volks	5173	718m²	Paarl	B Volks and Sons Pty Ltd
73	V241	R.G Volks	5172	803m²	Paarl	B Volks and Sons Pty Ltd
74	V241	R.G Volks	5184	884m²	Paarl	B Volks and Sons Pty Ltd
75	V241	R.G Volks	5151	1015m²	Paarl	B Volks and Sons Pty Ltd

76	V241	R.G Volks	5152	855m²	Paarl	B Volks and Sons Pty Ltd
77	V241	R.G Volks	5163	765m²	Paarl	B Volks and Sons Pty Ltd
78	V241	R.G Volks	5154	855m²	Paarl	B Volks and Sons Pty Ltd
79	V241	R.G Volks	5155	855m²	Paarl	B Volks and Sons Pty Ltd
80	V241	R.G Volks	5156	855m²	Paarl	B Volks and Sons Pty Ltd
81	V241	R.G Volks	5157	760m²	Paarl	B Volks and Sons Pty Ltd
82	V241	R.G Volks	5158	730m²	Paarl	B Volks and Sons Pty Ltd
83	V241	R.G Volks	5159	672m²	Paarl	B Volks and Sons Pty Ltd
84	V241	R.G Volks	5160	783m²	Paarl	B Volks and Sons Pty Ltd
85	V241	R.G Volks	5161	789m²	Paarl	B Volks and Sons Pty Ltd
86	V241	R.G Volks	5162	676m²	Paarl	B Volks and Sons Pty Ltd
87	V241	R.G Volks	5163	765m²	Paarl	B Volks and Sons Pty Ltd
88	V241	R.G Volks	5164	832m²	Paarl	B Volks and Sons Pty Ltd
89	V241	R.G Volks	5165	837m²	Paarl	B Volks and Sons Pty Ltd
90	V241	R.G Volks	5166	770m²	Paarl	B Volks and Sons Pty Ltd
91	V241	R.G Volks	5167	765m²	Paarl	B Volks and Sons Pty Ltd
92	V241	R.G Volks	5168	865m²	Paarl	B Volks and Sons Pty Ltd
93	V241	R.G Volks	5169	805m²	Paarl	B Volks and Sons Pty Ltd
94	V241	R.G Volks	5170	777m²	Paarl	B Volks and Sons Pty Ltd
95	V241	R.G Volks	5172	803m²	Paarl	B Volks and Sons Pty Ltd
96	V241	R.G Volks	5173	718m²	Paarl	B Volks and Sons Pty Ltd
97	V241	R.G Volks	5584	501m²	Paarl	B Volks and Sons Pty Ltd
98	V241	R.G Volks	8109	1224m²	Paarl	B Volks and Sons Pty Ltd
99	V241	R.G Volks	8117	722m²	Paarl	B Volks and Sons Pty Ltd
100	V241	R.G Volks	8118	722m²	Paarl	B Volks and Sons Pty Ltd
101	V241	R.G Volks	8119	722m²	Paarl	B Volks and Sons Pty Ltd
102	V241	R.G Volks	8120	722m²	Paarl	B Volks and Sons Pty Ltd
103	V241	R.G Volks	8178	765m²	Paarl	B Volks and Sons Pty Ltd
104	V241	R.G Volks	8179	785m²	Paarl	B Volks and Sons Pty Ltd
105	V241	R.G Volks	8180	1584m²	Paarl	B Volks and Sons Pty Ltd
106	V241	R.G Volks	8181	1584m²	Paarl	B Volks and Sons Pty Ltd
107	V241	R.G Volks	8182	998m²	Paarl	B Volks and Sons Pty Ltd
108	V241	R.G Volks	8183	1471m²	Paarl	B Volks and Sons Pty Ltd
109	V241	R.G Volks	8184	1011m²	Paarl	B Volks and Sons Pty Ltd
110	V241	R.G Volks	8185	1319m²	Paarl	B Volks and Sons Pty Ltd
111	V241	R.G Volks	8186	1584m²	Paarl	B Volks and Sons Pty Ltd
112	V241	R.G Volks	8187	1584m²	Paarl	B Volks and Sons Pty Ltd
113	V241	R.G Volks	8188	998m²	Paarl	B Volks and Sons Pty Ltd
114	V241	R.G Volks	8189	1375m²	Paarl	B Volks and Sons Pty Ltd
115	V241	R.G Volks	8190	1785m²	Paarl	B Volks and Sons Pty Ltd
116	V241	R.G Volks	8191	1785m²	Paarl	B Volks and Sons Pty Ltd
117	V241	R.G Volks	8192	1125m²	Paarl	B Volks and Sons Pty Ltd
118	V241	R.G Volks	8193	1288m²	Paarl	B Volks and Sons Pty Ltd
119	V241	R.G Volks	8194	1138m²	Paarl	B Volks and Sons Pty Ltd
120	V241	R.G Volks	8195	774m²	Paarl	B Volks and Sons Pty Ltd
121	V241	R.G Volks	8196	1182m²	Paarl	B Volks and Sons Pty Ltd
122	V241	R.G Volks	8197	1182m²	Paarl	B Volks and Sons Pty Ltd

123	V241	R.G Volks	8198	746m²	Paarl	B Volks and Sons Pty Ltd
124	V241	R.G Volks	8199	1004m²	Paarl	B Volks and Sons Pty Ltd
125	V241	R.G Volks	8200	914m²	Paarl	B Volks and Sons Pty Ltd
126	V241	R.G Volks	8203	914m²	Paarl	B Volks and Sons Pty Ltd
127	V241	R.G Volks	8204	927m²	Paarl	B Volks and Sons Pty Ltd
128	V241	R.G Volks	8206	927m²	Paarl	B Volks and Sons Pty Ltd
129	V241	R.G Volks	8207	927m²	Paarl	B Volks and Sons Pty Ltd
130	V241	R.G Volks	8208	927m²	Paarl	B Volks and Sons Pty Ltd
131	V241	R.G Volks	8209	927m²	Paarl	B Volks and Sons Pty Ltd
132	V241	R.G Volks	8213	927m²	Paarl	B Volks and Sons Pty Ltd
133	V241	R.G Volks	8214	904m²	Paarl	B Volks and Sons Pty Ltd
134	V241	R.G Volks	5094	834m²	Paarl	B Volks and Sons Pty Ltd
135	V241	R.G Volks	5097	834m²	Paarl	B Volks and Sons Pty Ltd
136	V241	R.G Volks	5098	844m²	Paarl	B Volks and Sons Pty Ltd
137	V241	R.G Volks	5100	812m²	Paarl	B Volks and Sons Pty Ltd
138	V241	R.G Volks	5101	954m²	Paarl	B Volks and Sons Pty Ltd
139	V241	R.G Volks	5102	859m²	Paarl	B Volks and Sons Pty Ltd
140	V241	R.G Volks	5105	862m²	Paarl	B Volks and Sons Pty Ltd
141	V241	R.G Volks	5106	834m²	Paarl	B Volks and Sons Pty Ltd
142	V241	R.G Volks	5107	942m²	Paarl	B Volks and Sons Pty Ltd
143	V241	R.G Volks	5108	1080m²	Paarl	B Volks and Sons Pty Ltd
144	V241	R.G Volks	5116	723m²	Paarl	B Volks and Sons Pty Ltd
145	V241	R.G Volks	5117	763m²	Paarl	B Volks and Sons Pty Ltd
146	V241	R.G Volks	5118	789m²	Paarl	B Volks and Sons Pty Ltd
147	V241	R.G Volks	5119	834m²	Paarl	B Volks and Sons Pty Ltd
148	V241	R.G Volks	5120	763m²	Paarl	B Volks and Sons Pty Ltd
149	V241	R.G Volks	5121	818m²	Paarl	B Volks and Sons Pty Ltd
150	V241	R.G Volks	5122	818m²	Paarl	B Volks and Sons Pty Ltd
151	V241	R.G Volks	5133	834m²	Paarl	B Volks and Sons Pty Ltd
152	V241	R.G Volks	5134	763m²	Paarl	B Volks and Sons Pty Ltd
153	V241	R.G Volks	5135	818m²	Paarl	B Volks and Sons Pty Ltd
154	V241	R.G Volks	5136	818m²	Paarl	B Volks and Sons Pty Ltd
155	V241	R.G Volks	5186	768m²	Paarl	B Volks and Sons Pty Ltd
156	V241	R.G Volks	11850	rem	Paarl	B Volks and Sons Pty Ltd

