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Government Printing Works

Notice submission deadlines

Government Printing Works has over the last few months implemented rules for completing and submitting the electronic Adobe Forms when you, the customer, submit your notice request.

In line with these business rules, GPW has revised the notice submission deadlines for all gazettes. Please refer to the GPW website www.gpwonline.co.za to familiarise yourself with the new deadlines.

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

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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.

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A reminder that documents must be attached separately in your email to GPW. (In other words, your email should have an Adobe Form plus proof of payment/purchase order – 2 separate attachments – where notice content is applicable, it should also be a 3rd separate attachment).

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- ❑ Single notice, single email – with proof of payment or purchase order.
- ❑ All documents must be attached separately in your email to GPW.
- ❑ 1 notice = 1 form, i.e. each notice must be on a separate form
- ❑ Please submit your notice **ONLY ONCE.**
- ❑ Requests for information, quotations and inquiries must be sent to the Contact Centre **ONLY**.
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GOVERNMENT NOTICES • GOEWERMENTSKENNISGEWINGS

DEPARTMENT OF WATER AND SANITATION

NO. 54 **22 JANUARY 2016**

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

PROPOSED CLASSES OF WATER RESOURCES AND RESOURCE QUALITY OBJECTIVES FOR THE LETABA CATCHMENT

I, Nomvula Paula Mokonyane, in my capacity as Minister of Water and Sanitation, and duly authorised in terms of section 13(4) of the National Water Act (Act No. 36 of 1998) hereby publish, for public comment, the proposed classes of water resources and the proposed resource quality objectives for the Letaba catchment, in the Schedule. Notice No.823 of 2014 published in Government Gazette 37999 of 19 September 2014 is hereby repealed.

Any person who wishes to submit written comments with regard to the proposed classes and resource quality objectives should submit the comments within 60 days from the date of publication of this Notice to:

Chief Director: Water Ecosystems
Attention: Ms Ndileka Mohapi
Department of Water and Sanitation
Ndinaye Building 5107
178 Francis Baard Street
Private Bag X313
Pretoria
0001

E-mail: mohapin@dws.gov.za Facsimile: 012 336 8813

MRS NP MOKONYANE
MINISTER OF WATER AND SANITATION
DATE: 19 ,12 ,2015

SCHEDULE

DESCRIPTION OF WATER RESOURCE

The proposed classes and resource quality objectives are determined for all or part of every significant water resource within the Letaba catchment as set out below:

Water Management Area:	Limpopo North West
Drainage Region:	B8 Secondary Drainage Region
River(s):	Letaba River System

PROPOSED CLASSES OF WATER RESOURCES AS REQUIRED IN TERMS OF SECTION 13(4)(a)(i)(aa) OF THE NATIONAL WATER ACT, 1998

1. A summary of the water resource classes for Integrated Units of Analysis (Figure 1) and ecological categories for the Letaba catchment is set out in Table 1.

2. Integrated units of Analysis are classified in terms of their extent of permissible utilization and protection as either Class I: indicating high environmental protection and minimal utilization; or Class II indicating moderate protection and moderate utilization; and Class III indicating sustainable minimal protection and high utilization.

PROPOSED RESOURCE QUALITY OBJECTIVES OF WATER RESOURCES AS REQUIRED IN TERMS OF SECTION 13(4)(a)(i)(bb) OF THE NATIONAL WATER ACT, 1998

1. A summary of resource quality objectives for hydrology, water quality, biota and habitat for resource units (quaternary catchments) is set out in Tables 2 – 5 respectively.

2. Resource quality objectives will apply from the date signed off as determined in terms of Section 13(1) of the National Water Act, 1998, unless otherwise specified by the Minister.

PROPOSED WATER RESOURCE CLASSES FOR THE LETABA CATCHMENT

Table 1: Summary of Water Resource Classes and Ecological Categories

Integrated Units of Analysis	Class for Integrated Units of Analysis	Biophysical node	River Name	Target Ecological Category
1. Letaba Upstream of Tzaneen Dam	II	B81A-00242	Broederstroom	C
		B81A-00256	Unnamed tributary	D
		B81A-00263	Unnamed tributary	D
		B81A-00270	Broederstroom	C
		B81B-00233	Mahitse	C
		B81B-00234	Mahitse	C
		B81B-00246	Politsi	C
		B81B-00251	Unnamed tributary	D
		B81B-00269	Morudi	B
		B81B-00227	Mahitse	D
		B81B-00240	Politsi	C
		B81B-00247	Groot Letaba	C
		EWR1	Groot Letaba	C
2. Letsitele and Thabina	III	B81D-00277	Thabina	D
		B81D-00280	Bobs	B
		B81D-00296	Mothlaka-Semeetse	B
		EWR2	Letsitele	D
		B81D-00272	Letsitele	C
3. Letaba Downstream of Tzaneen to Proposed Nwamitwa Dam	III	B81C-00245	Groot Letaba	C
		B81E-00213	Nwanedzi	D
		B81E-00244	Groot Letaba	D
4. Letaba from Proposed Nwamitwa Dam to Klein Letaba Confluence	II	EWR3	Groot Letaba	C
		B81F-00212	Groot Letaba	C
		B81F-00215	Groot Letaba	C
		B81F-00218	Groot Letaba	C
		B81F-00231	Groot Letaba	C
		B81J-00209	Groot Letaba	C
		EWR4	Groot Letaba	C
5. Southern Tributaries of Letaba in Integrated Units of Analysis 4 (from proposed Nwamitwa Dam to Klein Letaba Confluence)	I	B81F-00228	Reshwele	B
		B81F-00232	Makwena	B
6. Northern Tributaries to Letaba in Integrated Units of Analysis 4 (from proposed Nwamitwa Dam to Klein Letaba Confluence)	III	B81F-00189	Merekome	C
		B81F-00203	Lerwatlou	C
		B81G-00164	Molototsi	D
		B81H-00162	Metsemola	C
		B81H-00171	Molototsi	D
		B81J-00187	Mbhawula	C
7.	III	B82A-00168	Middle Letaba	C

Integrated Units of Analysis	Class for Integrated Units of Analysis	Biophysical node	River Name	Target Ecological Category
Upper Middle Letaba and Tributaries Upstream of Middle Letaba Dam		B82B-00173	Koedoes	D
		B82C-00175	Brandboontjies	E
		B82D-00163	Lebjelebore	C
		B82D-00154	Middle Letaba	D
		B82D-00166	Mosukodutsi	D
		B82D-00146	Middle Letaba	E
8. Klein Letaba Upstream of Middle Letaba Dam	II	B82E-00149	Khwali	B
		B82E-00150	Klein Letaba	C
		B82F-00141	Soeketse	C
		B82F-00128	Klein Letaba	C
		B82F-00137	Klein Letaba	D
9. Klein Letaba Downstream of Middle Letaba Dam	III	EWR5	Klein Letaba	C/D
		B82J-00165	Klein Letaba	C/D
		B82J-00178	Klein Letaba	C/D
		B82J-00201	Klein Letaba	C/D
		B82J-00207	Klein Letaba	C/D
10. Lower Klein Letaba Tributaries	I	B82H-00127	Nsama	C
		B82H-00139	Magobe	B
		B82H-00157	Nsama	B
		B82J-00153	Nalatsi	A
		B82J-00159	Byashishi	A
		B82J-00197	Ka-Malilibone	B
11. Letaba River (main stem) in the Kruger National Park	II	B83A-00220	Letaba	B
		B83A-00230	Letaba	C
		EWR6	Letaba	C
		B83A-00252	Letaba	C
		B83D-00250	Letaba	C
		EWR7	Letaba	C
		B83E-00265	Letaba	C
12. Letaba Tributaries in the Kruger National Park	I	B83A-00193	Shipikani	A
		B83A-00238	Nharhweni	A
		B83A-00254	Ngwenyeni	A
		B83B-00161	Tsende	A
		B83D-00204	Manyeleti	A
		B83D-00208	Makhadzi	A

Note (1): nMAR is the natural Mean Annual Runoff in million cubic meters per annum.

Note (2): The monthly flow requirements for EWR 3, 4, 5 and 7 represent the total flow defined by the recommended scenario where the Present Ecological State low flows and releases for water users defines the minimum requirements for the respective EWR sites.

Note (3): Ecological Water Requirements not specified as primary problems are related to water quality or rivers inundated by consecutive dams.

Note (4): Ecological Water Requirements not relevant as rivers situated in its totality within the Greater Kruger National Park and should stay natural.

RESOURCE QUALITY OBJECTIVES

Table 2 provides an indication of the hydrological RQOs for Rivers expressed in terms of flow at biophysical nodes and Ecological Water Requirement (EWR) sites. These summarised statistics are representative of the required flow regime in the river where the variability is dependent on the seasonal and temporal pattern of natural flow conditions. The mean monthly flows represent low flow requirements of a representative wet (April) and dry (October) month. Two alternative hydrological RQOs are defined for specific biophysical nodes affected by potential future water resource developments. These developments are Tzaneen Dam raising, construction of Nwamitwa Dam on the Groot Letaba River as well as a water resource development on the Klein Letaba River such as the potential Crystelfontein Dam.

Table 2: Summary of key hydrological RQOs for RIVERS for the Letaba River catchment

Biophysical node	River	Target EC	nMAR[1] (MCM)	Low flows (%nMAR)[2]	Total flows (%nMAR)[2]	October (m^3/s)		April (m^3/s)	
						Mean of monthly flows at the indicated frequency.[4]			
						90%	60%	90%	60%
IUA 1: LETABA RIVER UPSTREAM OF TZANEEN DAM									
B81B-00264 EWR1	Groot Letaba	C	99.84	11.8	21	0.125	0.198	0.155	0.352
B81B-00247	Groot Letaba	C	99.84	11.8	21	0.125	0.198	0.155	0.352
IUA 2: LETSITELE AND THABINA RIVERS									
B81D-00271 EWR2	Letsitele	D	116.55	15.3	23.7	0.042	0.100	0.131	0.753
IUA 4: LETABA FROM PROPOSED NWAMITWA DAM TO KLEIN LETABA CONFLUENCE									
RQOs applicable before the implementation of Nwamitwa Dam.									
B81F-00200 EWR 3(3)	Groot Letaba	C	394.93	-	46.1	0.254	0.806	0.720	1.261
B81J-00219 EWR4(3)	Groot Letaba	C	441.29	-	49.4	0.497	0.597	0.595	1.083
RQOs applicable when Nwamitwa Dam is implemented with high flow releases in January, February and March.									
B81F-00200 EWR 3(3)	Groot Letaba	C	394.93	-	43.91	1.092	1.222	1.318	2.500
B81J-00219 EWR4(3)	Groot Letaba	C	441.29	-	42.53	0.523	0.554	0.679	1.517
IUA 9: KLEIN LETABA FROM THE MIDDLE LETABA DAM									
RQOs applicable before the implementation of a water resource development in the Klein Letaba River.									
B82G-00135 EWR5(3)	Klein Letaba	C	124.18	-	54	0.004	0.015	0.008	0.040
RQOs applicable when a water resource development is implemented in the Klein Letaba River.									
B82G-00135 EWR5(3)	Klein Letaba	C/D	124.18	-	45	0.015	0.030	0.031	0.065
IUA 11: LETABA MAIN STEM IN THE KNP									
RQOs applicable before the implementation of Nwamitwa Dam.									

Biophysical node	River	Target EC	nMAR[1] (MCM)	Low flows (%nMAR)[2]	Total flows (%nMAR)[2]	October (m^3/s)		April (m^3/s)	
						Mean of monthly flows at the indicated frequency.[4]			
						90%	60%	90%	60%
B83D-00255 EWR7[(3)]	Letaba	C	646	-	55.8	0.579	0.579	0.590	1.155
RQOs applicable when Nwamitwa Dam is implemented with high flow releases in January, February and March.									
B83D-00255 EWR7[(3)]	Letaba	C	646	-	49.3	0.522	0.554	0.696	1.549

Note (1): nMAR is the natural Mean Annual Runoff in million cubic meters per annum.
Note (2): %nMAR is flow required at the nodes expressed as a percentage of the natural Mean Annual Runoff, Low flows and Total flows.
Note (3): The monthly flow requirements for EWR 3, 4, 5 and 7 represent the total flow defined by the indicated scenario where the Present Ecological State low flows and releases for water users defines the minimum requirements for the respective EWR sites.
Note (4): Percentage points on the monthly low flow frequency distribution continuum at the nodes, expressed as the percentage of the months (90% and 60%) that the flow should equal or exceed the indicated minimum values.

Table 3 provides the habitat, biota and water quality RQOs for each IUA for HIGH priority Resource Units. RQOs and the target Ecological Category relevant prior to the construction of the future dams are provided for each component and/or indicator. Expected changes after the construction of Nwamitwa and/or when a water resource development is implemented in the Klein Letaba River are indicated where relevant.

Table 3: RQOs for RIVERS for water quality, geomorphology, riparian vegetation, macro-invertebrates and fish in priority Resource Units (RU) in the Letaba Catchment

Component/ Indicator	Target EC*1	RQO
IUA 1 **RESOURCE UNIT RU EWR 1 (Letaba River, B81B-00264, B81B-00247)**		
Geomorphology	**C/D**	Maintain the current EC of C/D (≥ 58 %), and geomorphological structure.
Fish	**C**	Do not reduce current 22 species. Fish ecological category: C (≥ 62 %). Indicator of fast flowing habitats is the stargazer.
Invertebrates	**C**	Community representative of small foothill stream assemblage. Maintain the current EC of C (≥ 62 %), good stones in current (SIC) and marginal vegetation.
Riparian vegetation	**C**	Maintain target EC of C (≥ 62 %), Keep aliens in check (not more than 20-20% cover of perennial aliens). Maintain viable populations of matumi, leadwood, apple leaf.
Water quality	**B**	***Water quality RQOs immediately applicable.***
		Ensure that nutrient levels are within Acceptable limits: 50th percentile of the data must be less than 0.015 mg/L PO_4-P (Aquatic ecosystems: driver).
		Ensure that toxics are within Ideal limits or A categories: 95th percentile of the data must be within the Target Water Quality Range (TWQR) for toxics.
IUA 2 **RESOURCE UNIT RU EWR 2 (Letsitele River, B81D-00271)**		
Geomorphology	**D**	Maintain the current EC of D (≥ 42 %), and geomorphological structure.

Component/ Indicator	Target EC*1	RQO
Fish	**C/D**	Do not reduce current 24 species. Fish ecological category: C/D (≥ 58 %). Indicator of fast flowing habitats is the stargazer.
Invertebrates	**C**	Community representative of small foothill stream assemblage. Maintain the C (≥ 62 %) EC, good SIC and marginal vegetation.
Riparian vegetation	**D**	Keep aliens in check (not more than 20-50% cover of perennial aliens). Maintain viable populations of matumi, leadwood, apple leaf.
Water quality	**C**	***Water quality RQOs immediately applicable.*** • Ensure that nutrient levels are within Tolerable limits: 50th percentile of the data must be less than or equal to 0.025 mg/L PO_4-P (Agriculture - irrigation: driver). • Ensure that electrical conductivity (salt) levels are within Ideal limits: 95th percentile of the data must be less than or equal to 30 mS/m (Aquatic ecosystems: driver). • Ensure that toxics are within Ideal limits or A categories: 95th percentile of the data must be within the TWQR for toxics.
		Phase 1: Select an instream monitoring point and develop a baseline of data for faecal coliforms and E. coli. ***Phase 2: Water quality RQOs become applicable once a database of information has been produced.*** Meet faecal coliform and *E.coli* targets for recreational (full contact) use: Meet the TWQR of 0-130 counts per 100 ml (DWAF, 1996a).
IUA 3 **IUA 4** **RESOURCE UNIT RU EWR 3 (Letaba River, B81F-00200; B81C-00245; B81E-00244; B81F-00212; B81F-00215; B81F-00218; B81F-00231)**		
Geomorphology	**D**	Maintain the current EC (≥ 42 %), and geomorphological structure.
Fish	**C**	Do not reduce current 20 species. Fish ecological category: C (≥ 62 %). Indicator of fast flowing habitats is the shortspinesuckermouth.
Invertebrates	**C**	Community representative of Lowveld river in the middle with seasonal traits. Maintain the C (≥ 62 %) EC, diversity and integrity.
Riparian vegetation	**C/D→C**	Pre Nwamitwa: Maintain C/D (≥ 58%) EC. Keep aliens in check. Maintain viable populations of matumi, leadwood, apple leaf. Post Nwamitwa: Under the C (≥ 62 %) EC conditions it is expected that the marginal and lower zones will improve due to reduced encroachment on the macro-channel floor. RQOs to maintain this condition must be set post Nwamitwa Dam.
Water quality	**B/C**	***Ortho-phosphate RQO immediately applicable, i.e. before implementation of Nwamitwa Dam.*** Ensure that nutrient levels are within Acceptable limits: 50th percentile of the data must be less than or equal to 0.025 mg/L PO_4-P. ***Ortho-phosphate RQO applicable after implementation of Nwamitwa Dam.*** Ensure that nutrient levels are within Acceptable limits: 50th percentile of the data must be less than or equal to 0.015 mg/L PO_4-P (Aquatic ecosystems: driver).
		Electrical Conductivity RQO immediately applicable, i.e. before implementation of Nwamitwa Dam. Ensure that electrical conductivity (salt) levels are within Acceptable limits: 95th percentile of the data must be less than or equal to 55 mS/m, ***Electrical conductivity (salt) RQO applicable after implementation of Nwamitwa Dam.*** Ensure that electrical conductivity (salt) levels are within Ideal limits: 95th percentile of the data must be less than or equal to 30 mS/m (Industry Cat 3:

