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DEPARTMENT OF WATER AND SANITATION

NO. 1298

23 NOVEMBER 2018

**NATIONAL WATER ACT, 1998
(ACT NO.36 OF 1998)****PROPOSED CLASSES OF WATER RESOURCE AND RESOURCE QUALITY OBJECTIVES
FOR THE BREEDE-GOURITZ WATER MANAGEMENT AREA**

I, Gugile Nkwinti, Minister of Water and Sanitation, hereby in terms of section 13(4) of the National Water Act, 1998 (Act No. 36 of 1998) publish, for public comment, the proposed classes of water resources and the proposed resource quality objectives for the Breede-Gouritz Water Management Area, in the Schedule, to be determined under S13(1) of the Act.

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

Director: Water Resource Classification
Attention: Ms Lebogang Matlala
Department of Water and Sanitation
Ndinaye Building 5046
178 Francis Baard Street
Private Bag x 313
Pretoria
0001
Facsimile: 012 336 6712
Email: matlalal@dws.gov.za



MR NKWINTI GE (MP)
MINISTER OF WATER AND SANITATION
DATE: 23/10/2018

SCHEDULE

DESCRIPTION OF THE WATER RESOURCE

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

Water Management Area: Breede-Gouritz
 Drainage Region: G40-G50, H10- H90, J10-J40, K10-K70 Tertiary Drainage Region
 River(s): Breede Overberg Area: Breede River, Rivieronderend River, Overberg River, as well as other smaller coastal rivers. Gouritz Coastal Area: Gouritz River, Buffels River, Touws River, Groot River, Gamka River, Olifants River, Kammanassie River, and smaller coastal rivers.

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

- i. The proposed water resource classes for Breede-Gouritz Water Management Area are listed in Table 1 according to the overall class per integrated unit of analysis (IUA), indicated in Figure 1 for Breede Overberg Area and indicated in Figure 2 for Gouritz Coastal Area.
- ii. IUAs are classified in terms of their extent of permissible utilisation and protection as either Class I: indicating high environmental protection and minimal utilisation; Class II indicating moderate protection and moderate utilisation; and Class III indicating sustainable minimal protection and high utilisation.
- iii. Table 1 provides the IUA, its water resource class and its respective catchment configuration. The catchment configuration consists of a number of biophysical nodes representing river reaches or resource units (RUs). The ecological category to be maintained for each RU in the IUA is provided.

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

- i. Resource Quality Objectives (RQOs) are defined for each prioritised RU for every IUA in terms of water quantity, habitat and biota, and water quality. Prioritised RUs for Breede Overberg Area are indicated in Figure 1 and prioritised RUs for Gouritz Coastal Area are indicated in Figure 2.
- ii. Table 2 to Table 17 provide the RQOs for RIVERS in priority RUs.
- iii. Table 18 to Table 26 provide the RQOs for ESTUARIES in priority RUs.
- iv. Table 27 to Table 40 provide the RQOs for GROUNDWATER in priority RUs.
- v. RQOs 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.