The Regional Land Claims Commission investigated this claim in terms of provisions of the Act. Any party who has an interest in the above-mentioned land is hereby invited to submit, within 90 days from the publication of this notice, any comments / information to: The Regional Land Claims Commission: Western Cape, Private Bag X9163, Cape Town, 8000, Tel no: (021) 4090300 and Fax no: (021) 424-5146

Mr. L. H. Maphutha
Regional Land Claims Commissioner

APPROVED .....

DATE 2022/08/02

CHECKED.....

DATE.....

DEPARTMENT OF AGRICULTURE, LAND REFORM AND RURAL DEVELOPMENT

NOTICE 1249 OF 2022

GENERAL NOTICE IN TERMS OF THE RESTITUTION OF LAND RIGHTS ACT 1994, (ACT No. 22 OF 1994) AS AMENDED.

Notice is hereby given in terms of Section 11 (1) of the Restitution of Land Rights Act 1994 (Act 22 of 1994) as amended, that a Land Claim for Restitution of Land Rights has been lodged by Mr. Richard Gordon Volks on behalf of the Estate of the late Barnet Volks for properties mentioned in the table below situated in the City of Cape Town under Cape Town Metro, Western Cape

Reference Number : KRK6/2/3/A/10/82/0/249 (V236)

Dispossessed Party : Estate of Late Barnet Volks

Claimant : Mr. Richard Gordon Volks

NO	Property Description	District Municipality	Extent	Current Owner
1.	Erf 6001 Paarl	Cape Winelands, WC	565m²	Titus Roy Morris
2.	Erf 6002 Paarl	Cape Winelands, WC	148m²	Daniel Prins
3.	Erf 6003 Paarl	Cape Winelands, WC	149m²	Louis Solomon
4.	Erf 6004 Paarl	Cape Winelands, WC	730m²	Joseph Lapperts
5.	Erf 6005 Paarl	Cape Winelands, WC	781m²	Jeffrey and Audry Mathee
6.	Erf 6006 Paarl	Cape Winelands, WC	0.0000 DUM	Daniel Prins
7.	Erf 6007 Paarl	Cape Winelands, WC	528m²	Michael Minitzer
8.	Erf 6008 Paarl	Cape Winelands, WC	750m²	Barnet Volks
9.	Erf 6009 Paarl	Cape Winelands, WC	760m²	Frederick Samuel Brown
10.	Erf 6010 Paarl	Cape Winelands, WC	565m²	Aubrey Goetham
11.	Erf 6011 Paarl	Cape Winelands, WC	565m²	Johannes Maans and Wilhelmina Maria Ursula Manuel
12.	Erf 6012 Paarl	Cape Winelands, WC	565m²	Dora Meyer
13.	Erf 6013 Paarl	Cape Winelands, WC	565m²	Desmond Aubrey Adams
14.	Erf 6014 Paarl	Cape Winelands, WC	565m²	Raymond Maudin and Dorothy Dawn Ray Fredericks
15.	Erf 6015 Paarl	Cape Winelands, WC	740m²	Johannes Hendrik Blankenberg
16.	Erf 6016 Paarl	Cape Winelands, WC	781m²	John Mervyn, Nicholas Francois, Magdalena Jane and Nicholas Francois Stoffels
17.	Erf 6017 Paarl	Cape Winelands, WC	1487m²	Christiaan Thomas
18.	Erf 6018 Paarl	Cape Winelands, WC	595m²	Saul and Siena Van Der Vyver
19.	Erf 6019 Paarl	Cape Winelands, WC	595m²	William Cyril and Lenie September
20.	Erf 6020 Paarl (Now Consolidated into Erf 13091 Paarl)	Cape Winelands, WC	595m²	Baptist Church - Paarl

21.	Erf 6021 Paarl (Now consolidated into Erf 13091 Paarl)	Cape Winelands, WC	595m²	Baptist Church - Paarl
22.	Erf 6022 Paarl (Now consolidated into Erf 13091 Paarl)	Cape Winelands, WC	822m²	Baptist Church - Paarl
23.	Erf 6041 Paarl	Cape Winelands, WC	471m²	Anthea Benjamin
24.	Erf 6070 Paarl	Cape Winelands, WC	1077m²	Andreas Tobias Adonis
25.	Erf 6071 Paarl	Cape Winelands, WC	744m²	Rachel Stoffels
26.	Erf 6081 Paarl	Cape Winelands, WC	8922m²	Provincial Government - WC
27.	Erf 6084 Paarl	Cape Winelands, WC	386m²	Abraham Davis
28.	Erf 6086 Paarl	Cape Winelands, WC	733m²	Sheldou Moses
29.	Erf 6099 Paarl	Cape Winelands, WC	553m²	Christal Ann Ilzette and Alan Dean Muller
30.	Erf 6100 Paarl	Cape Winelands, WC	595m²	Constan Edgar Charles
31.	Erf 6101 Paarl	Cape Winelands, WC	595m²	Peter Ernest Julies
32.	Erf 6102 Paarl	Cape Winelands, WC	595m²	Seryldine Christol and John Edward Trevor Hanekom
33.	Erf 6103 Paarl	Cape Winelands, WC	595m²	Willie Roux
34.	Erf 6104 Paarl	Cape Winelands, WC	595m²	Alfred Thomas and Nicole Neethling
35.	Erf 6105 Paarl	Cape Winelands, WC	744m²	Gwendaline Marilyn Muller
36.	Erf 6106 Paarl	Cape Winelands, WC	744m²	Mark Reg and Matthee Sue Erl Linecia Daniels
37.	Erf 6107 Paarl	Cape Winelands, WC	744m²	Roseline and Douglas Oormeyer
38.	Erf 6108 Paarl	Cape Winelands, WC	744m²	Elizabeth Rachel October
39.	Erf 6109 Paarl	Cape Winelands, WC	595m²	Veronica Velancia and Alfred Cedric Abrahams
40.	Erf 6110 Paarl	Cape Winelands, WC	595m²	Susanna Caroline Hendricks
41.	Erf 6111 Paarl	Cape Winelands, WC	595m²	Eduard Warren Jacobs
42.	Erf 6112 Paarl	Cape Winelands, WC	608m²	Joseph Lapperts
43.	Erf 6113 Paarl	Cape Winelands, WC	595m²	Zenobia Theresa Pietersen
44.	Erf 6114 Paarl	Cape Winelands, WC	315m²	Wilhemina Eva Cornelissen
45.	Erf 6115 Paarl	Cape Winelands, WC	595m²	Christopher Sam Samaai
46.	Erf 6116 Paarl	Cape Winelands, WC	595m²	Howard Tommy West
47.	Erf 6117 Paarl	Cape Winelands, WC	595m²	Lenie Fortuin, Roelene and Ernest Sean Petersen
48.	Erf 6118 Paarl	Cape Winelands, WC	595m²	Magrieta Dorothea Thomas
49.	Erf 6119 Paarl	Cape Winelands, WC	730m²	Republiek Aartappelmoere Verspreiders PTY LTD
50.	Erf 6120 Paarl	Cape Winelands, WC	612m²	Zenobia Susan Prins
51.	Erf 6121 Paarl	Cape Winelands, WC	144m²	Daniel Jeftha
52.	Erf 6122 Paarl	Cape Winelands, WC	1028m²	Shaleen and Japie Josef
53.	Erf 6124 Paarl	Cape Winelands, WC	1100m²	Frederick George Hock