Component/ Indicator	Target EC*1	RQO
		driver).
		pH RQO is immediately applicable. Ensure that pH stays within Ideal limits: 5th and 95th percentiles of pH data must be between 6.5 and 8.0 (Aquatic ecosystems: driver).
		Toxics RQOs are immediately applicable. Ensure that toxics are within Ideal limits or A categories: 95th percentile of the data must be within the TWQR for toxics.
RESOURCE UNIT RU EWR 4 (Letaba River, B81J-00219; B81J-00209)		
Geomorphology	**C/D →D**	Maintain the geomorphological characteristics associated with the Ecological Categories.
Fish	**C**	Do not reduce current 26 species. Fish ecological category: C (≥ 62 %). Indicator of fast flowing habitats is the shortspinesuckermouth.
Invertebrates	**C→C/D**	Pre Nwamitwa: Community representative of Lowveld river in the middle with seasonal traits. Maintain the C/D (≥ 58 %) diversity and integrity. Post Nwamitwa: Under the C/D conditions it is expected that reduced high flows will reduce substrate quality. RQOs for the C/D (≥ 58 %) must be set post Nwamitwa Dam.
Riparian vegetation	**C**	Maintain C (≥ 62 %). Keep aliens in check (not more than 20- 20% cover of perennial aliens). Maintain viable populations of matumi, leadwood, apple leaf.
Water quality	**B/C**	***Water quality RQOs immediately applicable.*** • Ensure that nutrient levels are within Acceptable limits: 50th percentile of the data must be less than or equal to 0.025 mg/L PO_4-P (Aquatic ecosystems: driver). • Ensure that electrical conductivity (salt) levels are within Ideal limits: 95th percentile of the data must be less than or equal to 30 mS/m (Industry Cat 3: driver). • Ensure that pH stays within Acceptable limits: 5th and 95th percentiles of pH data must be between 6.5 and 8.4 (Industry Cat 3: driver). • Ensure that toxics are within Ideal limits or A categories: 95th percentile of the data must be within the TWQR for toxics.
		Phase 1: Select an instream monitoring point and develop a baseline of data for turbidity. ***Phase 2: Turbidity RQO becomes applicable once a database of information has been produced.*** Ensure that turbidity or clarity levels stay within Acceptable limits: A moderate change from present with temporary high sediment loads and turbidity during runoff events (Aquatic ecosystems: driver).
IUA 9 **RESOURCE UNIT RU EWR 5 (Klein Letaba River, B82G-00135; B82J-00165; B82J-00178; B82J-00201; B82J-00207)**		
Geomorphology	**C/D→D**	Maintain the geomorphological characteristics associated with the ecological categories.
Fish	**C**	Do not reduce current 22 species. Fish ecological category: C (≥ 62 %). Indicator of fast flowing habitats is the sawfinsuckermouth.
Invertebrates	**C/D→D**	Pre Klein Letaba development Community representative of Lowveld river assemblage with seasonal traits for a C/D : Under the C/D (≥ 58 %) conditions it is expected that reduced high flows will reduce substrate quality. RQOs for the C/D (≥ 58 %) must be set post Nwamitwa Dam.
Riparian vegetation	**C→C/D**	Keep aliens in check (not more than 20% (pre Klein Letaba development); not more than 30% (post Klein Letaba development) cover of perennial aliens). Agricultural activities should not encroach. Maintain viable populations of

Component/ Indicator	Target EC*1	RQO
		matumi, leadwood, apple leaf.
Water quality: B82G-00135, up to Giyani	B/C→C	***Ortho-phosphate RQO immediately applicable, i.e. before the implementation of water resource developments in the Klein Letaba River.*** Ensure that nutrient levels are within Acceptable limits: 50th percentile of the data must be less than or equal to 0.025 mg/L PO_4-P. ***Ortho-phosphate RQO applicable after the implementation of water resource developments in the Klein Letaba River.*** Ensure that nutrient levels are within Tolerable limits: 50th percentile of the data must be less than or equal to 0.075 mg/L PO_4-P (Aquatic ecosystems: driver).
		Phase 1: Select an instream monitoring point and develop a baseline of data for faecal coliforms and E. coli. ***Phase 2: Water quality RQOs become applicable once a database of information has been produced.*** Meet faecal coliform and *E. coli* targets for recreational (full contact) use: Meet the TWQR of 0-130 counts per 100 ml (DWAF, 1996a).
		Phase 1: Select an instream monitoring point and develop a baseline of data for turbidity. ***Phase 2: Turbidity RQO becomes applicable once a database of information has been produced.*** Ensure that turbidity or clarity levels stay within Acceptable limits: A moderate change from present with temporary high sediment loads and turbidity during runoff events. (Aquatic ecosystems: driver).
		Toxics RQOs immediately applicable. Ensure that toxics are within Ideal limits or A categories: 95th percentile of the data must be within the TWQR for toxics
Water quality: Downstream Giyani	C	***Ortho-phosphate RQO immediately applicable.*** Ensure that nutrient levels are within Tolerable limits: 50th percentile of the data must be less than or equal to 0.125 mg/L PO_4-P (Aquatic ecosystems: driver).
		Electrical conductivity (salt) RQO immediately applicable. Ensure that electrical conductivity (salt) levels are within Acceptable limits: 95th percentile of the data must be less than or equal to 55 mS/m (Aquatic ecosystems: driver).
		Phase 1: Select an instream monitoring point and develop a baseline of data for faecal coliforms and E. coli. ***Phase 2: Water quality RQOs become applicable once a database of information has been produced.*** Meet faecal coliform and *E. coli* targets for recreational (full contact) use: Meet the TWQR of 0-130 counts per 100 ml (DWAF, 1996a).
		Phase 1: Select an instream monitoring point and develop a baseline of data for turbidity. ***Phase 2: Turbidity RQO becomes applicable once a database of information has been produced.*** Ensure that turbidity or clarity levels stay within Acceptable limits: A moderate change from present with temporary high sediment loads and turbidity during runoff events. (Aquatic ecosystems: driver).
		Toxics RQOs immediately applicable. Ensure that toxics are within Ideal limits or A categories: 95th percentile of the data must be within the TWQR for toxics.
IUA 11 **RESOURCE UNIT RU EWR 7 (Letaba River, B83D-00255; B83A-00220; B83A-00230; B83A-00235 B83A-00252; B83D-00250; B83E-00265)**		

Component/ Indicator	Target EC*1	RQO
Geomorphology	**C→C/D**	Maintain the geomorphological characteristics associated with the Ecological Category
Fish	**C→C/D**	Do not reduce current 29 species. Maintain present FROC for a C (≥ 62 %) and, post Nwamitwa, the FROC for a C/D (≥ 58 %). Indicators of fast flowing habitats are the sawfinsuckermouth and largescale yellowfish.
Invertebrates	**C→C/D**	Community representative of a Lowveld River assemblage. Maintain rare SIC habitat and marginal vegetation. Set revised RQOs post Nwamitwa as the EC will change due sedimentation in pools and stagnation.
Riparian vegetation	**C**	Maintain C (≥ 62 %). No increase in alien vegetation. Maintain viable populations of matumi, leadwood, apple leaf, torch wood.
Water quality	**B**	***Water quality RQOs immediately applicable.*** Ensure that nutrient levels are within Acceptable limits: 50th percentile of the data must be less than or equal to 0.025 mg/L PO_4-P (Aquatic ecosystems: driver). Ensure that electrical conductivity (salt) levels are within Acceptable limits: 95th percentile of the data must be less than or equal to 55 mS/m (Aquatic ecosystems: driver). Ensure that toxics are within Ideal limits or A categories: 95th percentile of the data must be within the TWQR for toxics.
		Phase 1: Select an instream monitoring point and develop a baseline of data for turbidity. ***Phase 2: Turbidity RQO become applicable once a database of information has been produced.*** Ensure that turbidity or clarity levels stay within Ideal limits: A small change from natural state (Aquatic ecosystems: driver).

*1 Where two Ecological Categories are provided, the second category refers to expected change after the implementation of Nwamitwa Dam and when a water resource development is implemented in the Klein Letaba River.

*2 DWAF, 1996a: Department of Water Affairs and Forestry, South Africa. 1996a. South African Water Quality Guidelines. Volume 2, Recreational Use.

Table 4 provides the habitat and biota RQOs for priority wetlands in each IUA. The locality of the wetlands is linked to the river RU and biophysical nodes. The target Ecological Category is provided for the relevant wetlands in the Resource Unit. All target EC are set to maintain the PES and are therefore immediately applicable.

Table 4: Summary of key RQOs for BIOTA and HABITAT in WETLANDS in priority RUs in the Letaba Catchment

Biophysical node/RU	Target EC	Indicator	RQO
IUA 1: LETABA RIVER UPSTREAM OF TZANEEN DAM			
B81A-00270	**C**	Riparian vegetation	No increase in wetland fragmentation. No construction of furrows, canals, and excavations; no dredging. Maintain species composition and vegetative cover. No increase in the cover or abundance of woody invasive alien species. Forestry activities should not expand or intensify towards or into wetlands.
		Biota	No decline in populations of *Gunnera perpensa* (IUCN threat status of "Declining"). No decline in dark-footed forest shrews, Angoni vlei rats, vlei rats or water rats; herons, ducks, moorhens, greenshank or sandpiper;

Biophysical node/RU	Target EC	Indicator	RQO
			Natal ghost frog, green and brown water snakes. Periodic flooding of wetlands should support fish breeding/productivity.
IUA 2: LETSITELE AND THABINA RIVERS			
B81D-00277	**D**	Riparian vegetation	No increase in wetland fragmentation. No construction of furrows, canals, and excavations; no dredging. Maintain species composition and vegetative cover. Allow periodic flooding to maintain wetland EC. No increase in the cover or abundance of woody invasive alien species. Forestry activities should not expand or intensify towards or into wetlands.
		Biota	No decline in populations of *G. perpensa* (IUCN threat status of "Declining"). No decline in herons, ducks, moorhens; Natal ghost frog, green and brown water snakes. Periodic flooding of wetlands should support fish breeding/productivity.
IUA 3: LETABA RIVER DOWNSTREAM OF TZANEEN DAM TO THE PROPOSED NWAMITWA DAM			
B81C-00245	**D**	Riparian vegetation	No increase in wetland fragmentation. No construction of furrows, canals, and excavations; no dredging. Maintain species composition and vegetative cover. Allow periodic flooding to maintain wetland EC. No increase in the cover or abundance of woody invasive alien species. Forestry activities should not expand or intensify towards or into wetlands.
		Biota	No decline in populations of *G. perpensa* (IUCN threat status of "Declining"). No decline in herons, ducks, moorhens; Natal ghost frog, green and brown water snakes. Periodic flooding of wetlands should support fish breeding/productivity.
IUA 4: LETABA FROM PROPOSED NWAMITWA DAM TO KLEIN LETABA CONFLUENCE			
B81F-00231 (EWR 3)	**C/D**	Riparian vegetation	No increase in wetland fragmentation. No construction of furrows, canals, and excavations; no dredging. Maintain species composition and vegetative cover. Allow periodic flooding to maintain wetland EC. No increase in the cover or abundance of woody invasive alien species. Forestry activities should not expand or intensify towards or into wetlands.
		Biota	No decline in Angoni vlei rats or vlei rats; herons, ducks, moorhens, greenshank or sandpiper; Natal ghost frog, green and brown water snakes. Periodic flooding of wetlands should support fish breeding/productivity.
B81F-00200 (EWR 3)	**C**	Riparian vegetation	No increase in wetland fragmentation. No construction of furrows, canals, and excavations; no dredging. Maintain species composition and vegetative cover. Allow periodic flooding to maintain wetland EC. No increase in the cover or abundance of woody invasive alien species. Forestry activities should not expand or intensify towards or into wetlands.
		Biota	No decline in Angoni vlei rats or vlei rats; herons, ducks, moorhens, greenshank or sandpiper; Natal ghost frog, green and brown water

Biophysical node/RU	Target EC	Indicator	RQO
			snakes. Periodic flooding of wetlands should support fish breeding/productivity.
IUA 7: UPPER MIDDEL LETABA RIVER AND TRIBUTARIES UPSTREAM OF MIDDLE LETABA DAM			
B82B-00173	**D**	Riparian vegetation	No increase in wetland fragmentation. No construction of furrows, canals, and excavations; no dredging. No encroachment of agricultural activities into the wetland. Allow periodic flooding to maintain wetland EC.
		Biota	No decline in populations of *G. perpensa* (IUCN threat status of "Declining"). No decline in herons, ducks, moorhens; Natal ghost frog, green and brown water snakes. Periodic flooding of wetlands should support fish breeding/productivity.
B82C-00175	**D**	Riparian vegetation	No increase in wetland fragmentation. No construction of furrows, canals, and excavations; no dredging. No encroachment of agricultural activities into the wetland. Allow periodic flooding to maintain wetland EC.
		Biota	No decline in populations of *G. perpensa* (IUCN threat status of "Declining"). No decline in herons, ducks, moorhens; Natal ghost frog, green and brown water snakes. Periodic flooding of wetlands should support fish breeding/productivity.
IUA 9: KLEIN LETABA FROM THE MIDDLE LETABA DAM			
B82G-00135 (EWR 5)	**C/D**	Riparian vegetation	No encroachment of agricultural activities into the wetland. No construction of furrows, canals, and excavations; no dredging. Maintain species composition and vegetative cover.

Table 5 provides an indication of the narrative and numerical RQOs for groundwater expressed in terms of guidelines and limitations of groundwater abstractions. The groundwater assessment is undertaken on a quaternary catchment scale which has been grouped within the relevant IUAs.

Table 5: Summary of RQOs for GROUNDWATER in the Letaba Catchment

IUA 1: B81A; B81B	
Groundwater narrative RQO	
Abstraction	Significant ground water abstraction within 500m of a perennial channel should be restricted. All users to comply with existing allocation schedules and individual license conditions within the confirmed available yield.
Baseflow	Compliance to the low flow requirements for inflows to Tzaneen Dam.
Water Level	Water level in the aquifer must be higher than the water level in the surface water.
Water Quality	Shall not deteriorate from natural background.
Groundwater numerical RQO	
The total registered water use should remain below 7.52 Mm^3.	
IUA 2: B81D	
Groundwater narrative RQO	
Abstraction	Significant ground water abstraction within 500m of a perennial channel should be restricted. All users to comply with existing allocation schedules and individual licence conditions within the confirmed available yield.
Baseflow	Compliance to the low flow requirements at EWR 2. Impacts of baseflow reduction

	should be monitored at B1H010.
Water Level	Water level in the aquifer must be higher than the water level in the surface water.
Water Quality	Shall not deteriorate from natural background.
Groundwater numerical RQO	
The total registered water use should remain below 7.77 Mm^3.	
IUA 3: B81C	
Groundwater narrative RQO	
Abstraction	No further groundwater abstraction to take place. All users to comply with existing allocation schedules and individual license conditions within the confirmed available yield.
Baseflow	Compliance to the low flow requirements at EWR 3. Impacts of baseflow reduction should be monitored at B1H017.
Water Level	Water level in the aquifer must be higher than the water level in the surface water.
Water Quality	Shall not deteriorate from natural background.
IUA 3: B81E	
Groundwater narrative RQO	
Abstraction	No further groundwater abstraction to take place. All users to comply with existing allocation schedules and individual license conditions within the confirmed available yield.
Baseflow	Compliance to the low flow requirements at EWR 3. Impacts of baseflow reduction should be monitored at B1H017.
Water Level	No negative trend in water levels during annual during dry seasons. Water level monitoring network required near high abstraction zones.
Water Quality	Shall not deteriorate from natural background.
IUA 4 - 6: B81F	
Groundwater narrative RQO	
Abstraction	All users to comply with existing allocation schedules and individual license conditions within the confirmed available yield.
Water Level	No negative trend in water levels during annual during dry seasons. Water level monitoring network required near high abstraction zones.
Water Quality	Shall not deteriorate from present conditions. Monitoring of nitrates needs to be expanded.
Groundwater numerical RQO	
The total registered water use should remain below 14.40 Mm^3.	
IUA 4 - 6: B81J	
Groundwater narrative RQO	
Abstraction	All users to comply with existing allocation schedules and individual license conditions within the confirmed available yield.
Water Level	No negative trend in water levels during annual during dry seasons. Water level monitoring network required near high abstraction zones.
Water Quality	Shall not deteriorate from present conditions.
Groundwater numerical RQO	
The total registered water use should remain below 6.46 Mm^3/a.	
IUA 6: B81G	
Groundwater narrative RQO	

Abstraction	All users to comply with existing allocation schedules and individual licence conditions within the confirmed available yield.
Water Level	No negative trend in water levels during annual during dry seasons. Water level monitoring network required near high abstraction zones.
Water Quality	Shall not deteriorate from present conditions. Monitoring of nitrates needs to be expanded.
Groundwater numerical RQO	
The total registered water use should remain below 6.78 Mm^3.	
IUA 4 - 6: B81H	
Groundwater narrative RQO	
Abstraction	All users to comply with existing allocation schedules and individual license conditions within the confirmed available yield.
Water Level	No negative trend in water levels during annual during dry seasons.
Water Quality	Shall not deteriorate from present conditions. Monitoring of nitrates needs to be expanded.
Groundwater numerical RQO	
The total registered water use should remain below 7.97 Mm^3/a.	
IUA 7: B82A; B82D	
Groundwater narrative RQO	
Abstraction	Significant ground water abstraction within 500 m of a perennial channel should be restricted. All users to comply with existing allocation schedules and individual licence conditions within the confirmed available yield.
Baseflow	October inflows into the Middle Letaba Dam should be monitored.
Water Level	Water level in the aquifer must be higher than the water level in the surface water. No negative trend in water levels during annual during dry seasons.
Water Quality	Shall not deteriorate from present conditions.
Groundwater numerical RQO	
The total registered water use should remain below 17.47 Mm^3.	
IUA 7: B82B; B82C	
Groundwater narrative RQO	
Abstraction	All users to comply with existing allocation schedules and individual license conditions within the confirmed available yield. No further groundwater abstraction should be permitted as it will reduce the inflows into the Middle Letaba Dam.
Water Level	Water level in the aquifer must be higher than the water level in the surface water. No negative trend in water levels during annual during dry seasons.
Water Quality	Shall not deteriorate from present conditions.
IUA 8: B82E; B82F	
Groundwater narrative RQO	
Abstraction	All users to comply with existing allocation schedules and individual licence conditions within the confirmed available yield.
Water Level	No negative trend in water levels during annual during dry seasons.
Water Quality	Shall not deteriorate from present conditions. Monitoring of nitrates needs to be expanded.
Groundwater numerical RQO	
The total registered water use should remain below 18.46 Mm^3.	
IUA 9: B82G	

Groundwater narrative RQO	
Abstraction	All users to comply with existing allocation schedules and individual licence conditions within the confirmed available yield.
Water Level	No negative trend in water levels during annual during dry seasons.
Water Quality	Shall not deteriorate from present conditions. Monitoring of nitrates needs to be expanded.
Groundwater numerical RQO	
The total registered water use should remain below 11.02 Mm^3.	
IUA 9 - 10: B82H; B82J	
Groundwater narrative RQO	
Abstraction	All users to comply with existing allocation schedules and individual licence conditions within the confirmed available yield.
Water Level	No negative trend in water levels during annual during dry seasons.
Water Quality	Shall not deteriorate from present conditions. Monitoring of nitrates needs to be expanded.
Groundwater numerical RQO	
The total registered water use should remain below 14.89 Mm^3.	
IUA 12*: B83A; B83B; B83C; B83D; B83E	
Groundwater narrative RQO	
Abstraction	All users to comply with existing allocation schedules and individual licence conditions within the confirmed available yield.
Water Level	No negative trend in water levels during annual during dry seasons.
Water Quality	Shall not deteriorate from present conditions.
Groundwater numerical RQO	
The total registered water use should remain below 29.44 Mm^3.	