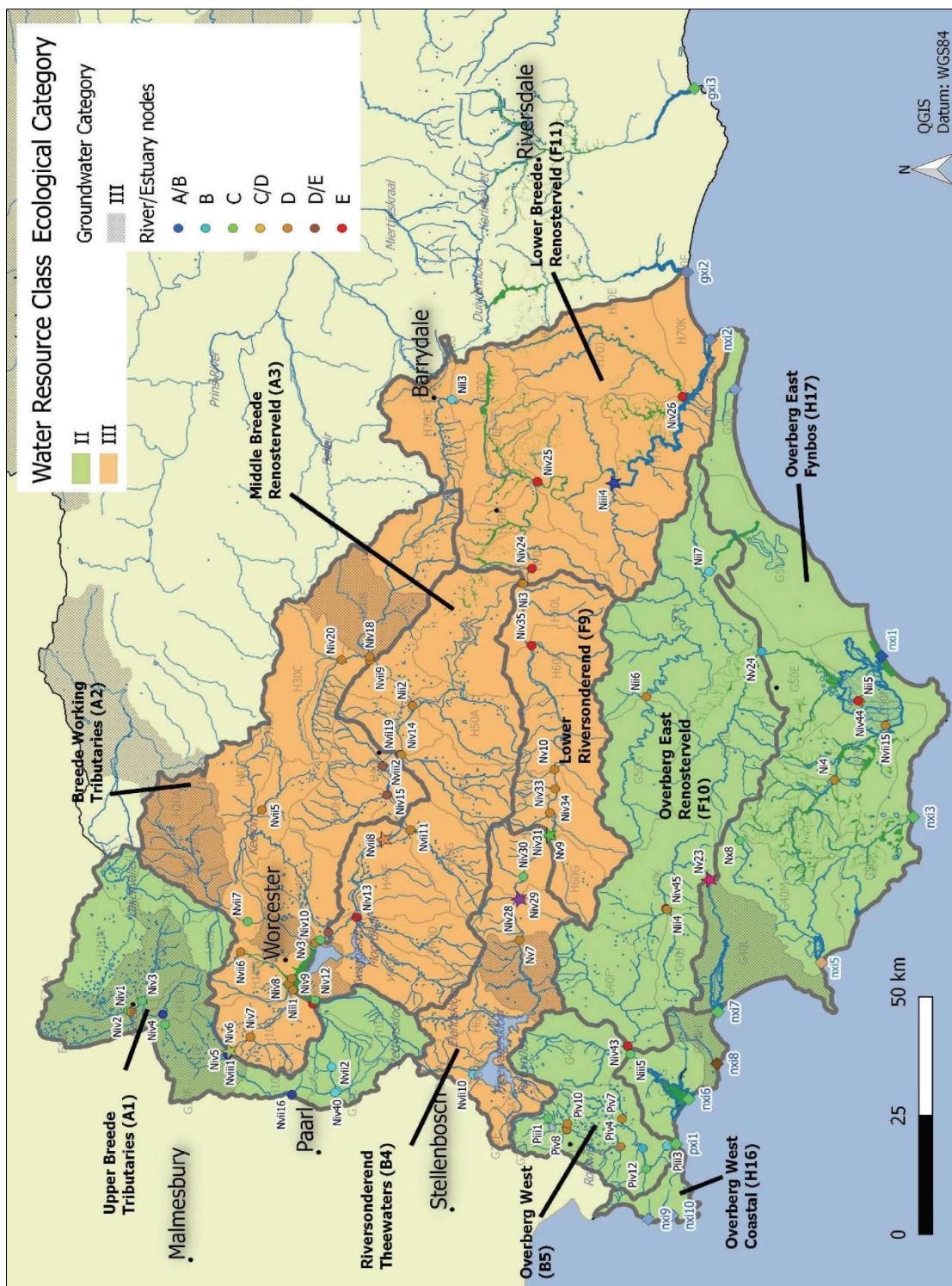


Figure 1: Proposed Water Resource Classes for the Breede Overberg Area

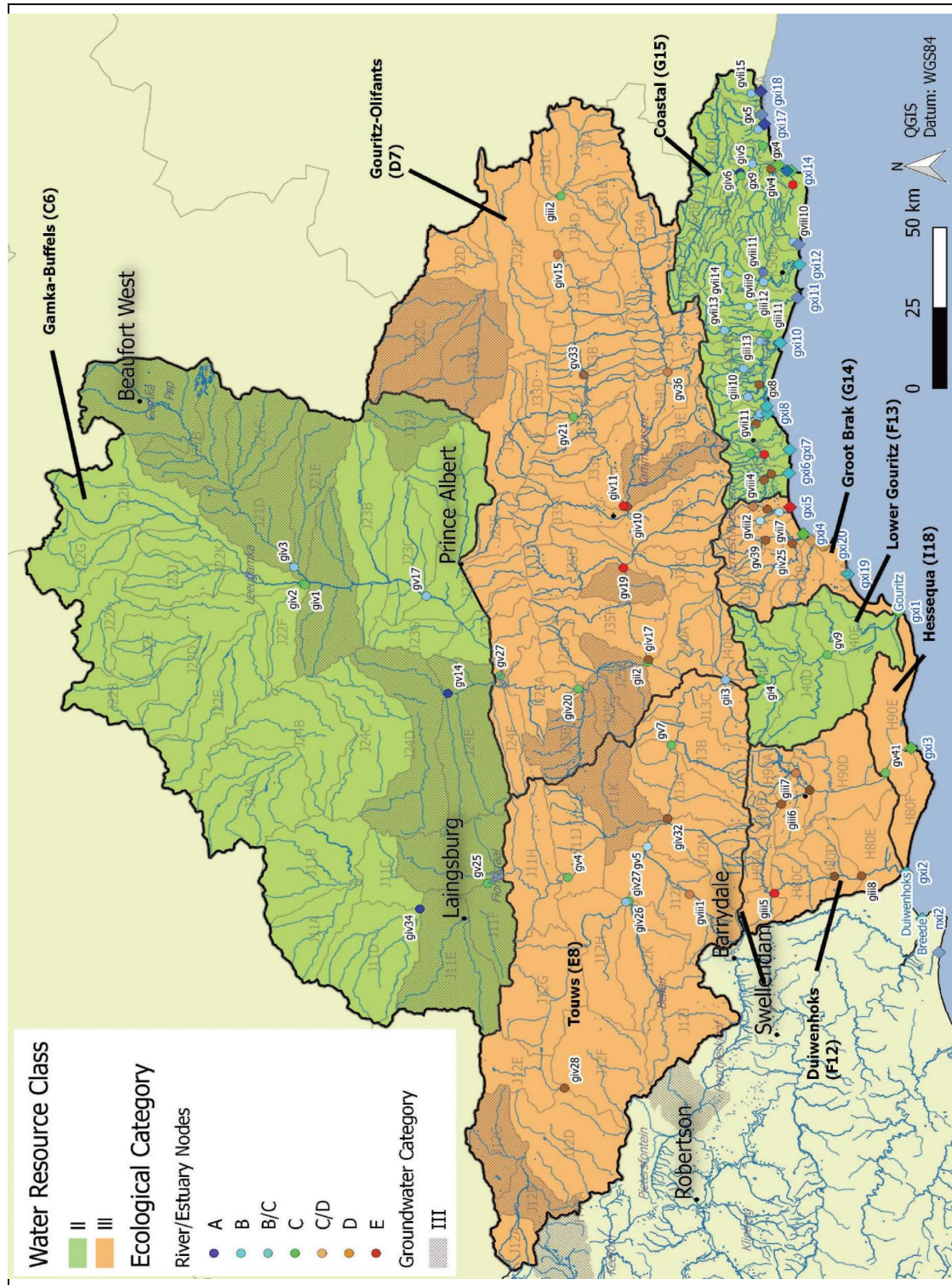


Figure 2: Proposed Water Resource Classes for the Gouritz Coastal Area

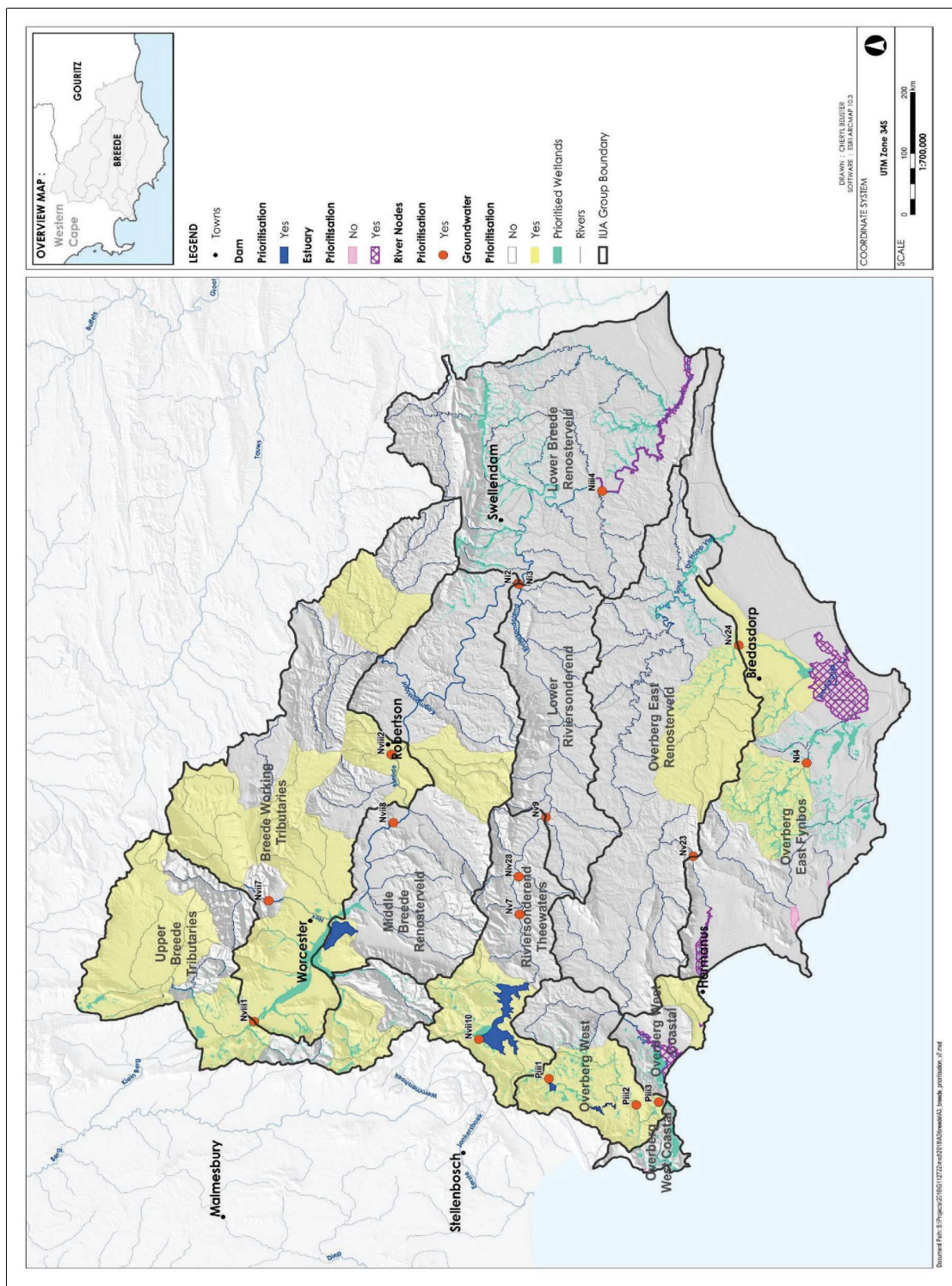


Figure 3: Proposed Priority Resource Units for the Breede Overberg Area

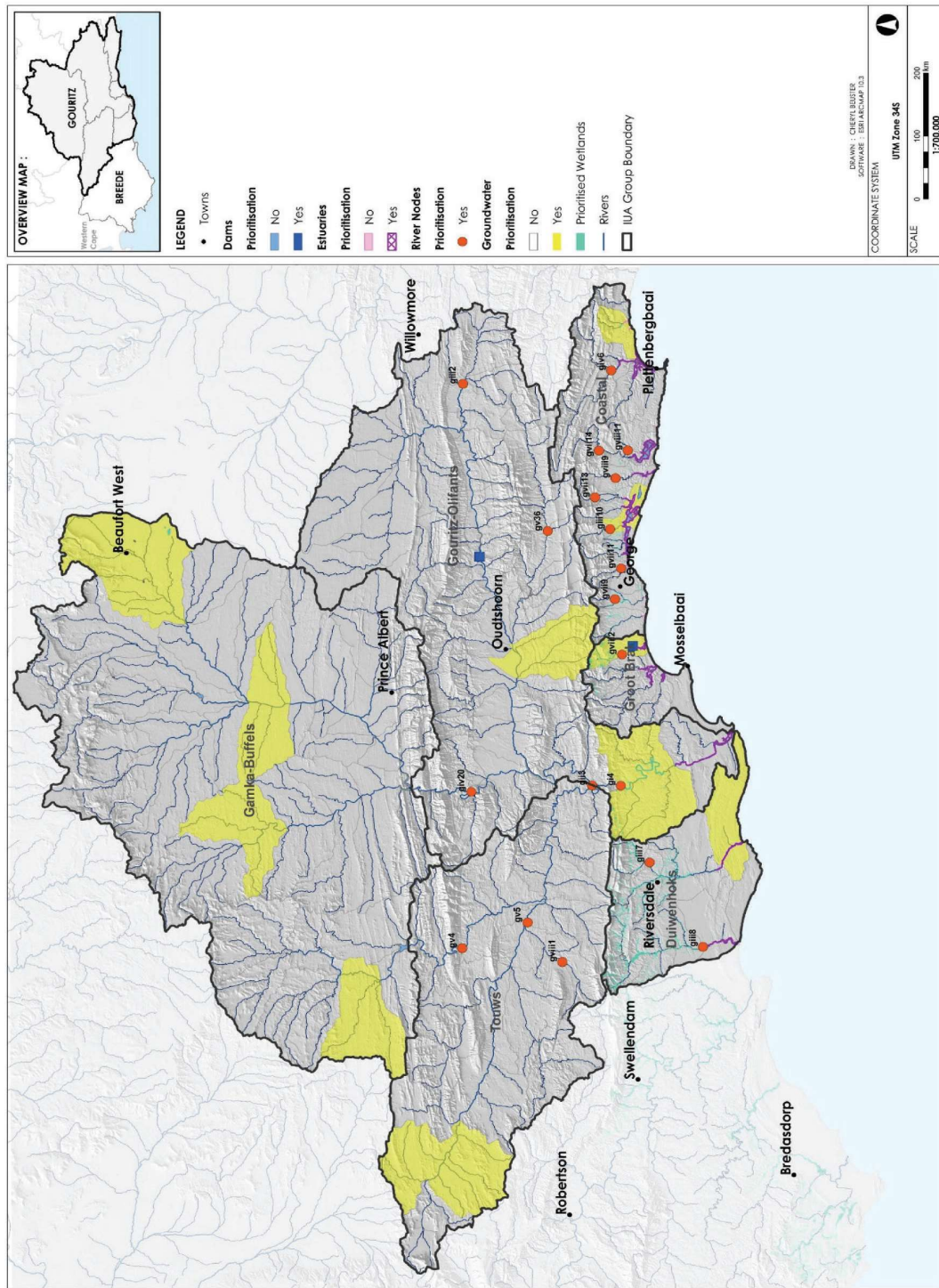


Table 1: Summary of Water Resource Classes per Integrated Unit of Analysis and Ecological Categories

Integrated Unit of Analysis (IUA)	Water Resource Class for IUA	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Natural MAR (million m ³ /a)