54.	Erf 6083 Paarl	Cape Winelands, WC	No data found	No data found
55.	Erf 6084 Paarl	Cape Winelands, WC	386m²	Abraham Davis
56.	Erf 6123 Paarl	Cape Winelands, WC	0.0000 DUM	Johannes Hendrik Blankenberg
57.	Erf 6170 Paarl (Now Consolidated into Erf 6988 Paarl)	Cape Winelands, WC	2435m²	Joseph Abel Volks
58.	Erf 6172 Paarl	Cape Winelands, WC	433m²	Wally Davis
59.	Erf 6176 Paarl	Cape Winelands, WC	6.9580 Unknown	No data found
60.	Erf 6187 Paarl	Cape Winelands, WC	360m²	Lily and Andrew Ehrenreich
61.	Erf 6188 Paarl	Cape Winelands, WC	782m²	Glodagh Patricia Cowley
62.	Erf 6189 Paarl	Cape Winelands, WC	420m²	Christine Jennifer Jones
63.	Erf 6190 Paarl	Cape Winelands, WC	2481m²	No data found
64.	Erf 6192 Paarl	Cape Winelands, WC	793m²	Charles Ronald Van Zetters
65.	Erf 6193 Paarl	Cape Winelands, WC	551m²	Juliana and William Japie Smith
66.	Erf 6197 Paarl	Cape Winelands, WC	786m²	Christina and Elizabeth Majiet
67.	Erf 6198 Paarl	Cape Winelands, WC	410m²	Bailey Lezil Natesha Nel
68.	Erf 6204 Paarl	Cape Winelands, WC	582m²	Elizabeth and Jacob Claasen
69.	Erf 6207 Paarl	Cape Winelands, WC	446m²	Dawood Jacobs
70.	Erf 6210 Paarl	Cape Winelands, WC	881m²	Susanna Rosina and Daniel Newman
71.	Erf 6211 Paarl	Cape Winelands, WC	2665m²	Housing Development Board - WC
72.	Erf 6212 Paarl	Cape Winelands, WC	445m²	Andreas Ellis Bothma
73.	Erf 6213 Paarl	Cape Winelands, WC	892m²	Douglas Godfrey Duimpies
74.	Erf 6215 Paarl	Cape Winelands, WC	1.0116ha	Paarl Opleidingsentrum
75.	Erf 6217 Paarl	Cape Winelands, WC	0.0000DUM	Christian Pietersen
76	Erf 6225 Paarl	Cape Winelands, WC	548m²	Suzetta and John Anthony Africa
77.	Erf 6226 Paarl	Cape Winelands, WC	1231m²	No data found
78.	Erf 6229 Paarl	Cape Winelands, WC	496m²	Winton and Elton Lance van Aarde
79.	Erf 6230 Paarl	Cape Winelands, WC	496m²	Sandra and Edward Duncan Ontong
80.	Erf 6231 Paarl	Cape Winelands, WC	483m²	Martha Cocum
81.	Erf 6232 Paarl	Cape Winelands, WC	528m²	Petronella Maxie Gilfellan
82.	Erf 6233 Paarl	Cape Winelands, WC	533m²	Joan Sauls
83.	Erf 6234 Paarl	Cape Winelands, WC	531m²	Dawid Jan Adams
84.	Erf 5997 Paarl	Cape Winelands, WC	565m²	Julian Esmerelda and Pierre Christopher Neil Simpson
85.	Erf 5998 Paarl	Cape Winelands, WC	565m²	Magdalene Caryn Bridgens
86.	Erf 5999 Paarl	Cape Winelands, WC	565m²	Gordon David Botha
87.	Erf 6000 Paarl	Cape Winelands, WC	565m²	David Ashley Mcmillan
88.	Erf 8004 Paarl	Cape Winelands, WC	No data found	No data found

89.	Erf 8005 Paarl	Cape Winelands, WC	No data found	No data found
90.	Erf 8006 Paarl	Cape Winelands, WC	No data found	No data found
91.	Erf 8091 Paarl	Cape Winelands, WC	1051m²	William Gerrit Jacobs
92.	Erf 8099 Paarl	Cape Winelands, WC	1007m²	Sydney James America
93.	Erf 8101 Paarl (Now consolidated into Erf 17305 Paarl	Cape Winelands, WC	1274m²	Mariam Isse Barre
94.	Erf 8102 Paarl	Cape Winelands, WC	1467m²	Aubrey David Samaai
95.	Erf 8204 Paarl	Cape Winelands, WC	927m²	Shirley Esther and Marcello Augustaf Patrick Ross
96.	Erf 8205 Paarl	Cape Winelands, WC	927m²	Anzill Adams
97.	Erf 8206 Paarl	Cape Winelands, WC	927m²	Conan Kevin Carolissen
98.	Erf 8207 Paarl	Cape Winelands, WC	926m²	Diane Gail Jacobs
99.	Erf 8208 Paarl	Cape Winelands, WC	927m²	Angela and Neil Theo Solomon Marsh
100.	Erf 8209 Paarl	Cape Winelands, WC	927m²	Desmond Thorne and Chaney Cazney Abrahams
101.	Erf 9127 Paarl	Cape Winelands, WC	532m²	Andrew Fredericks
102.	Erf 9128 Paarl (Now Consolidated into Erf 11540 Paarl)	Cape Winelands, WC	940m²	Faadiel Mogammad Essop
103.	Erf 9129 Paarl (Now consolidated into Erf 11540 Paarl)	Cape Winelands, WC	940m²	Faadiel Mogammad Essop
104.	Erf 9130 Paarl	Cape Winelands, WC	505m²	Douglas David Cupido
105.	Erf 6042 Paarl	Cape Winelands, WC	471m²	Ruiters Samantha Annenise Tanya and Yusuf Ruiters
106.	Erf 6061 Paarl	Cape Winelands, WC	470m²	Amina Holman
107.	Erf 6062 Paarl	Cape Winelands, WC	471m²	Melisa Shontell and Lynnchile Leon Nicholas
108.	Erf 6063 Paarl	Cape Winelands, WC	471m²	Johann Boonzaaier
109	Erf 8201 Paarl	Cape Winelands, WC	508m²	Hillary and John Joachim Jacobs

Date Submitted : 31 December 1998

The Regional Land Claims Commission investigated this claim in terms of provisions of the Act. Any party who has an interest in the above-mentioned land is hereby invited to submit, within 90 days from the publication of this notice, any comments / information to: The Regional Land Claims Commission: Western Cape, Private Bag X9163, Cape Town, 8000, Tel no: (021) 4090300 and Fax no: (021) 424-5146

Mr. L. H. Maphutha
Regional Land Claims Commissioner

APPROVED .....