* It is acknowledged that IUA 12 falls in the KNP.

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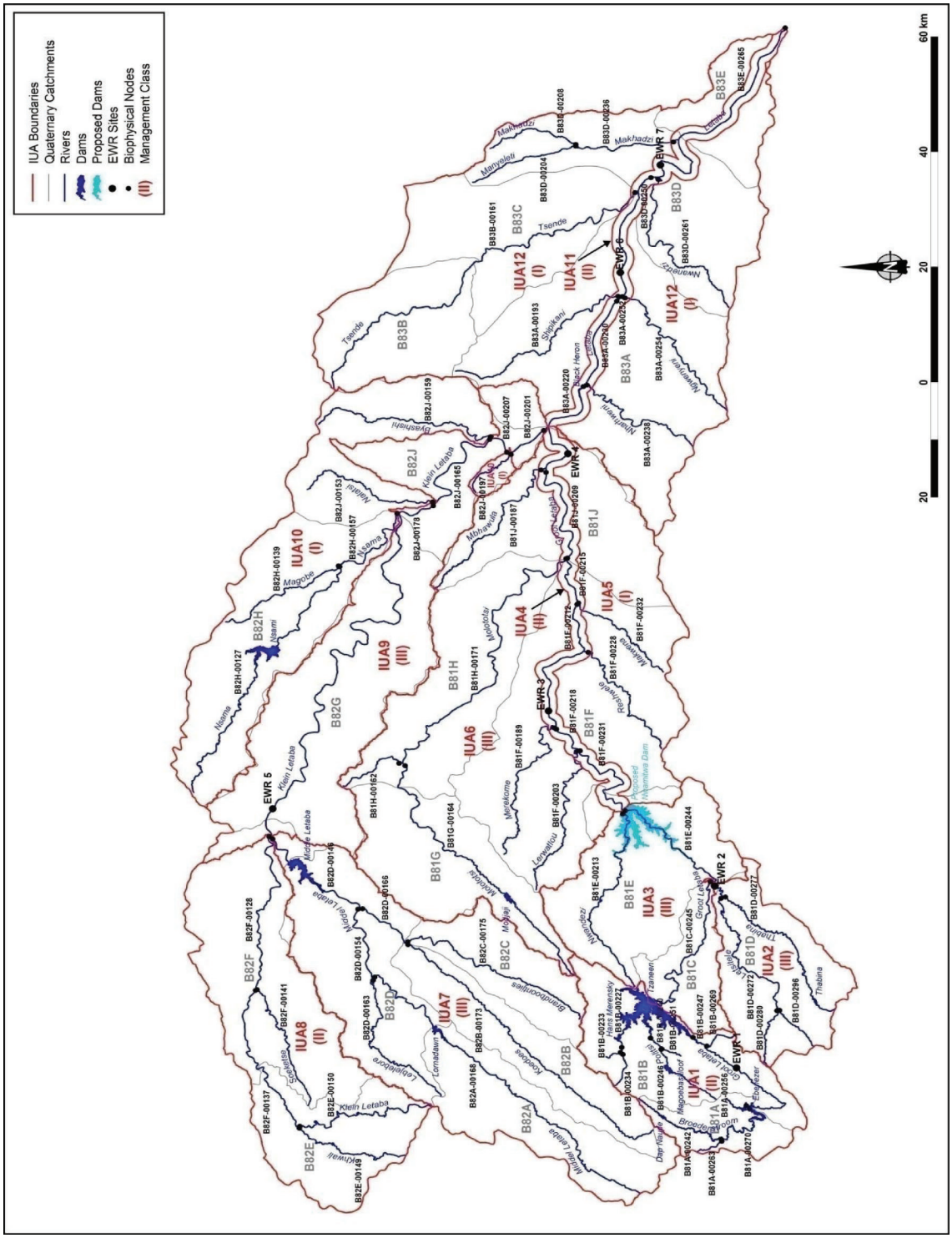

Figure 1: Integrated Units of Analysis of the Letaba Catchment

DEPARTMENT OF WATER AND SANITATION

NO. 55 **22 JANUARY 2016**

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

PROPOSED CLASSES OF WATER RESOURCES AND RESOURCE QUALITY OBJECTIVES FOR THE CATCHMENTS OF THE INKOMATI

I, Nomvula Paula Mokonyane, in my capacity as Minister of Water and Sanitation, and duly authorised in terms of section 13(4) of the National Water Act, 1998 (Act No.36 of 1998), hereby publish, for public comment, the proposed classes of water resources and the proposed resource quality objectives for the catchments of the Inkomati, in the Schedule.

Any person who wishes to submit written comments with regards to the proposed classes and resource quality objectives should submit the comments within 60 days from the date of publication of this Notice to:

Chief Director: Water Ecosystems
Attention: Ms Ndileka Mohapi
Department of Water and Sanitation
Ndinaye Building 5107
178 Francis Baard Street
Private Bag x 313
Pretoria
0001
E-mail: mohapin@dws.gov.za Facsimile: 012 336 8813

MRS NP MOKONYANE
MINISTER OF WATER AND SANITATION
DATE: 19 . 12 . 2015

SCHEDULE

DESCRIPTION OF WATER RESOURCE

The proposed classes and resource quality objectives are determined for all or part of every significant water resource within the catchments of the Inkomati as set out below:

Water Management Area: Inkomati-Usuthu
Drainage Region: X Primary Drainage Region
River(s): Komati (X1), Crocodile (X2), Sabie-Sand (X3), and X4 river systems

PROPOSED CLASSES OF WATER RESOURCES AS REQUIRED IN TERMS OF SECTION 13(4) (a)(i)(aa) OF THE NATIONAL WATER ACT, 1998

1. A summary of the water resource classes for Integrated Units of Analysis (Figure 1.1-1.4) and Ecological Categories (ECs) per biophysical node is set out in Table 1 to Table 4.

2. Integrated Units of Analysis (IUA) are classified in terms of their extent of permissible utilisation and protection as either Class I: indicating high environmental protection and minimal utilisation; or Class II indicating moderate protection and moderate utilisation; and Class III indicating sustainable minimal protection and high utilisation.

3. Table 1 to Table 4 provides the IUA, its Water Resource Classes and its respective catchment configuration. The catchment configuration consists of a number of biophysical nodes representing river reaches or resource units. The target EC for each unit in the IUA is provided.

PROPOSED RESOURCE QUALITY OBJECTIVES OF WATER RESOURCES AS REQUIRED IN TERMS OF SECTION 13(4)(a)(i)(bb) OF THE NATIONAL WATER ACT, 1998

1. Table 5 to Table 19 provides the Resource quality objectives for each Resource Unit (RU) which is represented by a biophysical node.

2. Resource quality objectives will apply from the date signed off as determined in terms of Section 13(1) of the National Water Act, 1998, unless otherwise specified by the Minister.

PROPOSED WATER RESOURCE CLASSES FOR THE CATCHMENTS OF THE INKOMATI

Table 1: Summary of Water Resource Classes and Ecological Categories in the Komati (X1) River System

IUAs	Class for IUAs	Biophysical node	River Name	Target EC
X1-1: Catchment upstream of Nooitgedacht Dam	II	X11A-01300		B
		X11A-01354		C
		X11A-01358	Vaalwaterspruit	C
		X11A-01295	Vaalwaterspruit	C
		X11A-01248	Vaalwaterspruit	C
		X11B-01370	Boesmanspruit	B
		X11B-01361		B/C
		X11B-01272	Boesmanspruit	B/C
X1-2: Komati River between Nooitgedacht and Vygeboom Dam	II	EWRK1	Komati	C
X1-3: All tributaries between Nooitgedacht and Vygeboom Dam excluding the main Komati River	II	X11C-01147	Witkloofspruit	C
		X11D-01129	Klein-Komati	C
		X11D-01137	Waarkraalloop	C
		X11E-01237	Swartspruit	B
		X11F-01133	Bankspruit	B
		X11G-01188	Ndubazi	B
		X11G-01143	Gemakstroom	C
X1-4: Gladdespruit catchment	III	EWRG1	Mngubhudle	D
		X11K-01165	Poponyane	C
		X11K-01199		D
X1-5: Komati River downstream of Vygeboom Dam to Swaziland	II	EWRK2	Komati	C
X1-6: All tributaries downstream of Vygeboom Dam in X1-6 excluding the Gladdespruit	I	EWRT1	Teespruit	C
		X12A-01305	Buffelspruit	B
		X12B-01246	Hlatjiwe	C
		X12C-01242	Phophenyane	B
		X12C-01271	Buffelspruit	B
		X12D-01235	Seekoeispruit	C
		X12H-01338	Sandspruit	B
		X12H-01340		B
		X12H-01318	Sandspruit	C
		X12J-01202	Mtsoli	B
		X12K-01333	Mlondozi	B/C
		X12K-01332	Mhlangampepa	B
X1-7: Lomati catchment upstream of Swaziland	II	X14A-01173	Lomati	B/C
		X14B-01166	Ugutugulo	C

IUAs	Class for IUAs	Biophysical node	River Name	Target EC
X1-8: Lomati catchment downstream of Driekoppies Dam	III	EWRL1	Lomati	C
		X14G-01128	Lomati	D/E
X1-9: Komati catchment downstream of Swaziland to the Lomati River confluence	III	X13J-01205	Mbiteni	D
		X13J-01141	Mzinti	D
		EWRK3A	Komati	D
X1-10: Komati catchment downstream of the Lomati River	III	X13K-01114	Komati	D
		X13K-01136	Mambane	D
		X13K-01068	Nkwakwa	C/D
		X13K-01038	Komati	E
		X13L-01000	Ngweti	D
		X13L-01027	Komati	E
		X13L-00995	Komati	D

Table 2: Summary of Water Resource Classes and Ecological Categories in the Crocodile (X2) River System

IUAs	Class for IUAs	Biophysical node	River Name	Target EC
X2-1: Crocodile sub-catchment upstream of Kwena Dam	II	X21B-00898	Lunsklip	C/D
		X21B-00929	Gemsbokspruit	C/D
		X21B-00925	Lunsklip	C
		EWRC1	Crocodile	A/B
		EWRC2	Crocodile	B
		X21C-00859	Alexanderspruit	C
X2-2: Crocodile River downstream of the Kwena Dam to the Elands River	II	EWRC3	Crocodile	B/C
		X21D-00957	Buffelskloofspruit	B/C
		X21E-00897	Buffelskloofspruit	B
X2-3: Elands catchment upstream of the Weltevredespruit (excluded)	I	X21F-01100	Leeuspruit	C
		X21F-01092	Leeuspruit	C/D
		X21F-01091	Rietvleispruit	C
		EWRE1	Elands	B
X2-4: Elands River downstream of X2-3 to the Ngodwana confluence, including the Weltevredenspruit, the Ngodwana River upstream of the Ngodwana Dam and the Lupelele River	I	X21G-01090	Weltevredespruit	C
		X21G-01016	Swartkoppiespruit	C
		X21H-01060	Ngodwana	B
		X21K-01007	Lupelule	B
X2-5: Elands River downstream of the Ngodwana River	I	EWRE2	Elands	B
X2-6: Crocodile River to the Nels River	II	X22B-00987	Crocodile	C
		X22B-00888	Crocodile	C

IUAs	Class for IUAs	Biophysical node	River Name	Target EC
confluence		X22C-00946	Crocodile	**C**
		X22J-00993	Crocodile	**C**
X2-7: Houtbos and Visspruit Rivers	**I**	X22A-00824	Blystaanspruit	**B**
		X22A-00887	Beestekraalspruit	**B/C**
		X22A-00875	Houtbosloop	**B**
		X22A-00919	Houtbosloop	**B/C**
		X22A-00920		**B**
		X22A-00917	Houtbosloop	**C**
		X22A-00913	Houtbosloop	**B**
		X22C-00990	Visspruit	**B/C**
X2-8: Nels, Wit, and Gladdespruit rivers	**II**	X22D-00843	Nels	**C**
		X22D-00846		**C**
		X22F-00842	Nels	**C**
		X22E-00849	Sand	**C**
		X22E-00833	Kruisfonteinspruit	**C**
		X22F-00886	Sand	**C**
		X22F-00977	Nels	**C/D**
		X22C-01004	Gladdespruit	**B/C**
		X22H-00836	Wit	**D**
X2-9: Crocodile River to the Kaap confluence including the Blinkwater tributary	**II**	X22K-01042	Mbuzulwane	**B**
		X22K-01043	Blinkwater	**B**
		X22K-01029	Blinkwater	**C**
		EWRC4	Crocodile	**C**
X2-10: Kaap Catchment	**II**	X23B-01052	Noordkaap	**C**
		X23C-01098	Suidkaap	**B/C**
		EWRK7	Kaap	**C**
		X23E-01154	Queens	**B/C**
		X23F-01120	Suidkaap	**C**
X2-11: Crocodile River from the Kaap confluence to the Komati River.	**II**	EWRC5	Crocodile	**C**
		EWRC6	Crocodile	**C**
X2-12: Nsikazi River	**II**	X24A-00826	Nsikazi	**C**
		X24A-00860	Sithungwane	**A**
		X24A-00881	Nsikazi	**B**
		X24B-00903	Gutshwa	**D**
		X24B-00928	Nsikazi	**A/B**
		X24C-00969	Mnyeleni	**A**
		X24C-00978	Nsikazi	**B**
X2-13: Northern tributaries of the Crocodile	**I**	X24E-00973	Matjulu	**B**
		X24E-00922	Mlambeni	**A/B**

IUAs	Class for IUAs	Biophysical node	River Name	Target EC
River located in the KNP		X24G-00902	Mitomeni	**A**
		X24G-00876	Komapiti	**A**
		X24G-00844	Mbyamiti	**A**
		X24G-00823	Muhlambamadubo	**A**
		X24G-00820	Mbyamiti	**A**
		X24G-00904	Mbyamiti	**A**
		X24H-00882	Vurhami	**A**
		X24H-00892	Mbyamiti	**A**

Table 3: Summary of Water Resource Classes and Ecological Categories in the Sabie-Sand (X3) River System

IUAs	Class for IUAs	Biophysical node	River Name	Target EC
X3-1: Sabie catchment upstream of the Klein Sabie included confluence	**I**	X31A-00741	Klein Sabie	**B/C**
		X31A-00783		**C**
		X31A-00786		**B**
		X31A-00794		**B**
		X31A-00796		**B**
		X31A-00803		**B/C**
X3-2: Sabie River downstream of X3-1 to the Marite confluence including the Goudstroom, MacMac, Motitsi and Marite upstream of Inyaka Dam.	**I**	EWR S1	Sabie	**B**
		X31B-00792	Goudstroom	**B/C**
		EWR S4	Mac-Mac	**B**
		EWR S2	Sabie	**B**
		X31E-00647a	Marite (US of dam)	**B**
		X31F-00695	Motitsi	**B**
X3-3: Marite and Sabie River downstream of Inyaka Dam to the Sand confluence.	**I**	EWR S5	Marite	**B/C**
		EWR S3	Sabie	**A/B**
X3-4: Sabaan, Noord-Sand, Bejani, Saringwa, Musutlu rivers.	**III**	X31H-00819	White Waters	**C**
		X31J-00774	Noord-Sand	**D**
		X31D-00773	Sabani	**C/D**
		X31J-00835	Noord-Sand	**D**
		X31K-00713	Bejani	**D**
		X31L-00657	Matsavana	**C**
		X31M-00673	Musutlu	**B/C**
		X31L-00664	Saringwa	**C**
		X31L-00678	Saringwa	**B/C**
X3-5: Sabie River downstream of the Sand confluence to the RSA border.	**I**	X33A-00731	Sabie	**A/B**
		X33A-00737	Sabie	**A/B**
		X33B-00784	Sabie	**A/B**
		X33B-00804	Sabie	**A/B**

IUAs	Class for IUAs	Biophysical node	River Name	Target EC
		X33B-00829	Sabie	**A/B**
		X33D-00811	Sabie	**A/B**
		X33D-00861	Sabie	**A/B**
X3-6: Southern and northern tributaries of the Sabie in the KNP downstream of the Sand confluence including the Phabeni.	**I**	X31K-00771	Phabeni	**B**
		X31M-00763	Nwaswitshaka	**A**
		X33A-00661	Nwatindlopfu	**A**
		X33A-00806	Nwatimhiri	**A**
		X33B-00694	Salitje	**A**
		X33B-00834	Lubyelubye	**A**
		X33C-00701	Mnondozi	**A**
		X33D-00864	Mosehla	**A**
		X33D-00894	Nhlowa	**A**
		X33D-00908	Shimangwana	**A**
		X33D-00911	Nhlowa	**A**
X3-7: Mutlumuvi catchment.	**II**	X32E-00629	Nwarhele	**C**
		X32E-00639	Ndlobesuthu	**D/E**
		EWR S6	Mutlumuvi	**C**
		X32F-00628	Nwarhele	**C/D**
X3-8: Sand catchment to the Khokhovela included confluence	**II**	EWR S7	Tlulandziteka	**C**
		X32B-00551	Motlamogatsana	**C**
		X32C-00558	Nwandlamuhari	**C**
		X32C-00564	Mphyanyana	**C**
		X32C-00606	Nwandlamuhari	**C**
		X32G-00549	Khokhovela	**C**
X3-9: Sand catchment downstream of the Khokovela confluence.	**I**	X32H-00560	Phungwe	**A**
		EWR S8	Sand	**B**
		X32J-00651	Mutlumuvi	**A**

Table 4: Summary of Water Resource Classes and Ecological Categories in the X4 River Systems

IUAs	Class for IUAs	Biophysical node	River Name	Target EC
IUA X4: Nwanedzi and Mwaswitsontso rivers	I	X40A-00437	Shinkelengane	**A**
		X40A-00454	Mmondzo	**A**
		X40A-00479	Nwanedzi	**A**
		X40A-00492	Rihlazeni	**A**
		X40A-00433	Mtomeni	**A**
		X40A-00420	Gudzani	**A**
		X40A-00426	Mavumbye	**A**
		X40A-00475	Mavumbye	**A/B**
		X40A-00459	Nwanedzi	**A**
		X40A-00486	Nwanedzi	**A/B**
		X40A-00469	Nwanedzi	**B**
		X40B-00534	Nungwini	**A**
		X40B-00537	Gwini	**A**
		X40B-00532	Mrunzuluku	**A**
		X40B-00497	Sweni	**A**
		X40B-00531	Mrunzuluku	**A**
		X40B-00530	Mrunzuluku	**A**
		X40B-00511	Sweni	**A**
		X40C-00592	Ripape	**A**
		X40C-00513	Nwaswitsontso	**B**
		X40D-00663	Shilolweni	**A**
		X40D-00594	Metsimetsi	**A**
		X40D-00598	Nwaswitsontso	**A/B**
		X40D-00660	Nwaswitsontso	**A**

RESOURCE QUALITY OBJECTIVES

Resource Quality Objectives for each Resource Unit (RU) are presented in Tables below. All RQOs are applicable from the date signed off, unless otherwise stated.