A1 Upper Breede Tributaries	II	H10B		Titus River	Niv3	C	21.45
		H10C		Koekedou River	Niv1	D	18.80
		H10C		Dwars River	Niv2	C	74.90
		H10C		Breede River	niv4	C	126.90
		H10D		Witels River	Niv4	A	84.30
		H10D		Breede River	Niv3	C	252.80
		H10E		Witte River	Nvii16	A	42.50
		H10F		Witte River	Niv5	A	141.70
		H10F		Wabooms River	Niv6	D	7.40
		H10F	A1-R01	Breede River	Nviii1	D	434.90
		H10J		Elands River	Niv40	B	58.10
		H10J		Krom River	Niv41	B	8.90
		H10J	A1-R02	Molenaars River	Nvii2	B	105.60
		H10G		Slanghoek River	Niv7	D	32.60
		H10G		Breede River	Niii1	D	497.60
		H10J		Smalblaar River	Niv42	E	191.20
A2 Breede Woring tributaries	III	H10H		Jan du Toit River	Niv8	D	17.90
		H10H		Hartbees River	Nvii6	D	4.00
		H10H		Hartbees River	Niv9	D	10.30
		H10K		Holsloot River	Niv12	C	119.60
		H10H		Breede River	Nv3	C	850.90
		H20F		Hex River	Nv18	D	10.90
		H20G	A2-R03	Hex River	Nvii7	C	102.80
		H20H		Hex River	Niv10	D	107.10
		H40C		Breede River	Nii1	C	957.90
		H40B		Koo River	Nvii5	D	0.90
		H40C		Nuy River	Niv11	D/E	29.30
		H30B		Kingna River	Niv18	D	27.80
		H30C		Pietersfontein River	Niv20	D	17.30
		H30D		Kaaisie River	Nvii9	D	21.10