DATE 2022/08/02

CHECKED.....

DATE.....22/7/2022

DEPARTMENT OF AGRICULTURE, LAND REFORM AND RURAL DEVELOPMENT

NOTICE 1250 OF 2022

GENERAL NOTICE IN TERMS OF THE RESTITUTION OF LAND RIGHTS ACT 1994, (ACT No. 22 OF 1994) AS AMENDED.

Notice is hereby given in terms of Section 11(1) of the Restitution of Land Rights Act, 1994 (Act No. 22 of 1994), as amended. These claims for the restitution of land rights have been submitted to the Regional Land Claims Commissioner for the Western Cape. The particulars regarding this claim are as follows:

Project Name : **Mshuqwana Family**

Number of Claims : **01**

Area : **Nyanga, City of Cape Town, Western Cape**

Type of Claim : **Tenancy**

Property : **As listed below**

Ref. number	Claimant	Lodgement date	Property description	Current owner(s)
M275	Z Mshuqwana	30/08/1996	T.P.S. 1 GENERAL DEALER ERF 1194 EMMS DRIVE NYANGA N.183 HANGANA STREET ERF 1174 NYANGA	Government of the Republic of South Africa

The Regional Land Claims Commission will investigate this claim in terms of provisions of the Act in due course. Any party who has an interest in the above-mentioned land is hereby invited to submit, within ~~60~~ 90 days from the publication of this notice, any comments/ information to:

The Regional Land Claims Commission: Western Cape
Private Bag X9163
Cape Town
8000

Tel: (021) 409-0300
Fax: (021) 424-5146

CHECKED.....

DATE.....22/7/2022

APPROVED.....

DATE .....2022/08/02.....
Mr. L.H Maphutha
Regional Land Claims Commissioner

DEPARTMENT OF EMPLOYMENT AND LABOURT

NOTICE 1251 OF 2022

Notice of the Productivity SA Annual General Meeting (AGM)

Productivity South Africa (herein after referred to as **Productivity SA)** is established in terms of section 31 of the Employment Services Act, No. 4 of 2014 as a juristic person and schedule 3A Public Entity of the Department of Employment and Labour. Productivity SA is responsible for fulfilling an economic or social **mandate** of government, which is to promote employment growth and productivity thereby contributing to South Africa's socio-economic development and competitiveness.

Productivity SA achieves its mandate primarily through its three core programmes (Strategic Business Units), namely, the Competitiveness Improvement Services (CIS), Business Turnaround and Recovery (BT&R) and Research, Innovation and Statistics (RIS). Productivity SA develops and implements custom-designed systems, including a suite of business process improvement tools and techniques to assist businesses of all sizes across industry sectors to stabilise, and become competitive and more profitable, through a focus on the following service offerings:

i. Turnaround strategies to enhance the productivity and operational efficiency of organisations and companies facing economic distress (financial and operational difficulties).
ii. The Workplace Challenge Programme (WPC), aimed at implementing best practices within small groups of enterprises or clusters within a value chain.
iii. Capacitating management and workers through skills development initiatives and the provision of relevant systems, tools and methods to deal with operational efficiency challenges.
iv. Providing productivity and operational efficiency enhancement skills programmes and support to State-owned Enterprises (SOEs) and Multinationals (equity equivalent commitments) to enable them to implement and achieve their Broad-based Black Economic Empowerment (BBBEE) targets relating to enterprise and supplier development.
v. Generation and dissemination of productivity and competitiveness-related information and knowledge.

In terms of clause 6 (6.1 – 6.6) of the Productivity SA's Constitution, the Board is required to hold the Annual General Meeting (AGM) each year within six months of the end of the preceding financial year of Productivity SA.

Notice is hereby given that Productivity SA's Board will be holding a physical Annual General Meeting (AGM) with Key Stakeholders: The Department of Employment and Labour as Shareholder, Organised Business, Organised Labour and Government with a maximum of three representatives, Strategic partners and Alliances, appointed Internal and External Auditors, Media and Executive Committee on:

- **Date: 16th September 2022**
- **Venue: The Protea Hotel, 1369 Fourteenth Road, Noordwyk, Midrand**
- **Time: 10h00 – 12h00**

The Annual General Meeting will discuss the following for adoption:

- Productivity SA Annual Report for the 2021/22 FY
- Productivity SA Annual Financial Statements for the 2021/22 FY
- Productivity SA Performance Information for the 2021/22 FY
- Productivity SA Strategic Plan 2021/22 – 2024/25
- Productivity SA Priorities over the MTSF 2019 - 2024
- Productivity SA Annual Performance Plan for the period 2022/23 FY
- Budget for the period 2022/23 FY

Please RSVP to Dorcas Khasake at: dorcask@productivitysa.co.za on or before the **10th September 2022**. She can be contacted at **011 848 5398** for further enquiries.

DEPARTMENT OF EMPLOYMENT AND LABOURT

NOTICE 1252 OF 2022

Notice of the Productivity SA Annual General Meeting (AGM)

Productivity South Africa (herein after referred to as **Productivity SA)** is established in terms of section 31 of the Employment Services Act, No. 4 of 2014 as a juristic person and schedule 3A Public Entity of the Department of Employment and Labour. As a public entity, Productivity SA is responsible for fulfilling an economic or social **mandate** of government, which is to promote employment growth and productivity thereby contributing to South Africa's socio-economic development and competitiveness.

Productivity SA's objectives are to improve the productivity and competitiveness of the national economy and business efficiency through research on socio-economic systems, productivity and economic sectors as well as through the collection and supply of information. The organisation offers various mechanisms to assist businesses to stabilise and become more profitable, in the form of a suite of Business Processes Improvement tools and Techniques. These interventions systematically help businesses of different sizes to optimise all aspects of underlying processes in the business to achieve financial stability, sustainability, more efficient results, wealth creation, job retention and creates environment conducive for job creation.

The interventions are through the following programmes:

- **Business Turnaround and Recovery Strategies** in support of enterprises facing economic distress (financial and operational difficulties) to prevent job losses or minimise the retrenchment of workers. This include developing long-term plans and programmes to restructure and improve the productivity and operational efficiency of the organisation with a view to retain jobs or minimise the retrenchment of workers.
- **Competitiveness Improvement Service (CIS) Programme incorporating the Workplace Challenge Programme (WPC)** funded by **the dtic** focusses on:
  i. enterprise competitiveness and sustainability, including enhancing the appropriate capacities of SMMEs and Co-operatives to adopt world-class productivity enhancement best practices, focusing on products, processes and people;
  ii. contributing to the creation of decent work by improving the competitiveness and sustainability of enterprises.
  iii. supporting South Africa's strategic objectives in scaling up efforts to promote long term industrialisation and transformation of the economy and to achieve a productive high-income economy which is globally competitive;
  iv. support to SMMEs and Co-operatives, particularly in the productive sectors with strong growth and employment multipliers within the priority sectors are targeted;
  v. prioritising the participation of historically disadvantaged people and regions in the economy and thereby support meaningful BBBEE using instruments such as Special Economic Zones (SEZs), Industrial Parks and Black Industrialists interventions.

In terms of clause 6 (6.1 – 6.6) of the Productivity SA's Constitution, the Board is required to hold the Annual General Meeting each year within six months of the end of the preceding financial year of Productivity SA.