Table 5-7 provides an indication of the hydrological RQOs for Rivers expressed in terms of flow at the Ecological Water Requirement (EWR) sites. These summarised statistics are representative of the required flow regime in the river where the variability is dependent on the seasonal and temporal pattern of natural flow conditions. The mean monthly flows represent low flow requirements of a representative wet (February) and dry (October) month.

Table 5: RIVERS: **Summary of key hydrological RQOs of the KOMATI RIVER System (X1)**

RU	Biophysical node	River	Target EC	nMAR[1] (MCM)	Low flows (%nMAR)[2]	Total flows (%nMAR)	October (m^3/s) Mean of monthly flows at the indicated frequency[3].		Feb (m^3/s)	
							90%	60/70%	90%	60/70%
IUA X1-2										
MRU Komati B	X11G-01142 EWR K1	Komati	C	158.6	16.1	27.5	0.254	0.374	0.618	0.779
IUA X1-4										
MRU Komati G	X11J-01106 EWR G1	Mngubhudle	D	29.5	19.9	26.9	0.041	0.063	0.122	0.205
IUA X1-5										
MRU Komati C	X12H-01258 EWR K2	Komati	C	545.6	9.3	18.3	0.599	0.82	1.156	1.649
IUA X1-6										
MRU Komati T	X12E-01287 EWR T1	Teespruit	C	56.4	22.6	35.3	0.206	0.272	0.294	0.349
IUA X1-8										
MRU Komati M	X14H-01066 EWR L1	Lomati	C	294.3	11.7	17.3	0.502	0.664	0.989	1.168
IUA X1-9										
MRU Komati D	X13J-01130 EWR K3A	Komati	D	1021.7	9.9	17.2	0.672	1.547	1.552	2.802
IUA X1-10										
MRU Komati E	X13K-01114	Komati	D	1341.4	12.9	18.1	3.75	3.942	5.529	6.121
	X13L-00995	Komati	D	1356.6	7.2	11.1	0.485	0.5	0.481	2.956

1 nMAR is the natural Mean Annual Runoff in million cubic meters per annum.
2 %nMAR is flow required at the nodes expressed as a percentage of the natural Mean Annual Runoff, Low flows and Total flows.
3 Percentage points on the monthly low flow frequency distribution continuum at the nodes, expressed as the percentage of the months (90% and 60% for biophysical nodes and 90% and 70% for EWR sites) that the flow should equal or exceed the indicated minimum values.

Table 6: RIVERS: **Summary of key hydrological RQOs of the CROCODILE RIVER System (X2)**

RU	Biophysical node	River	Target EC	Nmar[1] (MCM)	Low flows (%nMAR)[2]	Total flows (%nMAR)[3]	October (m^3/s) Mean of monthly flows at the indicated frequency[4]		Feb (m^3/s) Mean of monthly flows at the indicated frequency[4]	
							90%	60/70%	90%	60/70%
IUA X2-1										
MRU Croc A	X21A-00930 EWR C1	Crocodile	A/B	15.6	24.36	30.13	0.033	0.059	0.121	0.205
	X21B-00962 EWR C2	Crocodile	B	76.1	30.88	35.48	0.246	0.373	0.673	1.162
IUA X2-2										
MRU Croc B	X21E-00943 (EWR C3)	Crocodile	B/C	194	15.86	47.09	0.456	0.808	0.676	1.083
IUA X2-3										
MRU Elan A	X21G-01037 ER 1	Elands	B	60.00	10.39	47.12	0.100	0.177	0.293	0.613
IUA X2-5										
MRU Elan B	X21K-01035 ER 2	Elands	B	217.19	4.97	43.07	0.369	0.502	1.429	2.090
IUA X2-9										
MRU Croc D	X22K-01018 EWR C4	Crocodile	C	824.8	9.07	31.93	0.772	1.426	2.44	4.137
IUA X2-10										
MRU Kaap A	X23G-01057 EWR C7	Kaap	C	179.5	6.18	19.23	0.069	0.144	0.349	0.559
IUA X2-11										
MRU Croc E	X24H-00934 EWR C6	Crocodile	C	1165.6	9.65	19.55	0.76	0.898	3.083	4.276
	X24D-00994 EWR C5	Crocodile	C	1117.4	10.93	23.96	1.616	2.047	2.7	4.408

1 nMAR is the natural Mean Annual Runoff in million cubic meters per annum.
2 %nMAR is flow required at the nodes expressed as a percentage of the natural Mean Annual Runoff, Low flows and Total flows.
3 The monthly flow requirements for EWR 3 and 6 represent the total flow defined by the current operating rule where the revised Present Ecological State low flows and releases for water users defines the minimum requirements for the respective EWR sites.
4 Percentage points on the monthly low flow frequency distribution continuum at the nodes, expressed as the percentage of the months (90% and 60% for biophysical nodes and 90% and 70% for EWR sites) that the flow should equal or exceed the indicated minimum values.

Table 7: RIVERS: Summary of key hydrological RQOs of the SABIE AND SAND RIVER System (X3)

RU	Biophysical node	River	Target EC	nMAR[1] (MCM)	Low flows (%nMAR)[2]	Total flows (%nMAR)[3]	October (m^3/s) Mean of monthly flows at the indicated frequency[4]		Feb (m^3/s) Mean of monthly flows at the indicated frequency[4]	
							90%	60/70%	90%	60/70%
IUA X3-2										
MRU Sabie A	X31B-00757 EWR S1	Sabie	B	132	12.88	54	40.91	0.189	0.320	0.393
	X31D-00755 EWR S2	Sabie	B	261.7	11.14	63.35	24.21	0.360	0.535	0.638
MRU Mac A	X31C-00683 EWR S4	Mac-Mac	B	65.8	14.35	45.07	0.16	0.047	0.459	1.133
IUA X3-3										
Mar A	X31G-00728	Marite	B/C	156.4	28.32	63.94	0.68	0.88	0.75	1

RU	Biophysical node	River	Target EC	nMAR[1] (MCM)	Low flows (%nMAR)[2]	Total flows (%nMAR)[3]	October (m^3/s) Mean of monthly flows at the indicated frequency[4]		Feb (m^3/s)	
							90%	60/70%	90%	60/70%
	EWR S5									
MRU Sabie B	X31K-00715 EWR S3	Sabie	A/B	493.7	9.71	37.94	0.581	0.955	1.489	2.848
IUA X3-7										
MRU Mut A	X32F-00597 EWR S6	Mutlumuvi	C	45.0	22.21	28.46	0.0016	0.042	0.111	0.193
IUA X3-8										
MRU Sand A	X32A-00583 EWR S7	Tlulandziteka	B	28.9	11.14	39.66	0.025	0.047	0.086	0.138
IUA X3-9										
MRU Sand B	X32J-00602 EWR S8	Sand	B	133.6	3.36	24.71	0.028	0.088	0.235	0.605

1 nMAR is the natural Mean Annual Runoff in million cubic meters per annum.
2 %nMAR is flow required at the nodes expressed as a percentage of the natural Mean Annual Runoff, Low flows and Total flows.
3 The monthly flow requirements for EWR 5 represents the total flow defined by current operating rule where the Present Ecological State low flows and releases for water users defines the minimum requirements for the respective EWR site.
4 Percentage points on the monthly low flow frequency distribution continuum at the nodes, expressed as the percentage of the months (90% and 60% for biophysical nodes and 90% and 70% for EWR sites) that the flow should equal or exceed the indicated minimum values.

Table 8 to Table 10 provides the habitat, biota and water quality RQOs for priority RUs in the respective river systems. RQOs and the target ECs are provided for each component and/or indicator.

Table 8: RIVERS: RQOs for water quality, geomorphology, riparian vegetation, macro-invertebrates and fish in priority RUs of the KOMATI RIVER System (X1)

Component/ Indicator	Target EC	RQOs
IUA X1-2; MRU KOMATI B (EWR K1) (Komati River)		
Geomorphology	**C**	Maintain the current EC of C (>62%) and geomorphological structure.
Fish	**C**	Maintain target EC of C(>62%) and fish species richness of 11 species. Suitable habitats should be adequate for especially the primary indicator fish species, namely the small rheophilic (*Amphilius uranoscopus* (AURA)) and the large semi-rheophilic (*Labeobarbus marequensis* (BMAR)).
Invertebrates	**B/C**	Community is representative of a medium-sized foothill stream assemblage. Maintain the EC(>78%), good stones in current (SIC) and marginal vegetation, two high flow velocity species.
Riparian vegetation	**C**	Maintain current EC of C (>62%). Maintain vegetation cover (woody and non-woody) between 70 - 90%. Perennial invasive alien species kept in check. No increase of riparian zone fragmentation. Maintain riparian taxon richness.
Water quality	**B**	Ensure that nutrient levels are within Acceptable limits: 50th percentile of the data must be less than 0.02 mg/L PO_4-P (aquatic ecosystems: driver).
		Ensure that electrical conductivity (salt) levels are within Ideal limits: 95th percentile of the data must be less than or equal to 42 mS/m (aquatic ecosystems: driver).
		Ensure that toxics are within Ideal limits or A categories or TWQR: 95th percentile of the data must be within the TWQR[1] for toxics or the upper limit of the A category in DWAF (2008).
IUA X1-4; MRU KOMATI G (EWR G1) (Gladdespruit River)		
Geomorphology	**D**	Maintain the current EC of D (>42%) and geomorphological structure.
Fish	**D**	Maintain target EC of D (>42%) and fish species richness of 11 species. Suitable habitats should be adequate for especially the primary indicator fish species, namely the small rheophilic (AURA) and (*Chiloglanis pretoriae* (CPRE)).
Invertebrates	**D**	Community is representative of a small mountain stream assemblage. Maintain

Component/ Indicator	Target EC	RQOs
		the EC of D (>42%), good SIC and marginal vegetation, two moderate flow velocity species.
Riparian vegetation	**D**	Maintain target EC of D (>42%). Maintain vegetation cover (woody and non-woody) above 50%. Perennial invasive alien species kept in check. No increase of riparian zone fragmentation. Maintain riparian taxon richness.
Water quality	**C**	Ensure that turbidity/clarity or TSS levels stay within Acceptable limits: A small change from present with minor silting of habitats and turbidity loads; or <10% change from background TSS levels (aquatic ecosystems: driver).
		Ensure that nutrient levels are within Acceptable limits: 50th percentile of the data must be less than 0.02 mg/L PO_4-P (aquatic ecosystems: driver).
		Ensure that toxics are within Ideal limits or A categories or TWQR: 95th percentile of the data must be within the TWQR for toxics or the upper limit of the A category in DWAF (2008).
		Ensure that As levels are within Ideal limits or A categories: 95th percentile of the data must be less than 0.020 mg/L As (aquatic ecosystems: driver).
		Ensure that (free) Cn levels are within Ideal limits or A categories: 95th percentile of the data must be less than 0.004 mg/L Cn (aquatic ecosystems: driver).
IUA X1-5; MRU KOMATI C (EWR K2) (Komati River)		
Geomorphology	**C**	Maintain the current EC of C (>62%) and geomorphological structure.
Fish	**C**	Maintain target EC of C (>62%) and fish species richness of 19 species. Suitable habitats should be adequate for especially the primary indicator fish species, namely the small rheophilic (AURA) and the large semi-rheophilic (BMAR).
Invertebrates	**C**	Community is representative of a medium mountain stream assemblage. Maintain the EC of C (>62%), good SIC and marginal vegetation, two high flow velocity species.
Riparian vegetation	**C**	Maintain current EC of C (>62%). Maintain vegetation cover (woody and non-woody) between 50 - 80%. Perennial invasive alien species kept in check. No increase of riparian zone fragmentation. Maintain riparian taxon richness.
Water quality	**B/C**	Ensure that nutrient levels are within Acceptable limits: 50th percentile of the data must be less than 0.02 mg/L PO_4-P (aquatic ecosystems: driver).
		Ensure that electrical conductivity (salt) levels are within Ideal limits: 95th percentile of the data must be less than or equal to 42 mS/m (aquatic ecosystems: driver).
		Ensure that turbidity/clarity or TSS levels stay within Acceptable limits: A small change from present with minor silting of habitats and turbidity loads; or <10% change from background TSS levels (aquatic ecosystems: driver).
		Meet faecal coliform and *E.coli* targets for recreational (full contact) use: Meet the TWQR of 0-130 counts per 100 ml (DWAF, 1996b).
IUA X1-5; MRU KOMATI T (EWR T1) (Teewaterspruit River)		
Geomorphology	**C**	Maintain the current EC of C (>62%) and geomorphological structure.
Fish	**C**	Maintain target EC of C (>62%) and fish species richness of 19 species. Suitable habitats should be adequate for especially the primary indicator fish species, namely the small rheophilic (AURA) and the large semi-rheophilic (BMAR).
Invertebrates	**C**	Community is representative of a medium mountain stream assemblage. Maintain the EC of C (>62%), good SIC and marginal vegetation, two high flow velocity species.
Riparian vegetation	**C**	Maintain current EC of C (>62%). Maintain vegetation cover (woody and non-woody) above 30%. Perennial invasive alien species kept in check (less than 20%). No increase of riparian zone fragmentation. Maintain riparian taxon richness.
Water quality	**C**	Ensure that nutrient levels are within Tolerable limits: 50th percentile of the data must be less than 0.125 mg/L PO_4-P (aquatic ecosystems: driver).
		Ensure that turbidity/clarity or TSS levels stay within Acceptable limits: A small change from present with minor silting of habitats and turbidity loads; or <10% change from background TSS levels (aquatic ecosystems: driver).
		Meet faecal coliform and *E.coli* targets for recreational (full contact) use: Meet the TWQR of 0-130 counts per 100 ml (DWAF, 1996b).

Component/ Indicator	Target EC	RQOs
IUA X1-8; MRU KOMATI M (EWR L1) (Lomati River)		
Geomorphology	**D**	Maintain the current EC of D (>42%) and geomorphological structure.
Fish	**C**	Maintain target EC of C (>62%) and high fish species richness of 36 species. Suitable habitats should be adequate for especially the primary indicator fish species, namely the small rheophilic (*Chiloglanis anoterus* CANO)) and the large semi-rheophilic (BMAR).
Invertebrates	**C**	Community is representative of a medium-sized Lowveld river assemblage. Maintain the EC of C (>62%), good SIC, sand and gravel habitat, and marginal vegetation, one high flow velocity species.
Riparian vegetation	**B/C**	Maintain current EC of B/C (>78%). Maintain vegetation cover (woody and non-woody) between 50 - 80%. Perennial invasive alien species kept in check (less than 10%). No increase of riparian zone fragmentation. Maintain riparian taxon richness.
Water quality:	**B/C**	Ensure that turbidity/clarity or TSS levels stay within Acceptable limits: A small change from present with minor silting of habitats and turbidity loads; or <10% change from background TSS levels (aquatic ecosystems: driver).
		Ensure that electrical conductivity (salt) levels are within Acceptable limits: 95th percentile of the data must be less than or equal to 55 mS/m (aquatic ecosystems: driver).
		Ensure that nutrient levels (phosphate) are within Tolerable limits: 50th percentile of the data must be less than 0.075 mg/L PO_4-P (aquatic ecosystems: driver).
		Ensure that nutrient levels (TIN) are within Acceptable limits: 50th percentile of the data must be less than 1.0 mg/L TIN (aquatic ecosystems: driver).
		Meet faecal coliform and *E.coli* targets for recreational (full contact) use: Meet the TWQR of 0-130 counts per 100 ml (DWAF, 1996b).
		Ensure that toxics are within Ideal limits or A categories or TWQR: 95th percentile of the data must be within the TWQR for toxics or the upper limit of the A category in DWAF (2008).
IUA X1-9; MRU KOMATI D (EWR K3) (Komati River)		
Geomorphology	**D/E**	Maintain the current EC of D/E (>38%) and geomorphological structure.
Fish	**C/D**	Maintain target EC of C/D (>58%) and high fish species richness of 35 species. Suitable habitats should be adequate for especially the primary indicator fish species, namely the small rheophilic orangefin barb (*Barbus eutaenia* BEUT)) and the large semi-rheophilic (BMAR).
Invertebrates	**D**	Community is representative of a larger-sized Lowveld river assemblage. Maintain the EC of D (>42%); good SIC sand and gravel habitat, and marginal vegetation, one high flow velocity species.
Riparian vegetation	**D**	Maintain a D EC (>42%). Maintain vegetation cover (woody and non-woody) between 50 - 75%. Perennial invasive alien species kept in check (less than 15%). No increase of riparian zone fragmentation. Maintain riparian taxon richness.
Water quality	**D**	Ensure that electrical conductivity (salt) levels are within Tolerable limits: 95th percentile of the data must be less than or equal to 85 mS/m (aquatic ecosystems: driver).
		Ensure that nutrient levels (phosphate) are within Tolerable limits: 50th percentile of the data must be less than 0.125 mg/L PO_4-P (aquatic ecosystems: driver).
		Ensure that nutrient levels (TIN) are within Acceptable limits: 50th percentile of the data must be less than 1.0 mg/L TIN (aquatic ecosystems: driver).
		Ensure that periphyton levels are within Acceptable limits: 50th percentile of the data must be less than 21 mg/m^2 (aquatic ecosystems: driver).
		Meet faecal coliform and *E.coli* targets for recreational (full contact) use: Meet the TWQR of 0-130 counts per 100 ml (DWAF, 1996b).
		Ensure that toxics are within Ideal limits or A categories or TWQR: 95th percentile of the data must be within the TWQR for toxics or the upper limit of the A category in DWAF (2008).