Integrated Unit of Analysis (IUA)	Water Resource Class for IUA	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Natural MAR (million m ³ /a)
A3 Middle Breede Renosterveld	III	H40D		Doring River	Niv13	E	47.50
		H40F	A3-R04	Breede River	Nvii8	C/D	1042.80
		H40F		Breede River	Ni1	A/B	1043.40
		H40G		Poesjenels River	Nvii11	D	16.10
		H40H		Vink River	Niv15	D/E	15.60
		H40J		Willem Nels River	Nviii2	D/E	5.20
		H40J		Breede River	Nvii19	A/B	1081.90
		H40K		Keisers River	Nvii12	D	7.10
		H40K		Keisers River	Niv14	D	12.60
		H40L		Breede River	Nv11	D	1099.90
		H30E		Kogmanskloof River	Nli2	D	52.00
		H50A		Breede River	Nlii3	D	1153.40
		H50B	A3-R05	Breede River	Ni2	D	1170.10
		H60B	B4-R06	Du Toits River	Nvii10	B	43.90
		H60D	B4-R07	Riversonderend River	Nv7	C	370.20
		H60E	B4-R08	Baviaans River	Niv28	B	7.90
B4 Upper Riversonderend	III	H60E		Sersants River	Niv29	D	4.50
		H60F		Gobos River	Niv30	C	12.40
		H60F	B4-R09	Riversonderend River	Nv9	D	413.70
		H60G		Kwartel River	Niv31	D	10.70
		H60H		Soetmelksvlei River	Niv33	D	4.00
		H60H		Slang River	Niv34	D	2.10
		H60H		Riversonderend River	Nv10	D	442.90
		H60J		Riversonderend River	Nv11	D	463.10
		H60K		Kwassadie River	Niv35	E	5.90
		H60K		Riversonderend River	Nv12	D	474.50
F9 Lower Riversonderend	III	H60L	F9-R10	Riversonderend River	Ni3	D	483.80

Integrated Unit of Analysis (IUA)	Water Resource Class for IUA	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Natural MAR (million m ³ /a)
B5 Overberg West	II	G40C	B5-R11	Palmiet River	Piii1	C	250.40
		G40C		Witklippieskloof River	Piv10	D	15.10
		G40C		Palmiet River	Piv9	D	78.70
		G40C		Palmiet River	Pvi1	D	100.50
		G40C		Klipdrif River	Piv8	D	13.60
		G40D		Klein-Palmiet River	Piv4	D	13.70
		G40D		Krom/Ribbok River	Piv7	D	27.50
		G40D	B5-R12	Palmiet River	Piii2	B/C	206.70
		G40D		Dwars/Louws River	Piv12	C	25.20
		G40D	B5-R13	Palmiet River	Piii3	B	250.50
H16 Overberg West Coastal	II	G40D	B5-E01	Palmiet Estuary	Pxi1	C	173.44
		G40B	H16-E02	Buffels Estuary	Bxi1	B	8.80
		G40B	H16-E03	Rooiels Estuary	Bxi2	B	9.44
		G40F		Swart River	Niv43	E	42.10
		G40E		Bot River	Niii5	C	74.10
		G40G	H16-E04	Bot Estuary	Nxi6	C	77.67
		G40H	H16-E05	Onrus Estuary	Nxi8	D	2.49
		G40J		Hartbees River	Nii4	D	18.40
		G40K		Steenbok River	Niv45	E	10.80
		G40K	F10-R14	Klein River	Nv23	C/D	38.38
F10 Overberg East Renosterveld	II	G50G		Sout River	Nii6	D	4.20
		G50H		DeHoopVlei River	Nii7	B	27.10
		G40L	H17-E06	Klein Estuary	Nxi7	C	51.21
		G40M		Uilkraal River	Nx8	C	2.40
		G40M	H17-E07	Uilkraal Estuary	Nxi5	C/D	6.28
		G50A	H17-E08	Ratel Estuary	Nxi3	C	3.42
		G50B	H17-R15	Nuwejaar River	Ni4	C/D	12.50
		G50C		Heuningnes River	Nvii15	C/D	17.80
		G50C		Heuningnes River	Niv44	C/D	18.80
		G50D	H17-R16	Kars River	Nv24	B/C	15.40
H17 Overberg East Fynbos	II	G50E		Kars River	Nii5	E	21.60
		G50F	H17-E09	Heuningnes Estuary	Nxi1	A/B	30.56
		G50K	H17-E10	Klipdriffontein Estuary	Bxi3	A	0.75