Notice is hereby given that Productivity SA's Board will be holding the Annual General Meeting with the Key Stakeholders: Department of Employment and Labour as Shareholder, Organised Business, Organised Labour and Government with a maximum of three representatives, Strategic partners and Alliances, appointed Internal and External Auditors, Media, Executive Committee to attend the Annual General Meeting via a Webinar to be held on:

- **Date: 16th September 2022, Physical attendance**
- **Venue: TBC**
- **Time: 10h00 – 12h00**

The Annual General Meeting will discuss the following for adoption:

- Productivity SA Annual Report for the 2021/22 FY
- Productivity SA Annual Financial Statements for the 2021/22 FY
- Productivity SA Performance Information for the 2021/22 FY
- Productivity SA Revised Strategic Plan 2021/22 – 2024/25
- Productivity SA Priorities over the MTSF 2019 - 2024
- Productivity SA Annual Performance Plan for the period 2022/23 FY
- Budget for the period 2022/23 FY

Please RSVP to Dorcas Khasake at: dorcask@productivitysa.co.za on or before the **10th September 2022**. She can be contacted at **011 848 5398** for further enquiries.

NON-GOVERNMENTAL ORGANIZATION

NOTICE 1253 OF 2022

Swartland Municipality (WESTERN CAPE)

Removal of Restrictions in terms of the Spatial Planning and Land Use Management Act, 2013 (Act 16 of 2013)

ERF 1192 YZERFONTEIN SITUATE IN THE SWARTLAND MUNICIPALITY DIVISION MALMESBURY PROVINCE OF THE WESTERN CAPE

Under Section 47 of the Spatial Planning and Land Use Management Act, 2013 (Act 16 of 2013) and upon instructions by the Local Authority, a notice is hereby given that condition/s A(a), (b), (c), (d) contained in Deed of Transfer No. T19453/1948 and now held by T5654/2019 applicable to Erf 128 Cotswold are hereby removed.

DEPARTMENT OF TRANSPORT

NOTICE 1254 OF 2022

AIR SERVICE LICENSING ACT, 1990 (ACT NO.115 OF 1990)
APPLICATION FOR THE GRANT OR AMENDMENT OF DOMESTIC AIR SERVICE LICENCE

Pursuant to the provisions of section 15 (1) (b) of Act No. 115 of 1990 and Regulation 8 of the Domestic Air Regulations,1991, it is hereby notified for general information that the application detail of which appear in the appendix, will be considered by the Air Service Licensing Council. Representation in accordance with section 15 (3) of the Act No.115 of 1990 in support of, or in position, an application, should reach the Air Service Licensing Council. Private Box X 193, Pretoria, 0001, within 21 days of date of the publication thereof.

APPENDIX I

(A) Full name and trade name of the applicant. (B) Full business or residential address of the applicant. (C) Class of licence applied for. (D) Type of air service to which application applies. (E) Category of aircraft to which application applies.

(A) Flightec Solutions (Pty) Ltd. (B) Genet House, Wilge Power Station, Voltargo Ogies, Mpumalanga, 2226. (C) Class III. (D) Type G3, G4, G5, G10, G15, G16 (RPAS). (E) Category H1.

(A) Agizo Aerial Services (Pty) Ltd. (B) 6 East Street, Halfway Gardens, Midrand, 1686. (C) Class III. (D) Type G3, G4 & G16 (RPAS). (E) Category A4, H1 & H2.

(A) Suid Cargo Airlines (Pty) Ltd. Suid Cargo. (B) 202 Jutlander Road Beaulieu, Midrand, Gauteng. (C) Class II. (D) Type N2. (E) Category A1.

APPENDIX II

(A) Full Name and trade name of the applicant. (B) Full business or residential address the applicant. (C) The Class and number of license in respect of which the amendment is sought (D) Type of air service and the amendment thereto which is being applied for (E) Category of aircraft and the amendment thereto which is being applied for. (F) Amendment referred to in section 14(2) (b) to I.

(A) Westline Aviation (Pty) Ltd. Westline Aviation. (B) 66 Graham Rd, Unit 108, Block 6, Lombardy Business Park, Shere, Pretoria, 0084. (C) Class II & III; N235D & G869D. (D) Type N1, N2, G1, G2, G3, G4, G5, G6, G7, G8, G10, G11, G12, G13, G14,G15, & G16(RPAS). (E) Category A3, A4, & H2. (F) **Change to the Company name:** from Westline Aviation (Pty) Ltd to Westline Holdings (Pty) Ltd.

(A) Vila Aviation Technologies (PTY) Ltd. Vula Air. (B) #130 4TH Street, Parkmore, Johannesburg. (C) Class III; G1330D. (D) Type G2, G3, G4, G5, G7, G8, G9, G10, G12, G13 & G16 (RPAS Commercial Operations). (E) Category A4, H1 & H2. (F) **Changes to postholders:** Cedrec Sikhakhane Leitch & Noel Batsirai Mutandwa. **Change of Address to** 130 4th Street, Parkmore, Johannesburg, 2196, Gauteng, RSA.

(A) Henley Air (Pty) Ltd. Henley Air. (B) Hangar 6, Rand Airport, Germiston. (C) Class III;G576D. (D) Type G2, G3, G4, G5, G7, G8, G10, G11, G13, G15, G16 (Commercial operations with Remotely Piloted Aircraft Systems Ship to shore operations, Night Vision Googles, Powerline Erecting and Stringing Operations). (E) Category H1 & H2. (F) **Addition** of Category A4 (Remotely Piloted Aircraft Systems).

(A) GC Geofly (Pty) Ltd. GC Geofly. (B) 1193 Frederik Avenue, Kingfisher Close. Wilderness East, Wilderness, Western Cape, 6560. (C) Class III; G1238D. (D) Type G3, G4, G16 (RPAS). (E) Category A4. (F) **Addition** of Type G5 & Category H1.

(A) R.G. Macdonald. Sport Aviation & Sport Helicopters. (B) East Pier Road, V&A Waterfront, Cape Town. 8001. (C) Class II & Class III; N915D & G916D. (D) Type N1, N2, G2, G3, G11, G15, & G16 (Pleasure Flips with Non-type Certificated Aircraft. (E) Category H2. (F) **Changes to the MP:** Mr R.G. MacDonald replaces Mr Francios Marais as the RP:Flight Operations, Mr J.H. Claassens replaces Mr Fancois Marais as the RP: Aircraft and Mr F. Marais replaces Mr R. Russell as the Air Service Safety Officer.

AIR SERVICE LICENSING ACT, 1990 (ACT NO.115 OF 1990)
APPLICATION FOR THE GRANT OR AMENDMENT OF DOMESTIC AIR SERVICE LICENCE

Pursuant to the provisions of section 15 (1) (b) of Act No. 115 of 1990 and Regulation 8 of the Domestic Air Regulations,1991, it is hereby notified for general information that the application detail of which appear in the appendix, will be considered by the Air Service Licensing Council. Representation in accordance with section 15 (3) of the Act No.115 of 1990 in support of, or in position, an application, should reach the Air Service Licensing Council. Private Box X 193, Pretoria, 0001, within 21 days of date of the publication thereof.

APPENDIX I

(A) Full name and trade name of the applicant. (B) Full business or residential address of the applicant. (C) Class of licence applied for. (D) Type of air service to which application applies. (E) Category of aircraft to which application applies.

(A) Stratism Technology Solutions (Pty) Ltd. (B) 252 Rondebult Road, Parkdene, Boksburg, 1459. (C) Class III. (D) Type G3, G4, G5 & G16 (RPAS). (E) Category H1.