1 TWQR = Target Water Quality Range (DWAF, 1996a).
DWAF (1996a): South African Water Quality Guidelines: Volume 7: Aquatic Ecosystems.

DWAF (1996b): South African water quality guidelines. Volume 2: Recreational Use.

Table 9: RIVERS: RQOs for water quality, geomorphology, riparian vegetation, macro-invertebrates and fish in priority RUs of the CROCODILE RIVER System (X2)

Component/ Indicator	Target EC	RQOs
IUA X2-1; MRU CROC A (EWR C1) (Crocodile River)		
Geomorphology	**B**	Maintain the bed material size distribution within the active channel in order to maintain the available physical habitats. Maintain the reach as an alluvial meandering channel type. Maintain the target EC (>82%).
Fish	**A**	Maintain target EC of A (>92%) and low fish species richness of one species. Suitable vegetated habitats should be available for small semi-rheophilic (BANO).
Invertebrates	**B**	Community is representative of a small mountain stream assemblage. Maintain the B EC (>82%), good SIC and marginal vegetation, five high flow velocity species.
Riparian vegetation	**A**	Maintain current EC (>92%). Maintain woody vegetation cover below 10%. Maintain non-woody cover between 80% and 100%. Maintain reed cover below 5%.Perennial invasive alien species kept in check (less than 1%). No increase of riparian zone fragmentation. Maintain riparian taxon richness.
Water quality	**A**	Ensure that nutrient levels are within Acceptable limits: 50th percentile of the data must be less than 0.015 mg/L PO_4-P (aquatic ecosystems: driver).
		Ensure that electrical conductivity (salt) levels are within Ideal limits: 95th percentile of the data must be less than or equal to 30 mS/m (aquatic ecosystems: driver).
		Meet faecal coliform and *E.coli* targets for recreational (intermediate) use: Meet the TWQR[1] of 0-1000 counts per 100 ml (DWAF, 1996b).
IUA X2-1; MRU CROC A (EWR C2) (Crocodile River)		
Geomorphology	**B**	Maintain the bed material size distribution within the active channel in order to maintain the available physical habitats. Maintain the reach as an alluvial meandering channel type. Maintain the target EC of B (>82%).
Fish	**B**	Maintain target EC of B (>82%) and fish species richness of 11 species. Suitable habitats should be adequate for especially the primary indicator fish species, namely the small rheophilic (AURA) and (CPRE).
Invertebrates	**B**	Community is representative of a small mountain stream assemblage. Maintain the B EC (>82%), good SIC and marginal vegetation, five high flow velocity species.
Riparian vegetation	**A/B**	Maintain current EC (>92%). Maintain woody vegetation cover below 5%. Maintain non-woody cover between 80% and 100%. Maintain reed cover below 5%. Perennial invasive alien species kept in check (less than 5%). No increase of riparian zone fragmentation. Maintain riparian taxon richness.
Water quality	**C**	Ensure that nutrient levels are within Acceptable limits: 50th percentile of the data must be less than 0.015 mg/L PO_4-P (aquatic ecosystems: driver).
		Ensure that electrical conductivity (salt) levels are within Ideal limits: 95th percentile of the data must be less than or equal to 30 mS/m (aquatic ecosystems: driver).
		Meet faecal coliform and *E.coli* targets for recreational (intermediate) use: Meet the TWQR of 0-1000 counts per 100 ml (DWAF, 1996b).
IUA X2-2; MRU CROC B (EWR C3) (Crocodile River)		
Geomorphology	**C**	Maintain the bed material size distribution within the active channel in order to maintain the available physical habitats. Maintain the reach as an alluvial meandering channel type. Maintain the target EC of C (>62%).
Fish	**B**	Maintain target EC of B (>82%) and fish species richness of six species. Suitable habitats should be adequate for especially the primary indicator fish species, namely the small rheophilic (AURA) and (CPRE).
Invertebrates	**C**	Community is representative of a medium-sized foothill stream assemblage. Maintain the EC of C (>62%), good SIC and marginal vegetation,five high flow velocity species.

Component/ Indicator	Target EC	RQOs
Riparian vegetation	**C**	Maintain current EC of C (>62%). Maintain woody vegetation cover between 20 - 70%. Maintain non-woody cover between 30% and 90%.Maintain reed cover below 10%. Perennial invasive alien species kept in check (less than 15%). No increase of riparian zone fragmentation. Maintain riparian taxon richness.
Water quality	**C**	Ensure that nutrient levels are within Acceptable limits: 50th percentile of the data must be less than 0.025 mg/L PO_4-P (aquatic ecosystems: driver).
		Ensure that electrical conductivity (salt) levels are within Ideal limits: 95th percentile of the data must be less than or equal to 30 mS/m (aquatic ecosystems: driver).
		Ensure that toxics are within Ideal limits or A categories or TWQR: 95th percentile of the data must be within the TWQR for toxics or the upper limit of the A category in DWAF (2008).
IUA X2-9; MRU CROC D (EWR C4) (Crocodile River)		
Geomorphology	**B/C**	Maintain the bed material size distribution within the active channel in order to maintain the available physical habitats. Maintain the channel/reach type. Maintain the target EC of B/C (>78%).
Fish	**B**	Maintain target EC of B (>82%) and fish species richness of 20 species. Suitable habitats should be adequate for especially the primary indicator fish species, namely the small rheophilic (CPRE) and the large semi-rheophilic (BMAR).
Invertebrates	**C**	Community is representative of a larger-sized Lowveld riverassemblage. Maintain the EC of C (>62%), good SIC, sand and gravel habitat, and marginal vegetation, one high flow velocity species.
Riparian vegetation	**C**	Maintain current C EC (>62%). Maintain woody vegetation cover between 20 - 70%. Maintain non-woody cover above 30%. Maintain reed cover between 10 - 20%.Perennial invasive alien species kept in check (less than 20%). No increase of riparian zone fragmentation. Maintain riparian taxon richness.
Water quality	**C**	Ensure that nutrient levels are within Tolerable limits: 50th percentile of the data must be less than 0.125 mg/L PO_4-P (aquatic ecosystems: driver).
		Ensure that electrical conductivity (salt) levels are within Acceptable limits: 95th percentile of the data must be less than or equal to 55 mS/m (aquatic ecosystems: driver).
		Meet faecal coliform and *E.coli* targets for recreational (full contact) use: Meet the TWQR of 0-130 counts per 100 ml (DWAF, 1996b).
		Ensure that toxics are within Ideal limits or A categories or TWQR: 95th percentile of the data must be within the TWQR for toxics or the upper limit of the A category in DWAF (2008).
IUA X2-11; MRU CROC E (EWR C5) (Crocodile River)		
Geomorphology	**C/D**	Maintain the bed material size distribution within the active channel in order to maintain the available physical habitats. Maintain the channel/reach type. Maintain the target C/D EC (>58%).
Fish	**C**	Maintain target EC of C (>62%) and high fish species richness of 35 species. Suitable habitats should be adequate for especially the primary indicator fish species, namely the small rheophilic (CPRE) and the large semi-rheophilic (BMAR).
Invertebrates	**C**	Community is representative of a large, wide Lowveld river assemblage. Maintain the C (>62%), good SIC, sand and gravel habitat, and marginal vegetation, one moderate flow velocity species.
Riparian vegetation	**C**	Maintain current EC (>62%). Maintain woody vegetation cover between 20 - 70%. Maintain non-woody cover above 40%. Maintain reed cover above 10% along the channel. Perennial invasive alien species kept in check (less than 10%). No increase of riparian zone fragmentation. Maintain riparian taxon richness.
Water quality:	**C**	Ensure that nutrient levels are within Tolerable limits: 50th percentile of the data must be less than 0.075 mg/L PO_4-P (aquatic ecosystems: driver, EWR C6.
		Ensure that electrical conductivity (salt) levels are within Acceptable limits: 95th percentile of the data must be less than or equal to 70 mS/m (aquatic ecosystems: driver).

Component/ Indicator	Target EC	RQOs
		Ensure that turbidity/clarity or TSS levels stay within Acceptable limits: A moderate change from present with temporary high sediment loads and turbidity.
		Ensure that temperatures stay within Acceptable limits: A moderate change to instream temperatures should occur infrequently, i.e. vary by no more than 2◦C. Highly temperature sensitive species will occur in lower abundances (aquatic ecosystems: driver).
		Meet faecal coliform and *E.coli* targets for recreational (full contact) use: Meet the TWQR of 0-130 counts per 100 ml (DWAF, 1996b).
		Ensure that toxics are within the CEV limits: 95th percentile of the data must be within the CEV for toxics or the B category in DWAF (2008).
IUA X2-11; MRU CROC E (EWR C6) (Crocodile River)		
Geomorphology	**C**	Maintain the bed material size distribution within the active channel in order to maintain the available physical habitats. Maintain the channel/reach type. Maintain the target EC of C (>62%).
Fish	**C**	Maintain target EC of C (>62%) and high fish species richness of 34 species. Suitable habitats should be adequate for especially the primary indicator fish species, namely the small rheophilic sawfin suckermouth (*Chiloglanis paratus* CPAR)) and the large semi-rheophilic (BMAR).
Invertebrates	**C**	Community is representative of a large, wide Lowveld riverassemblage. Maintain the C EC (>62%), good SIC, sand and gravel habitat, and marginal vegetation, one moderate flow velocity species.
Riparian vegetation	**C**	Maintain current EC (>62%). Maintain woody vegetation cover between 5 - 60%. Maintain non-woody cover above 30% in the marginal zone. Maintain reed cover between 10 - 90% along the channel. Maintain absence of perennial invasive alien species. No increase of riparian zone fragmentation. Maintain riparian taxon richness.
Water quality	**C**	Ensure that nutrient levels are within Tolerable limits: 50th percentile of the data must be less than 0.125 mg/L PO_4-P (aquatic ecosystems: driver, EWR C6.
		Ensure that electrical conductivity (salt) levels are within Acceptable limits: 95th percentile of the data must be less than or equal to 70 mS/m (aquatic ecosystems: driver).
		Ensure that turbidity/clarity or TSS levels stay within Acceptable limits: A moderate change from present with temporary high sediment loads and turbidity.
		Ensure that temperatures stay within Acceptable limits: A moderate change to instream temperatures should occur infrequently, i.e. vary by no more than 2◦C. Highly temperature sensitive species will occur in lower abundances (aquatic ecosystems: driver).
		Meet faecal coliform and *E.coli* targets for recreational (full contact) use: Meet the TWQR of 0-130 counts per 100 ml (DWAF, 1996b).
		Ensure that toxics are within the CEV limits: 95th percentile of the data must be within the CEV for toxics or the B category in DWAF (2008).
IUA X2-10; MRU KAAP A (EWR C7) (Kaap River)		
Geomorphology	**B**	Maintain the bed material size distribution within the active channel in order to maintain the available physical habitats. Maintain the channel/reach type. Maintain the target EC of B (>82%).
Fish	**C**	Maintain target EC of C (>62%) and fish species richness of 11 species. Suitable habitats should be adequate for especially the primary indicator fish species, namely the small rheophilic (CPRE) and (BEUT) and the large semi-rheophilic (BMAR).
Invertebrates	**B**	Community is representative of a medium-sized Lowveld riverassemblage. Maintain the Category B (>82%), good SIC and marginal vegetation, three high flow velocity species.
Riparian vegetation	**C/D**	Maintain current EC of C/D (>58%). Maintain woody vegetation cover between 20 - 70%. Maintain non-woody cover above 30%.Maintain reed cover between 10 - 90% along the channel. Perennial invasive alien species kept in check (less than

Component/ Indicator	Target EC	RQOs
		30%). No increase of riparian zone fragmentation. Maintain riparian taxon richness.
Water quality	B	Ensure that nutrient levels are within Tolerable limits: The 50th percentile of the data may be at 0.125 mg/L PO_4-P (aquatic ecosystems: driver). The 50th percentile of the data must be ≤ 4.0 mg/L TIN-N (aquatic ecosystems: driver).
		Ensure that electrical conductivity (salt) levels are within Acceptable limits: 95th percentile of the data must be less than or equal to 200 mS/m (Aquatic ecosystems: driver). *Note this is a naturally salinised system.*
		Ensure that toxics are within Ideal limits or A categories or TWQR: 95th percentile of the data must be within the TWQR for toxics or the upper limit of the A category in DWAF (2008).
		Ensure that As levels are within Ideal limits or A categories: 95th percentile of the data must be less than 0.020 mg/L As (aquatic ecosystems: driver).
		Ensure that (free) Cn levels are within Ideal limits or A categories: 95th percentile of the data must be less than 0.004 mg/L Cn (aquatic ecosystems: driver).

1 TWQR = Target Water Quality Range (DWAF, 1996a).
DWAF (1996a): South African Water Quality Guidelines: Volume 7: Aquatic Ecosystems.
DWAF (1996b): South African water quality guidelines. Volume 2: Recreational Use.

Table 10: RIVERS: RQOs for water quality, geomorphology, riparian vegetation, macro-invertebrates and fish in priority RUs of the SABIE AND SAND RIVER System (X3)

Component/ Indicator	Target EC	RQOs
IUA X3-2;MRU SABIE A (EWR S1) (Sabie River)		
Geomorphology	B	Maintain the bed material size distribution within the active channel in order to maintain the available physical habitats. Maintain the channel/reach type. Maintain the target EC of B (>82%).
Fish	B	Maintain the EC of a B (>82%). RQO will be immediately applicable if the non-flow related measures are addressed. This will result in an improvement in the fish assemblage (reduced sedimentation of rocky substrate, improved indigenous vegetative habitats). Fish species richness of eight species must be maintained. Suitable habitats should be adequate for especially the primary indicator fish species, namely the small rheophilic (CANO) and the large semi-rheophilic (*Varicorhinus nelspruitensis* VNEL)).
Invertebrates	B	Community is representative of a small mountain stream assemblage. Maintain the EC(>82%), good SIC and marginal vegetation, one high flow velocity species. For an improvement in the PES additional key taxa for the improved situation: Oligoneuridae and Prosopistomatidae.
Riparian vegetation	B	Achieve and then maintain the B EC (>82%) RQO will be immediately applicable if the non-flow related measures are addressed. This will result in the woody cover improving and reed cover decreasing. Perennial invasive alien species should be less than 10%. No increase of riparian zone fragmentation. Maintain riparian taxon richness.
Water quality	A/B	Ensure that nutrient levels are within Acceptable limits: 50th percentile of the data must be less than 0.015 mg/L PO_4-P (aquatic ecosystems: driver).
		Ensure that electrical conductivity (salt) levels are within Ideal limits: 95th percentile of the data must be less than or equal to 30 mS/m (aquatic ecosystems: driver).
		Meet faecal coliform and *E.coli* targets for recreational (full contact) use: Meet the TWQR[1] of 0-130 counts per 100 ml (DWAF, 1996b).
		Ensure that toxics are within Ideal limits or A categories or TWQR: 95th percentile of the data must be within the TWQR for toxics or the upper limit of the A category in DWAF (2008).
IUA X3-2;MRU SABIE A (EWR S2) (Sabie River)		

Component/ Indicator	Target EC	RQOs
Geomorphology	**B**	Maintain the bed material size distribution within the active channel in order to maintain the available physical habitats. Maintain the channel/reach type. Maintain the target EC (>82%).
Fish	**B**	RQO will be immediately applicable if the non-flow related measures are addressed. This will result in an improvement to a B EC (>82%) in the fish assemblage (reduced sedimentation of rocky substrate, improved indigenous vegetative habitats).Maintain fish species richness of eight species. Suitable habitats should be adequate for especially the primary indicator fish species, namely the small rheophilic (CANO) and the large semi-rheophilic (VNEL).
Invertebrates	**B**	Community is representative of a small mountain stream assemblage. RQO will be immediately applicable if the non-flow related measures are addressed. This will result in an improvement to a B EC (>82%) with increased SASS V and MIRAI scores as well as additional taxa that will occur (Trichorythidae and Libellulidae)
Riparian vegetation	**B**	RQO will be immediately applicable if the non-flow related measures are addressed. This will result in a B EC (>82%) the woody cover improving and reed cover decreasing. Perennial invasive alien species should be less than 10%. No increase of riparian zone fragmentation. Maintain riparian taxon richness.
Water quality	**B**	Ensure that nutrient levels are within Acceptable limits: 50th percentile of the data must be less than 0.025 mg/L PO_4-P (aquatic ecosystems: driver). For an improvement in the PES ensure that nutrient levels are within Acceptable limits: 50th percentile of the data must be less than 0.015 mg/L PO_4-P (aquatic ecosystems: driver)
		Ensure that electrical conductivity (salt) levels are within Ideal limits: 95th percentile of the data must be less than or equal to 30 mS/m (aquatic ecosystems: driver).
		Meet faecal coliform and *E.coli* targets for recreational (full contact) use: Meet the TWQR of 0-130 counts per 100 ml (DWAF, 1996b).
		Ensure that toxics are within Ideal limits or A categories or TWQR: 95th percentile of the data must be within the TWQR for toxics or the upper limit of the A category in DWAF (2008).
IUA X3-3;MRU SABIE B (EWR S3) (Sabie River)		
Geomorphology	**B**	Maintain the bed material size distribution within the active channel in order to maintain the available physical habitats. Maintain the channel/reach type. Maintain the target EC of B (>82%).
Fish	**B**	Maintain target EC of B (>82%) and fish species richness of 26 species. Suitable habitats should be adequate for especially the primary indicator fish species, namely the small rheophilic (CANO) and the large semi-rheophilic (BMAR).
Invertebrates	**B**	Community is representative of a medium-sized foothill stream assemblage. Maintain the EC of B (>82%), good SIC and marginal vegetation, two high flow velocity species.
Riparian vegetation	**A/B**	Maintain current A/B EC (>92%). Maintain woody vegetation cover between 20 - 40%. Maintain non-woody cover between 30 - 90%. Maintain reed cover between 20 - 40% along the channel. Perennial invasive alien species kept in check (less than 5%). No increase of riparian zone fragmentation. Maintain riparian taxon richness.
Water quality	**B**	Ensure that nutrient levels are within Acceptable limits: 50th percentile of the data must be less than 0.015 mg/L PO_4-P (aquatic ecosystems: driver).
		Ensure that electrical conductivity (salt) levels are within Ideal limits: 95th percentile of the data must be less than or equal to 30 mS/m (aquatic ecosystems: driver).
		Ensure that turbidity/clarity or Total Suspended Solids (TSS) levels stay within Acceptable limits: A moderate change from present with temporary high sediment loads and turbidity (aquatic ecosystems: driver).
		Meet faecal coliform and *E.coli* targets for recreational (full contact) use: Meet the TWQR of 0-130 counts per 100 ml (DWAF, 1996b).
		Ensure that toxics are within Ideal limits or A categories or TWQR: 95th percentile of the data must be within the TWQR for toxics or the upper limit of the A category in DWAF (2008).