Integrated Unit of Analysis (IUA)	Water Resource Class for IUA	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Natural MAR (million m ³ /a)
F11 Lower Breede Renosterveld	II	H70A		Leeu River	Niv24	E	5.80
		H70B		Klip River	Niv24a	E	24.50
		H70B		Breede River	Nv2	C	1701.40
		H70C		Huis River	Nvii14	C	3.20
		H70C		Tradouw River	Nli3	B	19.40
		H70F		Buffelljags River	Niv25	E	119.40
		H70G	F11-R17	Breede River	Nlii4	C	1832.70
		H70H		Breede River	Nviii3	B	1841.20
		H70J		Slang River	Niv26	E	10.00
		H70K	F11-E11	Breede Estuary	Nxi2	B	1022.56
C6 Gamka Buffels	II	J11C		Buffels River	giv34	A	13.10
		J11F		Buffels River	gv25	C	24.30
		J21A		Gamka River	gv18	B	26.70
		J21D		Gamka River	giv3	B	31.90
		J22F		Koekemoers River	giv1	C	7.40
		J22K		Leeu River	giv2	C	17.10
		J23C		Gamka River	gv17	B	58.20
		J23F		Gamka River	giv21	B	68.00
		J23J		Gamka River	gv27	C	69.60
		J24D		Dwyka River	gv14	A	4.00
E8 Touws	III	J12C		Ysterdams River	giv30	D	2.80
		J12B		Donkies River	giv31	D	6.90
		J12D		Touws River	giv28	D	16.40
		J12H		Touws River	giv27	B	26.40
		J12K		Brak River	giv26	C	2.90
		J12L	E8-R18	Doring River	gviii1	C/D	2.90
		J12L	E8-R19	Touws River	gv5	B/C	33.50
		J11H	E8-R20	Buffels River	gv4	C	27.40
		J11J	E8-R21	Groot River	gv6	D	29.70
		J11K		Groot River	giv32	D	30.50
		J13A		Groot River	gv7	C	77.70
		J13C	E8-R22	Groot River	gli3	B	78.10

Integrated Unit of Analysis (IUA)	Water Resource Class for IUA	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Natural MAR (million m ³ /a)
D7 Gouritz-Olifants; Lower Gouritz	III	J25A	D7-R23	Gamka River	giv20	C	79.80
		J25D		Nels River	giv18	E	10.90
		J25E		Gamka River	gii2	C	111.80
		J31C	D7-R24	Olifants River	giii2	C	11.80
		J32E		Traka River	giv15	C/D	2.80
		J33B		Olifants River	gv33	D	25.00
		J33D		Meirings River	gv21	C	21.40
		J33F		Olifants River	giv11	E	79.90
		J34C	D7-R25	Kammanassie River	gv36	C/D	41.20
		J34F		Kammanassie River	giv10	D	59.20
		J35A		Grobbelaars River	gvii2	C	16.90
		J35A		Grobbelaars River	giv9	E	30.70
		J35D		Olifants River	gv19	E	224.50
		J35F		Olifants River	giv17	D	253.40
F13 Lower Gouritz	II	J40A		Gouritz River	giv16	C	394.90
		J40B	F13-R26	Gouritz River	gj4	C	489.10
		J40C		Gouritz River	gv28	D	21.40
		J40D		Gouritz River	gv9	C	571.80
		J40E	F13-E12	Gouritz Estuary	Gxi1	C	294.69
		H80B		Duienhoks River	giii5	E	62.50
F12 Duienhoks	III	H80C		Duienhoks River	gv11	D	75.10
		H80D	F12-R27	Duienhoks River	giii8	D	83.30
		H80E	F12-E13	Duienhoks Estuary	Gxi2	B	73.65
		H90B		Korinte River	giii6	D	34.20
I18 Hessequa	III	H90A	I18-R28	Goukou River	giii7	C/D	50.90
		H90C		Goukou River	gv10	D	92.90
		H90D		Goukou River	gv41	C	104.90
		H90E	I18-E14	Goukou Estuary	Gxi3	C	89.94

Integrated Unit of Analysis (IUA)	Water Resource Class for IUA	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Natural MAR (million m ³ /a)
G14 Groot Brak	III	K10D		Brandwag River	g1v25	D	17.90
		K10E		Moordkuil River	gv39	D	15.70
		K10F	G14-E15	Klein-Brak estuary	Gx14	C	39.10
		K20A	G14-R29	Groot-Brak River	gviii2	B/C	15.30
		K20A		Varing River	gviii12	C/D	6.00
		K20A		Varing River	gviii3	D	8.40
		K20A		Groot-Brak River	gvii7	B/C	27.00
		K20A	G14-E16	Groot-Brak estuary	Gxi5	E	16.77
		K10A	G14-E17	Blinde estuary	Gxi19	B	0.90
		K10A	G14-E18	Tweekuilen estuary	Gxi20	D	0.94
		K10A	G14-E19	Gericke estuary	Gxi21	D	0.29
		K10B	G14-E20	Hartenbos estuary	Gxi22	D	4.15
		K30A		Maalgate River	gviii4	D	15.30
		K30A		Maalgate River	gvii8	D	22.84
		K30A	G15-E21	Maalgate Estuary	Gxi6	B	29.81
		K30B	G15-R30	Malgas River	gvii9	C	8.16
		K30B		Gwaing River	gviii6	E	13.92
G15 Coastal	II	K30B	G15-E22	Gwaing Estuary	Gxi7	B	22.64
		K30C		Swart River	gviii7	D	16.10
		K30C	G15-R31	Kaaimans River	gvii11	B	17.53
		K30C		Silver River	gviii8	B	14.90
		K30C	G15-E23	Kaaimans Estuary	Gxi8	B	35.32
		K30D		Touws River	gvii12	B	16.70
		K30D		Klein River	gx8	D	2.50
		K30D	G15-E24	Wilderness Estuary	Gxi9	B	29.01
		K40A	G15-R32	Diep River	giii10	B	12.40
		K40B		Hoekraal River	giii13	B	27.90
		K40C	G15-R33	Karatara River	gvii13	B	11.20
		K40C		Karatara River	giii11	B	33.90
		K40D	G15-E25	Swartvlei Estuary	Gxi10	B	76.19
		K40E	G15-R34	Goukamma River	gviii9	B/C	30.40
		K40E	G15-E26	Goukamma Estuary	Gxi11	B	46.25
		K50A	G15-R35	Knysna River	gvii14	B	26.50
		K50A		Knysna River	giii12	B	46.60