(A) Ntamo Technologies (Pty) Ltd. (B) 23 Chasewater Street. New Redruth, Alberton, 1449. (C) Class III. (D) Type G3, G4, G5 & G16 (RPAS). (E) Category H1.

(A) Zar Aviation (Pty) Ltd. (B) 14 South Beach Road, Umdloti Beach, 4319. (C) Class II & III. (D) Type N1, N2, G2, G3, G4, G5, G8, G10 & G15. (E) Category H2

APPENDIX II

(A) Full Name and trade name of the applicant. (B) Full business or residential address the applicant. (C) The Class and number of license in respect of which the amendment is sought (D) Type of air service and the amendment thereto which is being applied for (E) Category of aircraft and the amendment thereto which is being applied for. (F) Amendment referred to in section 14(2) (b) to I.

(A) Caelum Technologies (Pty) Ltd. Caelum Technologies. (B) Hanger 2, General Aviation Area, East London Airport, East London, 5247. (C) Class III; G1245D. (D) Type G3, G4 & G16 (RPAS). (E) Category A4 & H1. (F) **Adding Type** G2, G5, G6, G8, G10, G13 & G15.

(A) Drone Visuals (Pty) Ltd. (B) 21 Roger de Clerck, Mkondeni. Pietermaritzburg, Kwa-Zulu Natal 3212. (C) Class III;G1338D. (D) Type G3, G4 & G16 (RPAS). (E) Category H1. (F) **Adding** Type G5 and **Changes to Postholders**.

(A) DC Geomatics (Pty) Ltd. (B) 28 San Te Fe 1, Seaward Estate, Ballito, 4420. (C) Class III;G1240D. (D) Type G3, G4, G5. (E) Category A4, H1 & H2. (F) **Changes to the MP:** Mr Ruan Vermaak is appointed as the RP: Aircraft.

(A) Winlife (Pty) Ltd. Rotorworkx Aviation. (B) Hangar 7, Diemerskraal Boerdery, Willington. (C) Class III; G1009D. (D) Type G5 & G10. (E) Category H2. (F) **Changes to the MP:** Mr. A.V. Hoffmann replaces Mr. J.W. Leitner as the Air Services Safety Officer, Mr. A.V. Hoffmann is appointed as the RP: Flight Operations (Fixed Wing) and Mr. A.C. le Roux is appointed as the RP:Aircraft (Fixed Wing).

(A) Starlite Aviation Operations (Pty) Ltd. (B) Main Base of Operation, Hangar 123, Virginia Airport, Durban North, 4051. (C) Class II & III; N623D & G771D. (D) Type N1, N2, G2, G3, G4, G5, G7, G8, G10 & G15. (E) Category A2, A3, A4, H1 & H2. (F) Changes to the MP: Nicolette Papahotis is appointed as the Accountable Manager and Bruce Fraser as the Flight Ops Manager.

(A) Equilibrium Aviation (Pty) Ltd. (B) 86 Joubert Road, Green Point, Cape Town, 8005. (C) Class II & III;N1282D & G1283D. (D) Type N1, N2, G2, G3, G4, G5, G8 & G10. (E) Category H2. (F) **Changes to the MP:** C. Kleingeld as the RP: Aircraft.

INTERNATIONAL AIR SERVICE ACT, (ACT NO.60 OF 1993)
GRANT /AMENDMENT OF INTERNATIONAL AIR SERVICE LICENSE

Pursuant to the provisions of section 17 (12) of Act No.60 of 1993 and Regulation 15 (1) and 15 (2) of the International Air Regulations,1994, it is hereby notified for general information that the applications, detail of which appear in the Schedules hereto, will be considered by the International Air Services Council (Council) representation in accordance with section 16(3) of the Act No. 60 of 1993 and regulation 25(1) of International Air Services Regulation, 1994, against or in favour of an application, should reach the Chairman of the International Air Services Council at Department of Transport, Private Bag X 193, Pretoria, 0001,within 28 days of the publication hereof.It must be stated whether the party or parties making such representation is / are prepared to be represent or represented at the possible hearing of the application.

APPENDIX I

(A) Full name, surname and trade name of the applicant. (B) Full business or residential address of the applicant. (C) Class of licence applied for. (D) Type of International Air Service to which application pertains. (E) Category or kind of aircraft to which application pertains. (F) Airport from and the airport to which flights will be undertaken. (G) Area to be served. (H) Frequency of flight.

(A) Van Den Berg Lugbespuiting CC. (B) 28 D'arcy Street, Douglas, Northern Cape. (C) Class III. (D) Type G5 & G8. (E) Category A2 & A4. (F) 28 D'arcy Street, Douglas, Northern Cape.

(A) Suid Cargo Airlines (Pty) Ltd. Suid Cargo. (B) 202 Jutlander Rd Beaulieu, Midrand, 1684. (C) Class II. (D) Type N1 & N4. (E) Category A1. (F) (G) Worldwide-Cargo Only.

(A) Equilibrium Aviation (Pty) Ltd. (B) 86 Joubert Road, Green Point, Cape Town, 8005. (C) Class II & III. (C) Type N1, N2, G2, G3, G4, G5, G8 & G10. (E) Category H2. (F) Springs Airfield Cape Town Airport. (G) Africa & Madagascar. (H) Non-Scheduled Operations.

APPENDIX II

(A) Full name, surname and trade name of the applicant. (B) Full business or residential address of the applicant. (C) Class and number of license in which the amendment is made . (D) Type of International Air Service in respect of which the amendment was made. (E) Category or kind of aircraft to which license was made. (F) Airport in respect of which the amendment was made. (G) Area to be served. (H) Frequency of flight.

(A) Starlite Aviation Operations (Pty) Ltd. (B) Main Base of Operation, Hangar 123, Virginia Airport, Durban North, 4051. (C) Class II & III. (D) Type N1, N4, G2, G3, G5, G7, G8, G10 & G16 (Ship to shore, off-shore operations, Fast-rope Insertion and extraction systems, Night Vision Systems, Forward Looking Infrared). (E) Category A2, A3, H1 & H2. (F)(G)(H) **Changes to the MP:** Nicolette Papahotis is appointed as the Accountable Manager and Bruce Fraser as the Flight Ops Manager.

(A) Airlink (Pty) Ltd. Airlink. (B) #3 Greenstone Hill Office Park, Emerald Boulevard, Greenstone Hill, Modderfontein. (C) Class I, (D)Type S1. (E) Category (A1). (F) JHB-VFA.(G)(H) 14 return flights per week.

INTERNATIONAL AIR SERVICE ACT, (ACT NO.60 OF 1993)
GRANT /AMENDMENT OF INTERNATIONAL AIR SERVICE LICENSE

Pursuant to the provisions of section 24 (1(a) and (b) and 25 (5)of Act No.60 of 1993 and Regulation 16 (1) and 17 (1) of the International Air Regulations,1994, it is hereby notified for general information that the applications, detail of which appear in the Schedules hereto, will be considered by the International Air Services Council (Council) representation in accordance with section 24(3) of the Act No. 60 of 1993 and regulation 25(2) of International Air Services Regulation, 1994, against or in favour of an application, should reach the Chairman of the International Air Services Council at Department of Transport, Private Bag X 193, Pretoria, 0001,within 21 days of the publication hereof. It must be stated whether the party or parties making such representation is / are prepared to be represent or represented at the possible hearing of the application.