Component/ Indicator	Target EC	RQOs
IUA X3-2;MRU MAC A (EWRS4) (MacMac River)		
Geomorphology	**A**	Maintain the bed material size distribution within the active channel in order to maintain the available physical habitats. Maintain the channel/reach type. Maintain the target EC (>92%).
Fish	**B/C**	Maintain target EC of B/C (>78%) and fish species richness of 20 species. Suitable habitats should be adequate for especially the primary indicator fish species, namely the small rheophilic (CANO) and the large semi-rheophilic (VNEL).
Invertebrates	**A/B**	Community is representative of a small mountain stream assemblage. Maintain the EC(>92%), good SIC and marginal vegetation, two high flow velocity species.
Riparian vegetation	**A/B**	Maintain current A/B EC (>92%). Maintain woody vegetation cover between 20 - 80%. Maintain non-woody cover between 30 - 60% in the marginal zone. Maintain the absence of reed cover. Perennial invasive alien species kept in check (less than 5%). No increase of riparian zone fragmentation. Maintain riparian taxon richness.
Water quality	**A/B**	Ensure that turbidity/clarity or TSS levels stay within Acceptable limits: A small change from present with minor silting of habitats and turbidity loads; or <10% change from background TSS levels (aquatic ecosystems: driver).
IUA X3-3;MRU MAR A (EWR S5) (Marite River)		
Geomorphology	**C**	Maintain the bed material size distribution within the active channel in order to maintain the available physical habitats. Maintain the channel/reach type. Maintain the target EC of C (>62%).
Fish	**B/C**	Maintain target EC of B/C (>78%) and fish species richness of 26 species. Suitable habitats should be adequate for especially the primary indicator fish species, namely the small rheophilic (CANO) and the large semi-rheophilic (BMAR).
Invertebrates	**B/C**	Community is representative of a medium-sized foothill stream assemblage. Maintain the B/C EC (>78%), good SIC and marginal vegetation, two high flow velocity species.
Riparian vegetation	**B/C**	Maintain current EC(>78%). Maintain woody vegetation cover between 70 - 80%. Maintain non-woody cover between 40 - 50% in the marginal zone. Maintain reed cover between 20 - 30% along the channel. Perennial invasive alien species kept in check (less than 15%). No increase of riparian zone fragmentation. Maintain riparian taxon richness.
Water quality	**B**	Ensure that nutrient levels are within Acceptable limits: 50th percentile of the data must be less than 0.015 mg/L PO_4-P (aquatic ecosystems: driver).
		Ensure that electrical conductivity (salt) levels are within Ideal limits: 95th percentile of the data must be less than or equal to 30 mS/m (aquatic ecosystems: driver).
		Meet faecal coliform and *E.coli* targets for recreational (full contact) use: Meet the TWQR of 0-130 counts per 100 ml (DWAF, 1996b).
		Ensure that toxics are within Ideal limits or A categories or TWQR: 95th percentile of the data must be within the TWQR for toxics or the upper limit of the A category in DWAF (2008).
IUA X3-7;MRU MUT A (EWR S6) (Mutlumuvi River)		
Geomorphology	**C**	Maintain the bed material size distribution within the active channel in order to maintain the available physical habitats. Maintain the channel/reach type. Maintain the target EC (>62%).
Fish	**C**	Maintain target EC of C (>62%) and fish species richness of 26 species. Suitable habitats should be adequate for especially the primary indicator fish species, namely the small rheophilic (CANO) and the large semi-rheophilic (BMAR).
Invertebrates	**B/C**	Community is representative of a medium-sized Lowveld river assemblage. Maintain the B/C EC (>78%), good SIC, sand and gravel habitat, and marginal vegetation, two moderate flow velocity species.
Riparian	**C**	Maintain current EC of C (>62%). Maintain woody vegetation cover between 20 -

Component/ Indicator	Target EC	RQOs
vegetation		70% along the banks. Maintain reed cover between 10 - 90% along the channel. Perennial invasive alien species kept in check (less than 20%). No increase of riparian zone fragmentation. Maintain riparian taxon richness.
Water quality	**B/C**	Ensure that nutrient levels are within Tolerable limits: 50th percentile of the data must be less than 0.125 mg/L PO_4-P (aquatic ecosystems: driver).
		Ensure that electrical conductivity (salt) levels are within Acceptable limits: 95th percentile of the data must be less than or equal to 55 mS/m (aquatic ecosystems: driver).
		Ensure that turbidity/clarity or Total Suspended Solids (TSS) levels stay within Acceptable limits: A moderate change from present with temporary high sediment loads and turbidity (aquatic ecosystems: driver).
		Meet faecal coliform and *E.coli* targets for recreational (full contact) use: Meet the TWQR of 0-130 counts per 100 ml (DWAF, 1996b).
		Ensure that toxics are within Ideal limits or CEV limits or TWQR: 95th percentile of the data must be within the TWQR for toxics or the upper limit of the A category in DWAF (2008).
IUA X3-8;MRU SAND A (EWR S7) (Thulandziteka River)		
Geomorphology	**C/D**	Maintain the bed material size distribution within the active channel in order to maintain the available physical habitats. Maintain the channel/reach type. Maintain the target EC of C/D (>58%).
Fish	**C**	Maintain target EC of C (>62%) and fish species richness of 29 species. Suitable habitats should be adequate for especially the primary indicator fish species, namely the small rheophilic (CANO) and the large semi-rheophilic (BMAR).
Invertebrates	**B/C**	Community is representative of a medium-sized Lowveld river assemblage. Maintain the EC(>78%) , good SIC, sand and gravel habitat, and marginal vegetation, one high flow velocity species.
Riparian vegetation	**C**	Maintain current EC(>62%) . Maintain woody vegetation cover between 20 - 70% along the banks. Maintain reed cover between 10 - 90% along the channel. Perennial invasive alien species kept in check (less than 20%). No increase of riparian zone fragmentation. Maintain riparian taxon richness.
Water quality	**C**	Ensure that nutrient levels are within Tolerable limits: 50th percentile of the data must be less than 0.125 mg/L PO_4-P (aquatic ecosystems: driver).
		Ensure that electrical conductivity (salt) levels are within Ideal limits: 95th percentile of the data must be less than or equal to 42 mS/m (aquatic ecosystems: driver).
		Ensure that turbidity/clarity or Total Suspended Solids (TSS) levels stay within Acceptable limits: A moderate change from present with temporary high sediment loads and turbidity (aquatic ecosystems: driver).
		Meet faecal coliform and *E.coli* targets for recreational (full contact) use: Meet the TWQR of 0-130 counts per 100 ml (DWAF, 1996b).
		Ensure that toxics are within Ideal limits or A categories or TWQR: 95th percentile of the data must be within the TWQR for toxics or the upper limit of the A category in DWAF (2008).
IUA X3-9;MRU SAND B (EWR S8) (Sand River)		
Geomorphology	**C**	Maintain the bed material size distribution within the active channel in order to maintain the available physical habitats. Maintain the channel/reach type. Maintain the target EC (>62%).
Fish	**B**	Maintain target EC of B (>82%) and high fish species richness of 35 species. Suitable habitats should be adequate for especially the primary indicator fish species, namely the small rheophilic (CANO) and the large semi-rheophilic (BMAR).
Invertebrates	**B**	Community is representative of a medium-sized Lowveld riverassemblage. Maintain the B EC (>82%), good SIC, sand and gravel habitat, and marginal vegetation, one moderate flow velocity species.
Riparian vegetation	**B**	Maintain current B EC(>82%) . Maintain the absence of terrestrial woody species in the channel. Maintain reed cover between 20 - 80% along the channel.

Component/ Indicator	Target EC	RQOs
		Perennial invasive alien species kept in check (less than 10%). No increase of riparian zone fragmentation. Maintain riparian taxon richness.
Water quality	B	Ensure that nutrient levels are within Tolerable limits: 50th percentile of the data must be less than 0.125 mg/L PO_4-P (aquatic ecosystems: driver).
		Meet faecal coliform and *E.coli* targets for recreational (full contact) use: Meet the TWQR of 0-130 counts per 100 ml (DWAF, 1996b).

1 TWQR = Target Water Quality Range (DWAF, 1996a).
DWAF (1996a): South African Water Quality Guidelines: Volume 7: Aquatic Ecosystems.
DWAF (1996b): South African water quality guidelines. Volume 2: Recreational Use.

Tables 11 – 13 provide the water quality RQOs for priority RUs (other than EWR sites) in the respective river systems.

Table 11: RIVERS: Summary of key WATER QUALITY RQOs in WQ priority RUs of the KOMATI RIVER System (X1)

RUs	SQ number	Water Quality RQOs
IUA X1-1		
RU K1	X11A-01358	Ensure that **nutrient levels** are within Acceptable limits: 50th percentile of the data must be less than 0.025 mg/L **PO_4-P** (aquatic ecosystems: driver). Ensure that **electrical conductivity (salt) levels** are within Ideal limits: 95th percentile of the data must be less than or equal to 30 mS/m (aquatic ecosystems: driver). Ensure **pH levels** stay within Acceptable limits: A small change from the Ideal range is allowed, i.e. a 5th percentile of 5.9-6.5, and a 95th percentile of 8.0-8.8 (aquatic ecosystems: driver). Ensure that **toxics** are within Ideal limits or A categories or TWQR[1]: 95th percentile of the data must be within the TWQR for toxics or the upper limit of the A category in DWAF (2008). Ensure that **sulphate levels** are within Acceptable limits: 95th percentile of the data must be less than 30 mg/L (industrial cat 3: drivers; DWA, 2012a). Meet **faecal coliform and *E.coli* targets** for recreational (full contact) use: Meet the TWQR of 0-130 counts per 100 ml (DWAF, 1996b).
	X11A-01248	
	X11A-01295	
RU K2	X11B-01370	Ensure that **nutrient levels** are within Acceptable limits: 50th percentile of the data must be less than 0.025 mg/L **PO_4-P** (aquatic ecosystems: driver). Ensure that **electrical conductivity (salt) levels** are within Ideal limits: 95th percentile of the data must be less than or equal to 30 mS/m (aquatic ecosystems: driver). Ensure **pH levels** stay within Acceptable limits: A small change from the Ideal range is allowed, i.e. a 5th percentile of 5.9-6.5, and a 95th percentile of 8.0 - 8.8 (aquatic ecosystems: driver). Ensure that **toxics** are within Ideal limits or A categories or TWQR: 95th percentile of the data must be within the TWQR for toxics or the upper limit of the A category in DWAF (2008). Ensure that **sulphate levels** are within Acceptable limits: 95th percentile of the data must be less than 30 mg/L (industrial cat 3: drivers; DWA, 2012a). Meet **faecal coliform and *E.coli* targets** for recreational (full contact) use: Meet the TWQR of 0 - 130 counts per 100 ml (DWAF, 1996b).
	X11B-01361	
	X11B-01272	
IUA X1-3		
RU K3	X11C-01147	Ensure that **electrical conductivity (salt) levels** are within Ideal limits: 95th percentile of the data must be less than or equal to 30 mS/m (aquatic ecosystems: driver). Ensure **pH levels** stay within Acceptable limits: A small change from the Ideal range is allowed, i.e. a 5th percentile of 5.9 - 6.5, and a 95th percentile of 8.0 - 8.8 (aquatic ecosystems: driver). Ensure that **toxics** are within Ideal limits or A categories or TWQR: 95th percentile of the data must be within the TWQR for toxics or the upper limit of the A category in DWAF (2008). Ensure that **sulphate levels** are within Acceptable limits: 95th percentile of the data must be less than 30 mg/L (industrial cat 3: drivers; DWA, 2012a).
	X11D-01129	
	X11D-01137	
RU K4	X11E-01237	Ensure that **toxics** are within Ideal limits or A categories or TWQR: 95th percentile of the data must be within the TWQR for toxics or the upper limit of the A category in

RUs	SQ number	Water Quality RQOs
		DWAF (2008). Ensure that **turbidity/clarity or TSS levels** stay within Acceptable limits: A small change from present with minor silting of habitats and turbidity loads; or <10% change from background TSS levels (aquatic ecosystems: driver).
IUA X1-10		
RU K13	X13L-01000	Ensure that **electrical conductivity (salt) levels** are within Tolerable limits: 95th percentile of the data must be less than or equal to 85 mS/m (aquatic ecosystems: driver). Ensure that **nutrient levels** are within Tolerable limits: 50th percentile of the data must be less than 0.125 mg/L **PO_4-P** (aquatic ecosystems: driver). Ensure that **turbidity/clarity or TSS levels** stay within Acceptable limits: A small change from present with minor silting of habitats and turbidity loads; or <10% change from background TSS levels (aquatic ecosystems: driver). Meet **faecal coliform and *E.coli* targets** for recreational (full contact) use: Meet the TWQR of 0 - 130 counts per 100 ml (DWAF, 1996b).
MRU Komati E	X13K-01114	Ensure that **electrical conductivity (salt) levels** are within Tolerable limits: 95th percentile of the data must be less than or equal to 85 mS/m (aquatic ecosystems: driver). Ensure that **temperatures** stay within Acceptable limits: A moderate change to instream temperatures should occur infrequently, i.e. vary by no more than 2◦C. Highly temperature sensitive species will occur in lower abundances (aquatic ecosystems: driver). Ensure that **nutrient levels** are within Tolerable limits: 50th percentile of the data must be less than 0.125 mg/L **PO_4-P** (aquatic ecosystems: driver). Ensure that **turbidity/clarity or TSS levels** stay within Acceptable limits: A moderate change from present with temporary high sediment loads and turbidity. Meet **faecal coliform and *E.coli* targets** for recreational (full contact) use: Meet the TWQR of 0 - 130 counts per 100 ml (DWAF, 1996b). Ensure that **toxics** are within the CEV limits: 95th percentile of the data must be within the CEV for toxics or the B category in DWAF (2008).
	X13K-01038	
	X13L-01027	
	X13L-00995	

1 TWQR = Target Water Quality Range (DWAF, 1996a).
DWAF (1996a): South African Water Quality Guidelines: Volume 7: Aquatic Ecosystems.
DWAF (1996b): South African water quality guidelines. Volume 2: Recreational Use.