Integrated Unit of Analysis (IUA)	Water Resource Class for IUA	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Natural MAR (million m ³ /a)
		K50B	G15-R36	Gouna River	gviii11	A/B	27.60
		K50B	G15-E27	Knysna Estuary	Gxi12	B	68.83
		K60G		Noetzie River	gviii10	B	4.80
		K60G	G15-E28	Noetsie estuary	Gxi13	B	3.59
		K60G		Piesang River	gx3	E	7.30
		K60G	G15-E29	Piesang Estuary	Gxi14	C	5.12
		K60C	G15-R37	Keurbooms River	giv6	C	46.10
		K60D		Palmiet River	giv5	A	42.10
		K60E		Keurbooms River	gx9	B	91.30
		K60F		Bitou River	giv4	C	23.60
		K60G	G15-E30	Keurbooms Estuary	Gxi15	A	131.60
		K70A		Buffels River	gx4	B/C	1.80
		K70A	G15-E31	Matjies Estuary	Gxi16	C	3.25
		K70A		Sout River	gx5	B	3.80
		K70A	G15-E32	Sout(Oos) Estuary	Gxi17	A	5.99
		K70A	G15-E33	Groot(Wes) Estuary	Gxi23	B	11.10
		K70B		Bloukrans River	gvii15	B	31.20
		K70B	G15-E34	Bloukrans Estuary	Gxi18	A	11.10

Table 2: Resource Quality Objectives for RIVERS in priority Resource Units in the Integrated Unit of Analysis A1 Upper Breede Tributaries

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
A1 Upper Breede Tributaries	II	H10F	A1-R01	Breede River	nviii1	D	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Breede River in a condition equal to or better than a D category.	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
									Maintenance flows (million cubic metres)		High	1.651	4.007	2.105	1.934	1.268	1.754	2.343	3.544	6.452	7.719	10.526	13.009
											Low	6.667	1.651	2.105	1.934	1.268	1.754	2.343	3.544	6.452	7.719	10.526	13.009
							Quality	Nutrients	Phosphate (PO ₄ -P)	River nutrient levels must be maintained in a mesotrophic or better condition.	≤ 0.075 milligrams per litre (50 th percentile)												
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams per litre (50 th percentile)												
									Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at levels that do not adversely affect aquatic ecosystems	≤ 55 milliSiemens/metre EC (95 th percentile)											
							Quality	System variables	pH range	Dissolved oxygen	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≥ pH ≤ 8.5 (5 th and 95 th percentiles)											
												DO ≥ 6 milligrams per litre (5 th percentile)											
									Toxins	Ammonia Atrazine Endosulfan	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.073 milligrams per litre (95 th percentile) ≤ 0.079 milligrams per litre (95 th percentile) ≤ 0.0013 milligrams per litre (95 th percentile)											
							Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95 th percentile)													
										Geomorphology	GAI score	D category (42-57%)											
											VEGRAI score	D category (42-57%)											
							Habitat	Riparian vegetation	Marginal zone cover abundance	VEGRAI level 3 should be within a D category (42-57%).	No exotic species, no terrestrial woody species												
									Lower zone cover abundance		No exotic species, no terrestrial woody species												
Upper zone cover abundance	Exotic species < 5%, terrestrial woody species > 50%																						
Biota	Fish	FRAI score	FRAI should be within a D category (42-57%).	D category (42-57%)																			
		MIRAI score		D category (42-57%)																			

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric														
									Invertebrate diversity	category (42-57%)	SASS score > 70, ASPT > 5.0														
									Number of families		> 15 families at abundances A - C														
							Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Molenaars River in a condition equal to or better than a B category.	Months	High	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
											Maintenance flows (million cubic metres)	Low	3.381	3.434	2.506	1.584	1.022	0.869	0.909	1.356	2.479	3.588	4.149	4.39	4.002
											≤ 0.025 milligrams per litre (50 th percentile)														
								Nutrients	Phosphate (PO ₄ -P) Total inorganic nitrogen (TIN)	Nutrient levels must be maintained in the river at an oligotrophic condition.	≤ 0.70 milligrams per litre (50 th percentile)														
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at levels that do not adversely affect aquatic ecosystems	≤ 30 milliSiemens/metre (95 th percentile)														
									pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	4.5 ≥ pH ≤ 7.5 (5 th and 95 th percentiles)														
							Quality	System variables	Dissolved oxygen		≥ 8 milligrams per litre (5 th percentile)														
								Toxins	Ammonia	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.073 milligrams per litre (95 th percentile)														
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Ideal category for full contact recreation.	≤ 130 counts/100ml (95 th percentile)														
								Geomorphology	GAI score	GAI score should be within B category (42-57%).	B category (82-87%)														
							Habitat	Riparian vegetation	VEGRAI score Marginal zone cover abundance Lower zone cover abundance	VEGRAI level 3 should be within a B category (82-87%)	B category (82-87%) No exotic species, no terrestrial woody species No exotic species, no terrestrial woody species														
							Biota	Fish	FRAI score	FRAI should be within a E category (22-37%)	E category (22-37%)														