APPENDIX I (Renewals)

(A) **SAUDI ARABIAN AIRLINES**. (B) P.O. Box 167 cc: 919 Flight Operations Building #241, King Abdul Aziz International Airport, Jeddah, 21231 Kingdom of Saudia Arabia. (C) Class I. (D) Type S2. (E) A1 - B777FFG – Reg: HZ-AK71, HZ-AK72, HZ-AK73, HZ-AK74 (Dry Lease) and B747-400SF – Reg: TF-AMA, TF-AMB, TF-AMR. (Wet Lease). (F) and (G) Jeddah – O R Tambo (Johannesburg) – Nairobi – Jeddah. (H) Four (04) return flights per week.

(A) **ELAL ISRAEL AIRLINES LTD**. (B) Ben Gurion Airport, P.O. Box 41, 7015001, Israel. (C) Class I. (D) Type S1 and S2. (E) **A1 fleet for S1 services:** B787-8 – Reg: 4X-ERA, 4X-ERB, 4X-ERC; B787-9 – Reg: 4X-EDA, 4X-EDB, 4X-EDC, 4X-EDD, 4X-EDE, 4X-EDF, 4X-EDH, 4X-EDI, 4X-EDJ, 4X-EDK, 4X-EDL, 4X-EDM; B777 – Reg: 4X-ECD. **A1 fleet for S2 services:** No cargo freighter listed for scheduled operations. (F) and (G) Ben Gurion Airport (Israel) - O R Tambo International Airport ORTIA/Johannesburg) – Ben Gurion Airport (Israel) [No fifth freedom traffic rights may be exercised at intermediate or beyond points.] (H) For S1 Services: Four (04) return flights per week as stipulated in accordance with the Air Transport Agreement between the Governments of the Republic of South Africa and the State of Israel. For S2-Services: Two (2) return flights per week.

(A) **EDELWEISS AIR AG**. (B) The Circle 32, 8058 Zurich Airport, Switzerland. (C) Class I. (D) Type S1. (E) A1 - A340-300 - Reg**:** HB-JMD, HB-JME, HB-JMF, HB-JMG. (F) and (G) Zurich – Cape Town – Zurich. (H) Seven (07) return flights per week.

(A) **TURKISH AIRLINES INC**. (B) P.O. Box 16278, O R Tambo International Airport, 1627. (C) Class I. (D) Type S2. (E) A1 - A330-243F – Reg: TC-JCI, TC-JDO, TC-JDP, TC-JDR, TC-JDS, TC-JOO, TC-JOU, TC-JOV, TC-JOY, TC-JOZ; B777-FF2 – Reg: TC-LJL, TC-LJM, TC-LJN, TC-LJO, TC-LJP, TC-LJR, TC-LJS, TC-LJT. (F) and (G) Istanbul – (O R Tambo) Johannesburg – Entebbe – Istanbul; Istanbul – O R Tambo – Nairobi – Istanbul (No 5th freedom rights to be exercised between Johannesburg and Nairobi). (H) Two (02) flights per week. (Day 1 and day 4)

(A) **UNITED AIRLINES, INC**. (B) United Airlines Inc., 233 South Wacker Dreive, HDQIZ, Chicago, IL, 60606. (C) Class I. (D) Type S1. (E) A1 FLEET : **B777-222** - Reg: N204UA, N206UA, N209UA, N210UA, N211UA, N212UA, N213UA, N214UA, N215UA, N216UA, N217UA, N218UA, N219UA, N220UA, N221UA, N222UA, N223UA, N224UA, N225UA,

N226UA, N227UA, N228UA, N229UA, N768UA, N769UA, N771UA, N772UA, N773UA, N774UA, N775UA, N776UA, N777UA, N778UA, N779UA, N780UA, N782UA, N783UA, N784UA, N785UA, N786UA, N787UA, N788UA, N791UA, N792UA, N793UA, N794UA, N795UA, N796UA, N797UA, N798UA, N799UA; **B777-224** - Reg: N78001, N78002, N78003, N78004, N78005, N74007, N78008, N78009, N76010, N79011, N77012, N78013, N77014, N27015, N57016, N78017, N37018, N77019, N69020, N76021, N77022;
B777-300 - Reg: N2331U, N2332U, N2333U, N2135U, N2136U, N2138U, N2140U, N2250U, N2251U, N2341U, N2142U, N2243U, N2534U, N2639U, N2644U, N2645U, N2737U, N2747U, N2748U, N2749U, N2846U; B**787-8** - Reg: N27901, N26902, N27903, N20904, N45905, N26906, N29907, N27908, N26909, N26910, N28912, N30913.
B787-9 - Reg: N19951, N36962, N35953, N38955, N45956, N27957, N27958, N27959, N26960, N29961, N17963, N27964, N27965, N26966, N26967, N29968, N15969, N29971, N24972, N24973, N24974, N24976, N24980, N29981, N38950, N29975, N29977, N29978, N24979, N26970, N29985, N19986, N28987, N23983, N25982, N29984, N13954, N38950, N19986, N26952; **B787-10** - Reg: N14001, N17002, N12003, N12004, N12005, N16009, N91007, N12010, N14011, N12012, N13013. (F) and (G) (Newark) New Jersey - Cape Town - New Jersey (three (03) flights per week) / New Jersey - O R Tambo (Johannesburg) - New Jersey (seven (07) flights per week). (H) Ten (10) flights per week.

(A) **CONGO AIRWAYS SA** avec CA. (B) 130, Boulevard du 30 Juin Immeuble ELEMBO C/Gombe, Kinshasa – DRC. (C) Class I. (D) Type S1. (E) Airbus 320-216 – Reg: 9S-ALU and 9S-AKD. (F) and (G) N'djili Airport (Kinshasa, DRC) – Lubumbashi International Airport (DRC) – O R Tambo International Airport (ORTIA, Johannesburg) - Lubumbashi International Airport (DRC) - N'djili Airport (Kinshasa, DRC). (H) Three (03) flights per week (day 3, 5, 7).

(A) **AIR TANZANIA COMPANY LIMITED**. (B) P.O. Box 543, Dar Es Salaam, Tanzania. (C) Class I. (D) Type S1. (E) Airbus Canada BD500-1A11 - Reg: 5H-TCM and B787-8 – Reg: 5H-TCG, 5H-TCH, 5H-TCI, 5H-TCJ, 5H-TCL. (F) and (G) Dar Es-Salaam (Julius Nyerere International Airport) – O R Tambo International Airport (ORTIA, Johannesburg) – Dar Es-Salaam. (H) Five (05) flights per week.

(A) **AIR FRANCE.** (B) 45 rue de Paris, 95747 Roissy CDG Cedex – FRANCE (C) Class I (D) S1 (E) B77W: FGSQA, FGSQB, FGSQC, FGSQD, FGSQE, FGSQF, FGSQG, FGSQH, FGSQI,
FSSQJ, FGSQK, FGSQL, FGSQM, FGSQN, FGSQO, FGSQP, FGSQR, FGSQS, FGSQT,
FGSQU, FGSQV, FGSQX, FGSQY, FGZNA, FGZNB, FGZNC, FGZND, FGZNE, FGZNF,
FGZNG, FGZNH, FGZNI, FGZNJ, FGZNK, FGZNL, FGZNN, FGZNO, FGZNP, FGZNQ,
FGZNR, FGZNS, FGZNT, FGZNU. B772: FGSPA, FGSPB, FGSPC, FGSPD, FGSPE, FGSPF, FGSPG, FGSPI, FGSPJ, FGSPK, FGSPL, FGSPM, FGSPN, FGSPO, FGSPP, FGSPQ, FGSPT, FGSPU, FGSPX, FGSPY, FGSPZ. B789: FHRBA, FHRBB, FHRBC, FHRBD, FHRBE, FHRBF, FHRBG, FHRBH, FHRBI, FHRBJ. A359: FHTYA, FHTYB, FHTYC, FHTYD, FHTYE, FHTYF, FHTYG, FHTYH, FHTYI, FHTYJ, FHTYK. (F) France – Johannesburg – France, France – Cape Town – France (G) Seven (07) flights per week.