Table 12: RIVERS: Summary of key WATER QUALITY RQOs in WQ priority RUs of the CROCODILE RIVER System (X2)

RUs	SQ number	Water Quality RQOs
IUA X2-3		
MRU Elan A	X21F-01046	Ensure that **electrical conductivity (salt) levels** are within Ideal limits: 95th percentile of the data must be less than or equal to 30 mS/m (aquatic ecosystems: driver). Ensure that **nutrient levels** are within Acceptable limits: 50th percentile of the data must be less than 0.025 mg/L **PO_4-P** (aquatic ecosystems: driver). Meet **faecal coliform and *E.coli* targets** for recreational (full contact) use: Meet the TWQR of 0 - 130 counts per 100 ml (DWAF, 1996b). Ensure that **toxics** are within Ideal limits or A categories or TWQR[1]: 95th percentile of the data must be within the TWQR for toxics or the upper limit of the A category in DWAF (2008). Ensure that **pH** stays within Ideal limits: 5th and 95th percentiles of pH data must be between 6.5 and 8.0 (aquatic ecosystems: driver). Ensure that **Cr-VI levels** are within Ideal limits or A categories: 95th percentile of the data must be less than 0.014 mg/L Cr-VI (aquatic ecosystems: driver). Ensure that **Mn levels** are within Ideal limits or A categories or TWQR: 95th percentile of the data must be within the TWQR of 0.180 mg/L Mn (aquatic ecosystems: driver).
	X21F-01081	
	X21G-01037 ER 1	
RU C7	X21F-01100	Ensure that **electrical conductivity (salt) levels** are within Ideal limits: 95th percentile of the data must be less than or equal to 30 mS/m (aquatic ecosystems: driver). Ensure that **nutrient levels** are within Acceptable limits: 50th percentile of the data must be less than 0.025 mg/L **PO_4-P** (aquatic ecosystems: driver). Meet **faecal coliform and *E.coli* targets** for recreational (full contact) use: Meet the

RUs	SQ number	Water Quality RQOs
		TWQR of 0 - 130 counts per 100 ml (DWAF, 1996b). Ensure that **toxics** are within Ideal limits or A categories or TWQR: 95th percentile of the data must be within the TWQR for toxics or the upper limit of the A category in DWAF (2008). Ensure that **pH** stays within Ideal limits: 5th and 95th percentiles of pH data must be between 6.5 and 8.0 (aquatic ecosystems: driver). Ensure that **Cr-VI levels** are within Ideal limits or A categories: 95th percentile of the data must be less than 0.014 mg/L Cr-VI (aquatic ecosystems: driver). Ensure that **Mn levels** are within Ideal limits or A categories or TWQR: 95th percentile of the data must be within the TWQR of 0.180 mg/L Mn (aquatic ecosystems: driver).
IUA X2-4		
MRU Elan B	X21G-1073	Ensure that **electrical conductivity (salt) levels** are within Acceptable limits: 95th percentile of the data must be less than or equal to 55 mS/m (aquatic ecosystems: driver). Ensure that **nutrient levels** are within Acceptable limits: 50th percentile of the data must be less than 0.025 mg/L **PO_4-P** (aquatic ecosystems: driver).
	X21J-01013	Ensure that **toxics** are within Ideal limits or A categories or TWQR: 95th percentile of the data must be within the TWQR for toxics or the upper limit of the A category in DWAF (2008). Ensure that **turbidity/clarity or TSS levels** stay within Acceptable limits: A moderate change from present with temporary high sediment loads and turbidity.
IUA X2-5		
MRU Elan B	X21K-01035 ER 2	Ensure that **electrical conductivity (salt) levels** are within Acceptable limits: 95th percentile of the data must be less than or equal to 55 mS/m (aquatic ecosystems: driver). Ensure that **nutrient levels** are within Acceptable limits: 50th percentile of the data must be less than 0.025 mg/L **PO_4-P** (aquatic ecosystems: driver).
	X21K-00997	Ensure that **toxics** are within Ideal limits or A categories or TWQR: 95th percentile of the data must be within the TWQR for toxics or the upper limit of the A category in DWAF (2008). Ensure that **turbidity/clarity or TSS levels** stay within Acceptable limits: A moderate change from present with temporary high sediment loads and turbidity.
IUA X2-6 AND PART OF IUA X2-9		
MRU Croc C	X22B-00987	Ensure that **electrical conductivity (salt) levels** are within Acceptable limits: 95th percentile of the data must be less than or equal to 55 mS/m (aquatic ecosystems: driver). Ensure that **nutrient levels** are within Acceptable limits: 50th percentile of the data must be less than 0.025 mg/L **PO_4-P** (aquatic ecosystems: driver). Meet **faecal coliform and *E.coli* targets** for recreational (full contact) use: Meet the TWQR of 0 - 130 counts per 100 ml (DWAF, 1996b). Ensure that **toxics** are within Ideal limits or A categories or TWQR: 95th percentile of the data must be within the TWQR for toxics or the upper limit of the A category in DWAF (2008). Ensure that **Mn levels** are within Ideal limits or A categories or TWQR: 95th percentile of the data must be within the TWQR of 0.180 mg/L Mn (aquatic ecosystems: driver). Ensure that **turbidity/clarity or TSS levels** stay within Acceptable limits: A moderate change from present with temporary high sediment loads and turbidity.
	X22B-00888	
	X22C-00946	
	X22J-00993	
	X22J-00958	
	X22K-00981	
	X22J-00958	Ensure that **electrical conductivity (salt) levels** are within Acceptable limits: 95th percentile of the data must be less than or equal to 55 mS/m (aquatic ecosystems: driver). Ensure that **nutrient levels** are within Acceptable limits: 50th percentile of the data must be less than 0.025 mg/L **PO_4-P** (aquatic ecosystems: driver).
	X22K-00981	Meet **faecal coliform and *E.coli* targets** for recreational (full contact) use: Meet the TWQR of 0 - 130 counts per 100 ml (DWAF, 1996b). Ensure that **toxics** are within Ideal limits or A categories or TWQR: 95th percentile of the data must be within the TWQR for toxics or the upper limit of the A category in DWAF (2008).
IUA X2-8		
RU C12	X22C-01004	Ensure that **toxics** are within Ideal limits or A categories or TWQR: 95th percentile of the data must be within the TWQR for toxics or the upper limit of the A category in DWAF (2008). Ensure that **Mn levels** are within Ideal limits or A categories or TWQR:

RUs	SQ number	Water Quality RQOs
		95th percentile of the data must be within the TWQR of 0.180 mg/L Mn (aquatic ecosystems: driver). Ensure that **turbidity/clarity or TSS levels** stay within Acceptable limits: A moderate change from present with temporary high sediment loads and turbidity.
RU C14	X22H-00836	Ensure that **electrical conductivity (salt) levels** are within Acceptable limits: 95th percentile of the data must be less than or equal to 55 mS/m (aquatic ecosystems: driver). Ensure that **nutrient levels** are within Tolerable limits: 50th percentile of the data must be less than 0.125 mg/L **PO_4-P** (aquatic ecosystems: driver). Meet **faecal coliform and *E.coli* targets** for recreational (full contact) use: Meet the TWQR of 0 - 130 counts per 100 ml (DWAF, 1996b). Ensure that **toxics** are within Ideal limits or A categories or TWQR: 95th percentile of the data must be within the TWQR for toxics or the upper limit of the A category in DWAF (2008).
RU C16	X23B-01052	Ensure that **electrical conductivity (salt) levels** are within Ideal limits: 95th percentile of the data must be less than or equal to 30 mS/m (aquatic ecosystems: driver). Ensure that **nutrient levels** are within Acceptable limits: 50th percentile of the data must be less than 0.025 mg/L **PO_4-P** (aquatic ecosystems: driver). Ensure that **turbidity/clarity or TSS levels** stay within Acceptable limits: A moderate change from present with temporary high sediment loads and turbidity.
RU C17	X23C-01098	Ensure that **electrical conductivity (salt) levels** are within Ideal limits: 95th percentile of the data must be less than or equal to 30 mS/m (aquatic ecosystems: driver). Ensure that **nutrient levels** are within Tolerable limits: 50th percentile of the data must be less than 0.075 mg/L **PO_4-P** (aquatic ecosystems: driver). Meet **faecal coliform and *E.coli* targets** for recreational (full contact) use: Meet the TWQR of 0 - 130 counts per 100 ml (DWAF, 1996b). Ensure that **toxics** are within Ideal limits or A categories or TWQR: 95th percentile of the data must be within the TWQR for toxics or the upper limit of the A category in DWAF (2008). Ensure that **As levels** are within Ideal limits or A categories: 95th percentile of the data must be less than 0.020 mg/L As (aquatic ecosystems: driver). Ensure that **(free) Cn levels are** within Ideal limits or A categories: 95th percentile of the data must be less than 0.004 mg/L Cn (aquatic ecosystems: driver).
RU C17	X23E-01154	
RU C17	X23F-01120	
IUA X2-11		
MRU Croc D	X24C-01033	Ensure that **electrical conductivity (salt) levels** are within Acceptable limits: 95th percentile of the data must be less than or equal to 85 mS/m (aquatic ecosystems: driver). Ensure that **nutrient levels** are within Tolerable limits: 50th percentile of the data must be less than 0.125 mg/L **PO_4-P** (aquatic ecosystems: driver). Meet **faecal coliform and *E.coli* targets** for recreational (full contact) use: Meet the TWQR of 0 - 130 counts per 100 ml (DWAF, 1996b). Ensure that **turbidity/clarity or TSS levels** stay within Acceptable limits: A moderate change from present with temporary high sediment loads and turbidity.
IUA X2-12 AND X2-13		
RU C19	X24B-00903	Ensure that **electrical conductivity (salt) levels** are within Acceptable limits: 95th percentile of the data must be less than or equal to 55 mS/m (aquatic ecosystems: driver). Ensure that **nutrient levels** are within Tolerable limits: 50th percentile of the data must be less than 0.125 mg/L **PO_4-P** (aquatic ecosystems: driver). Meet **faecal coliform and *E.coli* targets** for recreational (full contact) use: Meet the TWQR of 0 - 130 counts per 100 ml (DWAF, 1996b). Ensure that **toxics** are within Ideal limits or A categories or TWQR: 95th percentile of the data must be within the TWQR for toxics or the upper limit of the A category in DWAF (2008).

1 TWQR = Target Water Quality Range (DWAF, 1996a).
DWAF (1996a): South African Water Quality Guidelines: Volume 7: Aquatic Ecosystems.
DWAF (1996b): South African water quality guidelines. Volume 2: Recreational Use.

Table 13: RIVERS: Summary of key WATER QUALITY RQOs in WQ priority RUs of the SABIE AND SAND RIVER System (X3)

RUs	SQ number	Water quality RQOs
IUA X3-4		
RU S6	X31J-00774 X31J-00835	Ensure that **nutrient levels** are within Acceptable limits: 50th percentile of the data must be less than 0.025 mg/L **PO_4-P** (aquatic ecosystems: driver). Ensure that **electrical conductivity (salt) levels** are within Ideal limits: 95th percentile of the data must be less than or equal to 30 mS/m (aquatic ecosystems: driver). Ensure that **turbidity/clarity or TSS levels** stay within Acceptable limits: A moderate change from present with temporary high sediment loads and turbidity (aquatic ecosystems: driver). Meet **faecal coliform and *E.coli* targets** for recreational (full contact) use: Meet the TWQR of 0 - 130 counts per 100 ml (DWAF, 1996b). Ensure that **toxics** are within Ideal limits or A categories or TWQR[1]: 95th percentile of the data must be within the TWQR for toxics or the upper limit of the A category in DWAF (2008).
RU S9	X31K-00713	Ensure that **nutrient levels** are within Acceptable limits: 50th percentile of the data must be less than 0.025 mg/L **PO_4-P** (aquatic ecosystems: driver). Ensure that **electrical conductivity (salt) levels** are within Ideal limits: 95th percentile of the data must be less than or equal to 30 mS/m (aquatic ecosystems: driver). Ensure that **turbidity/clarity or TSS levels** stay within Acceptable limits: A moderate change from present with temporary high sediment loads and turbidity (aquatic ecosystems: driver). Meet **faecal coliform and *E.coli* targets** for recreational (full contact) use: Meet the TWQR of 0 - 130 counts per 100 ml (DWAF, 1996b). Ensure that **toxics** are within Ideal limits or A categories or TWQR: 95th percentile of the data must be within the TWQR for toxics or the upper limit of the A category in DWAF (2008).
IUA X3-5		
MRU Sabie C	X33A-00731 X33A-00737 X33B-00784 X33B-00804 X33B-00829 X33D-00811 X33D-00861	Ensure that **nutrient levels** are within Tolerable limits: 50th percentile of the data must be less than 0.125 mg/L PO_4-P. Ensure that **electrical conductivity (salt) levels** are within Ideal limits: 95th percentile of the data must be less than or equal to 42 mS/m (aquatic ecosystems: driver). Ensure that **turbidity/clarity or TSS levels** stay within Acceptable limits: A moderate change from present with temporary high sediment loads and turbidity (aquatic ecosystems: driver). Ensure that **toxics** are within Ideal limits or A categories or TWQR: 95th percentile of the data must be within the TWQR for toxics or the upper limit of the A category in DWAF (2008). Meet **faecal coliform and *E.coli* targets** for recreational (full contact) use: Meet the TWQR of 0 - 130 counts per 100 ml (DWAF, 1996b).
IUA X3-7		
RU S13	X32E-00639	Ensure that **nutrient levels** are within Tolerable limits: 50th percentile of the data must be less than 0.125 mg/L **PO_4-P** (aquatic ecosystems: driver). Ensure that **periphyton chl-a levels** are within Tolerable limits: 50th percentile of the data must be less than or equal to 84 mg/m^2(aquatic ecosystems: driver). Ensure that **electrical conductivity (salt) levels** are within Ideal limits: 95th percentile of the data must be less than or equal to 42 mS/m (aquatic ecosystems: driver). Ensure that **turbidity/clarity or TSS levels** stay within Acceptable limits: A moderate change from present with temporary high sediment loads and turbidity (aquatic ecosystems: driver). Meet **faecal coliform and *E.coli* targets** for recreational (full contact) use: Meet the TWQR of 0 - 130 counts per 100 ml (DWAF, 1996b). Ensure that **toxics** are within Ideal limits or A categories or TWQR: 95th percentile of the data must be within the TWQR for toxics or the upper limit of the A category in DWAF (2008).
IUA X3-8		

RUs	SQ number	Water quality RQOs
RU S14	X32B-00551	Ensure that **nutrient levels** are within Acceptable limits: 50th percentile of the data must be less than 0.025 mg/L **PO_4-P** (aquatic ecosystems: driver). Ensure that **turbidity/clarity or TSS levels** stay within Acceptable limits: A small change from present with minor silting of habitats and turbidity loads; or <10% change from background TSS levels (aquatic ecosystems: driver). Meet **faecal coliform and *E.coli* targets** for recreational (full contact) use: Meet the TWQR of 0 - 130 counts per 100 ml (DWAF, 1996b). Ensure that **toxics** are within Ideal limits or A categories or TWQR: 95th percentile of the data must be within the TWQR for toxics or the upper limit of the A category in DWAF (2008).

1 TWQR = Target Water Quality Range (DWAF, 1996a).
DWAF (1996a): South African Water Quality Guidelines: Volume 7: Aquatic Ecosystems.
DWAF (1996b): South African water quality guidelines. Volume 2: Recreational Use.

Table 14 to table 16 provides the habitat and biota RQOs for priority wetlands in each IUA. The locality of the wetlands is linked to the river RU and biophysical nodes. The target EC is provided for the relevant wetlands in the Resource Unit. All target EC are set to maintain the PES and are therefore immediately applicable. It must be noted, that although these wetlands can be of high priority, the level of RQOs provided are at moderate level due to a lack of detailed information such as baseflow conditions and as none of the scenarios will impact on the wetlands.

Note that the following RQOs for the wetlands are standard and relevant for all RUs:
- Maintain species composition and vegetative cover.
- No increase in the cover or abundance of woody alien invasive species.
- No increase in wetland fragmentation.

Table 14: WETLANDS: Summary of RQOs for priority wetlands in the KOMATI RIVER System (X1)

RUs	SQ number	Target EC	Wetland RQO
X1-1			
RU K1	X11A-01354	**C**	Maintain C EC(>62%). Cessation of land use encroachment on pans, seeps and channeled valley bottom wetland.
	X11A-01248	**C**	
RU K2	X11B-01272	**B/C**	Improve to B/C(>78%) by increasing buffer zones where wetlands are not artificial. Cessation of land use encroachment on non-artificial channeled valley bottom wetlands.
X1-3			
RU K3	X11C-01147	**C**	Maintain C EC (>62%). Cessation of land use encroachment on pans, seeps and non-artificial channeled valley bottom wetlands.
	X11D-01129	**C**	
RU K4	X11E-01237	**B**	Maintain wetland EC of B/C (>78%). Cessation of land use encroachment on channeled valley bottom wetlands.
RU K5	X11G-01143	**C**	Maintain wetland EC of C (>62%). Cessation of land use encroachment on seeps.
X1-6			
RU K8	X12A-01305	**B**	Cessation of land use, urban and forestry encroachment on seeps and channeled valley bottom wetlands.(>62%, >62%, >78%)
	X12C-01271	**B**	
	X12D-01235	**B/C**	
X1-9			
RU K11	X13J-01205	**D**	Maintain wetland EC of D (>42%). Cessation of land use and agricultural encroachment on floodplain and non-artificial channeled valley bottom wetlands.

Table 15: WETLANDS: Summary of RQOs for priority wetlands in the CROCODILE RIVER System (X2)

RUs	SQ number	Target EC	Wetland RQO
IUA X2-1			
MRU Croc A	X21A-00930	**B**	Improve only wetlands not already in B (>82%) category by improving wetland buffers, removing alien woody species within wetlands, not increasing the amount of dams, rehabilitating dams not in use, reducing amount of dams if possible and the cessation of land use and forestry encroachment on wetlands. Note that this MRU includes Verloren Vlei which is already in a B EC.
RU C1	X21B-00929	**C**	Maintain C EC (62%). See above.
	X21B-00898	**C**	
RU C2	X21C-00859	**C**	Improve to a C (62%) by improving buffer zones for wetlands especially with reference to agriculture. Cessation of land use and forestry encroachment on natural wetlands.
IUA X2-3			
MRU Elan A	X21F-01046	**B/C**	Improve to a B/C (78%) by removing agriculture from wetland areas. Cessation of land use and agricultural encroachment on natural wetlands (seeps and channelled valley bottom).
IUA X2-8			
RU C12	X22C-01004	**B/C**	Improve to a B/C (78%) by removing agriculture from wetland areas. Cessation of land use and forestry encroachment on natural wetlands (seeps and channelled valley bottom).
RU C14	X22H-00836	**D**	Maintain EC of a D (42%). Cessation of farm dam construction
IUA X2-10			
RU C17	X23E-01154	**B/C**	Maintain EC of a B/C (78%). Cessation of forestry encroachment on seeps.

Table 16: WETLANDS: Summary of RQOs for priority wetlands in the SABIE AND SAND RIVER System (X3)

RUs	SQ number	Target EC	Wetland RQO
IUA X3-7			
MRU Mut A	X32D-00605 (EWR S6)	**C**	Improve to a C (62%) by improving wetland buffers and reduce overgrazing.
IUA X3-8			
MRU Sand A	X32A-00583 (EWR S7)	**C**	Improve to a C (62%) by improving wetland buffers and reduce overgrazing.
RU S14	X32B-00551	**C**	Maintain wetland EC of C (62%). Cessation of land use encroachment on channeled valley bottom wetlands.

Table 17 – 19 provides the groundwater RQOs based on the prioritisation and baseline assessment of the eleven Groundwater Units. The relevant RQO parameters used included water level, baseflow and water quality. The setting of water quantity related RQOs (i.e. water level and baseflow) is aimed at maintaining water levels within natural seasonal fluctuations ensuring sufficient yield for all users and to improve or maintain groundwater discharge to support low flow river requirements. The setting of water quality related RQOs is aimed at maintaining the groundwater quality in relation to its background/present level, or ensuring compliance with water

quality standards for domestic use, as this is the more stringent requirement for the variety of users in the Groundwater Unit.

Table 17: Summary of RQOs for Groundwater in the Komati River Catchment

IUA	Groundwater Unit	Component	Narrative RQO	Indicator/Measure	Numerical Criteria
X1-2 and X1-3	GU1-3	Quantity	Groundwater flow directions in the resource unit should not be reversed from it natural flow directions towards the drainage systems.	Flow measurement at EWR G1.	19.9 % nMAR[1]
X1-6 and X1-5	GU1-5			Flow measurement at EWR T1.	22.6 % nMAR[1]
X1-8 and X1-9	GU1-6			Flow measurement at EWR K3 and EWR L1.	9.9 and 11.7 % nMAR[1]
X1-6 and X1-5	GU1-5	Aquifer	No negative trend between peak drawdowns during dry seasons. Seasonal fluctuation to stay within natural range.	Water level - Depth to Groundwater Level at active monitoring boreholes using Groundwater Monitoring Guidelines*.	
X1-8 and X1-9	GU1-6				
All	All	Quality	Groundwater quality should be based on background groundwater quality. Sites that exceed the water use requirement# should not be allowed to deteriorate in water quality.	Background water quality per borehole/spring using Groundwater Monitoring Guidelines* Bi-annual monitoring.	
X1-1	GU1-1		Salinity levels should not increase. Concentrations must be maintained at levels to support domestic and ecological water users.	Salts - Electrical Conductivity. Bi-annual monitoring.	Electrical Conductivity ≤ 40 mS/m (based on quality dataset) [2].
X1-6 and X1-5	GU1-5		Nitrate values in the GU must be maintained to support domestic water users.	Nutrients – Nitrate (as Nitrogen). Bi-annual monitoring.	Nitrate (as N)< 4 mg/l in recharge area (based on quality dataset) [2].
X1-8 and X1-9	GU1-6		Nitrate values in the GU must be maintained to support domestic water users.	Nutrients – Nitrate (as Nitrogen). Bi-annual monitoring.	Nitrate (as N)< 5 mg/l in recharge area (based on quality dataset) [2].

Table 18: Summary of RQOs for Groundwater in the Crocodile River Catchment

IUA	GUs	Component	Narrative RQO	Indicator/Measure	Numerical Criteria
X2-2 and X2-4	GU2-3	Quantity	Groundwater flow directions in the resource unit should not be reversed from it natural flow directions towards the drainage systems.	Flow measurement at EWR C3 and ER1.	30.1 and 4.97 % nMAR[1].
X2-7, X2-5, X2-6, X2-8 and X2-9	GU2-4			Flow measurement at EWR C4.	9.07 % nMAR[1].
X2-10	GUA2-5			Continuous flow measurement at EWR C7.	6.18 % nMAR[1].
X2-2 and X2-4	GU2-3	Aquifer	No negative trend between peak drawdowns during dry seasons. Seasonal fluctuation to stay within natural range.	Water level - Depth to Groundwater Level at active monitoring boreholes using Groundwater Monitoring Guidelines*.	
X2-7, X2-5, X2-6, X2-8 and X2-9	GU2-4				
X2-10	GU2-5				
All	All	Quality	Groundwater quality should be based on background groundwater quality. Sites that exceed the water use requirement# should not be allowed to deteriorate in water quality.	Background water quality per borehole/spring using Groundwater Monitoring Guidelines*.	
X2-2 and X2-	GU2-3		Salinity levels should not	Salts - Electrical	Electrical Conductivity ≤

4			increase.	Conductivity. Bi-annual monitoring.	55mS/m (based on quality dataset) [2].
X2-7, X2-5, X2-6, X2-8 and X2-9	GU2-4		Nitrate values must be maintained to support domestic water users.	Nutrients – Nitrate (as Nitrogen). Bi-annual monitoring.	Nitrate values in the recharge area should not increase to >3mg/l[2].
X2-10	GUA2-5				
X2-10	GUA2-5		Salinity levels should not increase. Concentrations must be maintained at levels to support domestic and ecological water users.	Salts - Electrical Conductivity. Bi-annual monitoring.	Electrical Conductivity ≤ 60 mS/m (based on quality dataset) [2].

Table 19: Summary of RQOs for Groundwater in the Sabie-Sand River Catchment

IUA	GUs	Component	Narrative RQO	Indicator/Measure	Numerical Criteria
X3-1 and X3-2	GU3-1	Quantity	Groundwater flow directions in the resource unit should not be reversed from it natural flow directions towards the drainage systems.	Flow measurement at EWR 1 and EWR 4.	12.88 and 14.35 % nMAR[1].
X3-2, X3-4, X3-3 and X3-6	GU3-2			Flow measurement at EWR 5 and EWR 3.	28.32 and 9.71 % nMAR[1].
X3-7 and X3-8	GU3-3			Flow measurement at EWR 7 and EWR 6.	11.14 and 13.38 % nMAR[1].
X3-1 and X3-2	GU3-1	Aquifer	No negative trend between peak drawdowns during dry seasons. Seasonal fluctuation to stay within natural range.	Water level - Depth to Groundwater Level at active monitoring boreholes using Groundwater Monitoring Guidelines*.	
X3-7 and X3-8	GU3-3				
All	All	Quality	Groundwater quality should be based on background groundwater quality. Sites that exceed the water use requirement[#] should not be allowed to deteriorate in water quality.	Background water quality per borehole/spring using Groundwater Monitoring Guidelines*.	
X3-1 and X3-2	GU3-1		Nitrate values must be maintained to support domestic water users.	Nutrients – Nitrate (as Nitrogen). Bi-annual monitoring.	Nitrate values in the recharge area should not increase to >2mg/l[2].
X3-2, X3-4, X3-3 and X3-6	GU3-2				Nitrate (as N)<8mg/l in recharge area (based on quality dataset) [2].
X3-7 and X3-8	GU3-3				
X3-4	GU3-4				Nitrate (as N)<6mg/l in recharge area (based on quality dataset) [2].

* - A Guideline for the Assessment, Planning and Management of Groundwater Resources in South Africa, DWAF (2008).
# - South African Water Quality Guidelines, DWAF (1996).
1 - %nMAR is flow required at the nodes expressed as a percentage of the natural Mean Annual Runoff, Low flows.
2 - It is generally recognised that the groundwater chemistry evolves along a flow path, e.g. from a fresh low mineralised bicarbonate water in recharge areas to an older, higher mineralised water (water type dependent on amongst other factors the underlying geology) in discharge areas, where it often undergoes additional concentration increases due to evapotranspiration. Additional factors influencing the groundwater quality over relatively short distances include the occurrence of preferential flow paths (along fractures) or the proximity to pollution sources. The background quality observed at one monitoring site is therefore not necessarily applicable as a background value for another monitoring location.

Figure 1.1: Komati (X1) Catchment IUAs and Biophysical Nodes

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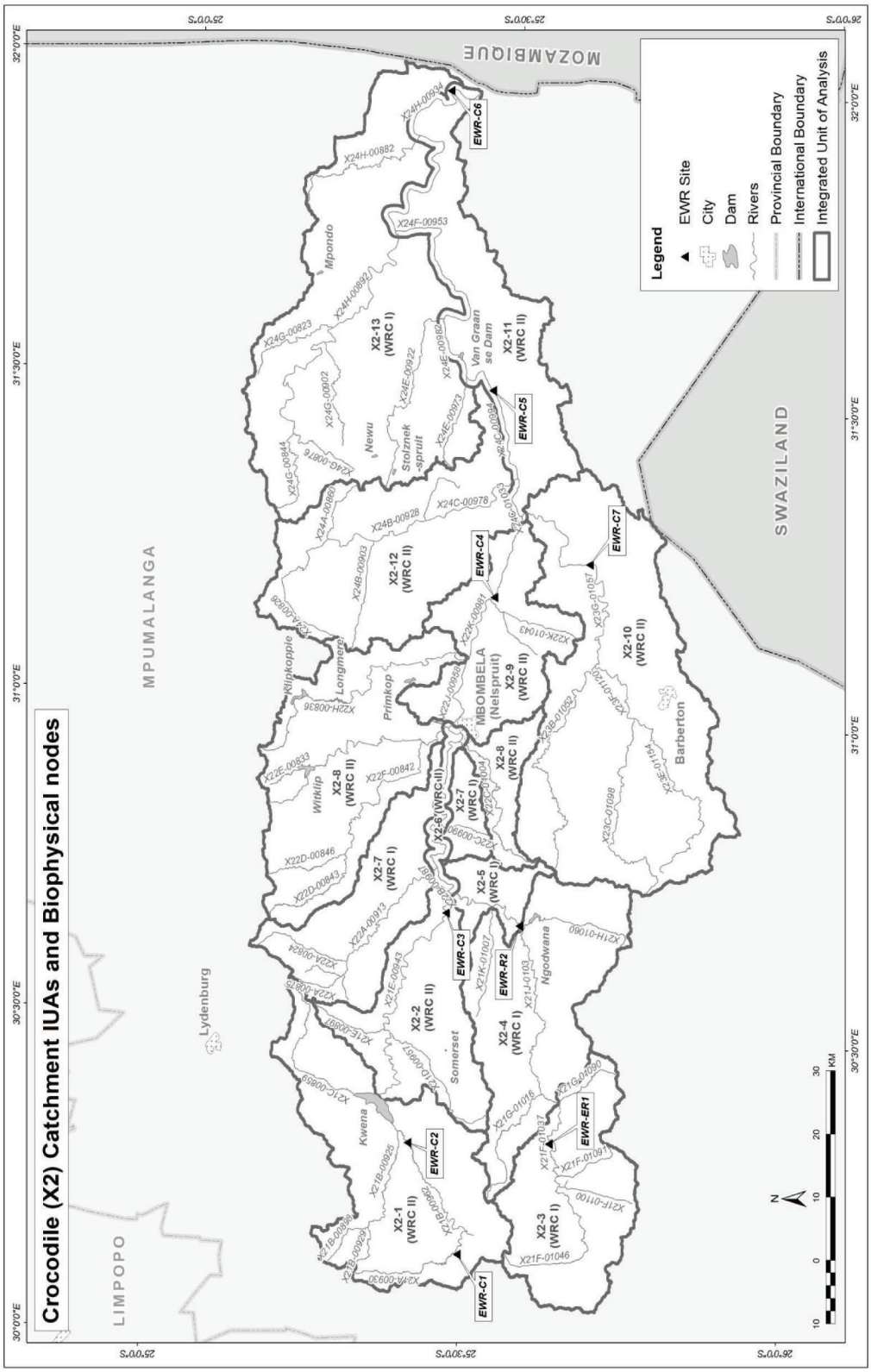

Figure 1.2: Crocodile (X2) Catchment IUAs and Biophysical Nodes

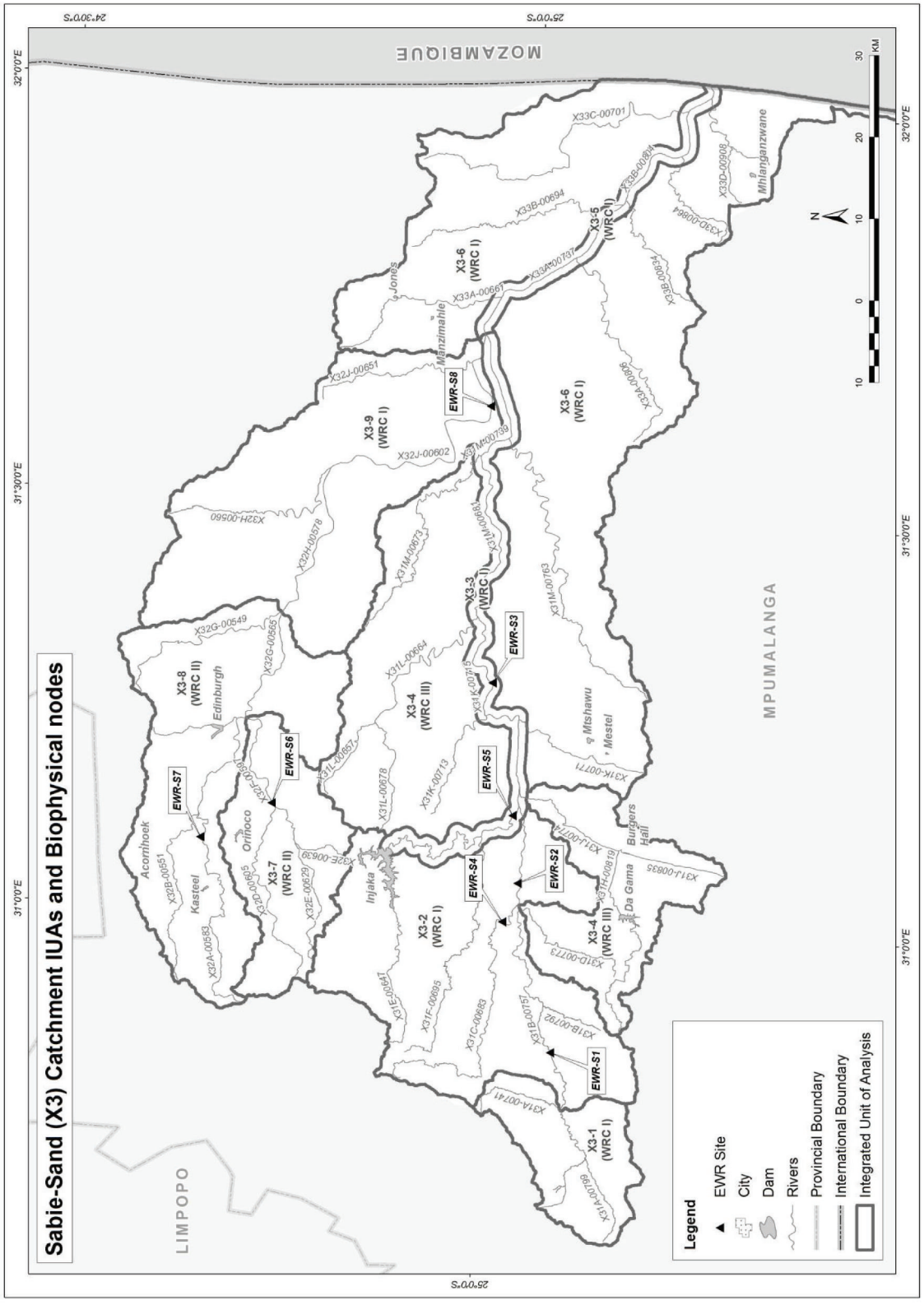

Figure 1.3: Sabie-Sand (X3) Catchment IUAs and Biophysical Nodes

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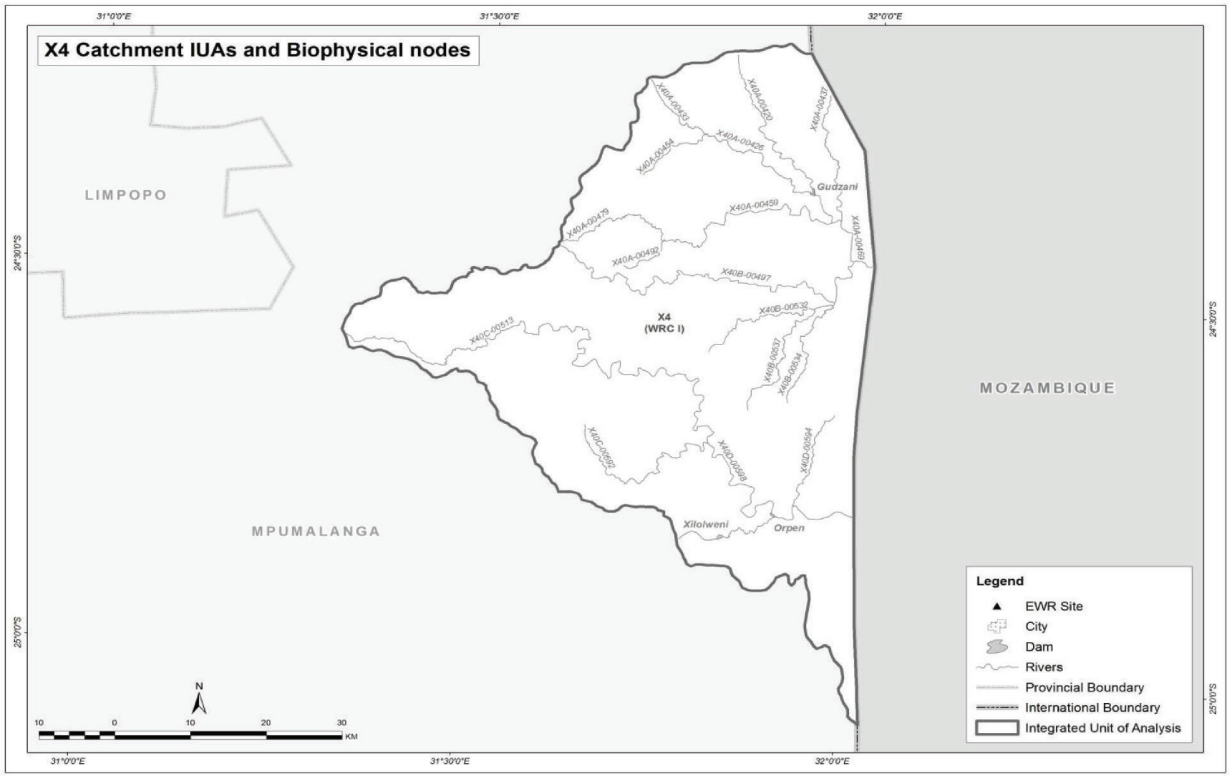

Figure 1.4: X4 Catchment IUAs and Biophysical Nodes

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