(A) **KLM ROYAL DUTCH AIRLINES**. (B) PO Box 7700, 1117ZL Schiphol Oost, The Netherlands (C) Class I (D) S1 (E) B77W: PHBVA, PHBVB, PHBVC, PHBVD, PHBVF, PHBVG, PHBVI, PHBVK, PHBVN, PHBVO, PHBVP, PHBVR, PHBVS, PHBVU,

PHBVV, PHBVW. B772: PHBQA, PHBQB, PHBQC, PHBQD, PHBQE, PHBQF, PHBQG, PHBQH, PHBQI, PHBQK, PHBQL, PHBQM, PHBQN, PHBQO, PHBQP. B789: PHBHA, PHBHC, PHBHD, PHBHE, PHBHF, PHBHG, PHBHH, PHBHI, PHBHL, PHBHM, PHBHN, PHBHO, PHBHP. B787-10: PHBKA, PHBKC, PHBKD, PHBKF, PHBKG, PHBKH. (F) Amsterdam-Johannesburg-Amsterdam and Amsterdam-Cape Town-Amsterdam (G) fourteen (14) flights per week and Seven (07) flights per week.

(A) **SINGAPORE AIRLINES LIMITED**. (B) SIA Office, Upper Mezzaine, Level International Departure, O.R Tambo International Airport. (C) Class I. (D) S1. (E) A350, A350-931, A350-941, B777-200ER, A350URL and B747 Reg: 9V-SHA, SHB, SHC, SHD, SHE, SHF, SHG, SHH, SHI, SHJ, SHK, SHL, SHM, SHN, SHO, SHP, SHQ, SHR, SHS, SHT, SHU, SHV, SJB, and SJE, SFI, SFK, SFN, SFO, SFP and SFQ, SGA, SGB, SGC, SGD, SGE,SGF,SGG, SMA, SMB, SMC, SMD, SME, SMF, SMG, SMI, SMJ, SMK, SML, SMM, SMN, SMO, SMP, SMQ, SMR, SMS, SMT,SMU,SMV,SMW,SMY, SMZ, SJA, SJE, SJE. (F) and (G) Singapore – O R Tambo – Cape Town-Singapore (No cabotage rights).

(A) **SAUDI ARABIAN AIRLINES**. (B) P. O Box 167, Flight Operations Building, #241, King Abdul Aziz International Airport, Jeddah, 21231, Kingdom of Saudi Arabia (C) Class I. (D) S1. (E) B787-10, Boeing 777 and A330: Reg: HZ-AR24, AR25, AR26, AR27, AR28, AK11, AK12, AK13,AK14, AK15, AK16, AK17, AK19, AK20, AK21, AK22, AK23, AK24, AK25, AK26, AK27, AK28, AK29, AK30,AK31,AK32, AK33, AK34, AK35, AK36, AK37, AK38, AK39, AK40, AK41, AK42, AK43, AQA,AQB,AQC,AQD, AQE, AQF, AQH, AQJ, AQK, AKL, AQ11, AQ12, AQ13, AQ14, AQ15, AQ16, AQ17, AQ18, AQ19, AQ20, AQ21, AQ22,AQ23, AQ24, AQ25, AQ26, AQ27, AQ28 ,AQ29, AQ30, ARA, ARB, ARC, ARF, ARG, ARH, AR11, AR12, AR13, AR22, AR23. (F) and (G) Jeddah-Johannesburg-Jeddah. (H) Four (4) flights per week.

APPENDIX II (amendment)

(A) **COMPAGNIE AERIENNE ASKY**, trade name ASKY Airlines. (B) P O Box 2988, Lome-Togo. (C) Class I. (D) Type S1. (E) **Adding of aircraft:** A1 – B737-800 – Reg: ET-APM. (F) and (G) LFW (Lome/Togo) – LOS (Lagos/Nigeria) – DLA (Douala/Cameroon) - JNB (2x); LFW (Lome/Togo) – LOS (Lagos/Nigeria) – LBV (Libreville/Gabon) - JNB (2x). (H) Four (04) return flights per week.

(A) **CONDOR FLUGDIENST GMBH**. (B) Condor Flugdienst GmbH, An der Gehespitz 50, 63263 Neu-Isenberg, Germany. (C) Class I. (D) Type S1. (E) Adding of aircraft: A1 – A330-243 – Reg: D-AIYA, D-AIYB, D-AIBY, D-AIYD. (F) and (G) Frankfurt – Cape Town and Frankfurt – O R Tambo International Airport (ORTIA, Johannesburg). (H) Five (05) return flights per week.

(A) **DELTA AIR LINES**(B) 1030 Delta Blvd. Dept. 982, Atlanta, GA 30320, USA. (C) Class I. (D) Type S1. (E) **Adding frequencies @ 3 flights**.

(A) **UNITED AIRLINES**, Inc. trade name, United (B) United Airlines, Inc., 233 South Wacker Drive, HDQIZ, Chicago, IL, 60606. (C) Class I. (D) Type S1. (E) **Adding a new route: Washington – Cape Town – Washington and frequencies** (H) **Adding 3 flights**

BOARD NOTICES • RAADSKENNISGEWINGS

BOARD NOTICE 320 OF 2022

PAN SOUTH AFRICAN LANGUAGE BOARD

(ACT No. 59 OF1995 as amended by Act No.10 of 1999)

CORRECTION NOTICE

CALL FOR COMMENTS

This Correction Notice serves to correct the Government Gazette:"Board Notice No 306, p66 of 15 July 2022, Gazette No. 47019,".

PROVINCIAL LANGUAGE COMMITTEE

The Pan South African Language Board (PanSALB) herewith declares that the following persons have been duly co-opted as members of the Mpumalanga Provincial Language Committee in terms of Section 8(8) (a) of the PanSALB Act (Act No. 59 of 1995 as amended, and in accordance with Board Notice No. 94 of 2005 Government Gazette No. 28053 of 30 September 2005) (Norms and Rules for Provincial Language Committee).

Co-opted members are hereby published for public comments. Members of the public are invited to submit written comments by 29 August 2022.

Should no comments or objections be received by the stipulated due date, then the co-opted person's name will be deemed to be confirmed for co-option.

	PROVINCIAL LANGUAGE COMMITTEE	
TITLE, NAME/S AND SURNAME	**AREA OF SPECIALIZATION**	**PROVINCE REPRESENTED**
1. Mr Leonard Mokitimi Rabalao	Setswana	Mpumalanga
2. Mr Ntokozo Simon Mngomezulu	South African Sign Language (SASL)	Mpumalanga
3. Mr Piet Jan Masilela	IsiNdebele	Mpumalanga

Comments and/or objections should be sent to:

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Printed by and obtainable from the Government Printer, Bosman Street, Private Bag X85, Pretoria, 0001
Contact Centre Tel: 012-748 6200. eMail: info.egazette@gpw.gov.za
Publications: Tel: (012) 748 6053, 748 6061, 748 6065

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