Table 3: Resource Quality Objectives for RIVERS in priority Resource Units in the Integrated Unit of Analysis A2 Breede Working Tributaries

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																	
A2 Breede Working Tributaries	III	H20G	A2-R03	Hex River	nvi17	C	Quantity	Low flows High flows	Flows shall be sufficient to maintain the Hex River in a condition equal to or better than a C category.	Maintenance low flows Maintenance high flows	≤ 0.075 milligrams/litre (50 th percentile) ≤ 1.75 milligrams/litre (50 th percentile) ≤ 55 milliSiemens/metre (95 th percentile) 6.5 ≥ pH ≤ 8.5 (5 th and 95 th percentiles) ≥ 8 milligrams per litre (5 th percentile) ≤ 0.073 milligrams per litre (95 th percentile) ≤ 0.079 milligrams per litre (95 th percentile) ≤ 0.0013 milligrams per litre (95 th percentile) ≤ 165 counts/100ml (95 th percentile) C/D category (57-62%) D category (42-57%) No exotic species, no terrestrial woody species No exotic species, no terrestrial woody species D category (42-57%) C category (62-77%) SASS score > 100, ASPT > 6.3	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep				
												Maintenance flows (million cubic metres)	High	2.998	0.387	0.395	1.888	1.18	1.066	0.943	1.142	1.652	1.137	2.26	1.098	6.801	2.797	3.333
													Low	2.998	0.387	0.395	1.888	1.18	1.066	0.943	1.142	1.652	1.137	2.26	1.098	6.801	2.797	3.333
							Quality	Nutrients	Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	Maintenance low flows Maintenance high flows																	
									Total inorganic nitrogen (TIN)	Salt concentrations need to be maintained at levels that do not adversely affect aquatic ecosystems	Maintenance low flows Maintenance high flows																	
									Electrical conductivity (EC)	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	Maintenance low flows Maintenance high flows																	
								System variables	pH range	Toxicity levels must not pose a threat to aquatic ecosystems. Concentrations of waterborne pathogens should be maintained in an acceptable category for full contact recreation.	Maintenance low flows Maintenance high flows																	
									Dissolved oxygen		Maintenance low flows Maintenance high flows																	
									Ammonia		Maintenance low flows Maintenance high flows																	
							Toxins	Pathogens	Atrazine	Toxicity levels must not pose a threat to aquatic ecosystems. Concentrations of waterborne pathogens should be maintained in an acceptable category for full contact recreation.	Maintenance low flows Maintenance high flows																	
									Endosulfan		Maintenance low flows Maintenance high flows																	
									Escherichia coli		Maintenance low flows Maintenance high flows																	
							Geomorphology	Habitat	GAI score	GAI score should be within a C/D category (57-62%).	Maintenance low flows Maintenance high flows																	
									VEGRAI score	VEGRAI level 3 should be within a D category (42-57%).	Maintenance low flows Maintenance high flows																	
									Marginal zone cover abundance		Maintenance low flows Maintenance high flows																	
							Biota	Fish	Lower zone cover abundance	FRAI should be within a D category (42-57%).	Maintenance low flows Maintenance high flows																	
									FRAI score		Maintenance low flows Maintenance high flows																	
									MIRAI score		Maintenance low flows Maintenance high flows																	
Invertebrates	Fish	Invertebrate diversity	FRAI should be within a D category (42-57%).	Maintenance low flows Maintenance high flows																								
		FRAI score		Maintenance low flows Maintenance high flows																								
		MIRAI score		Maintenance low flows Maintenance high flows																								

Table 4: Resource Quality Objectives for RIVERS in priority Resource Units in the Integrated Unit of Analysis A3 Middle Breede Renosterveld

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																		
A3 Middle Breede Renosterveld	III	H40F	A3-R04	Breede River	nvii8	C/D	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Breede River in a condition equal to or better than a C/D category.	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep						
							Quality	Nutrients	Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50 th percentile)																		
									Total inorganic nitrogen (TIN)	be maintained in the river at a mesotrophic or better condition.	≤ 1.75 milligrams/litre (50 th percentile)																		
									Electrical conductivity (EC)	Salt concentrations need to be maintained at levels that do not adversely affect aquatic ecosystems	≤ 55 milliSiemens/metre (95 th percentile)																		
							Quality	System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≥ pH ≤ 8.5 (5 th and 95 th percentiles)																		
									Dissolved oxygen		≥ 6 milligrams litre (5 th percentile)																		
									Ammonia	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.073 milligrams per litre (95 th percentile)																		
							Pathogens	Toxins	Atrazine		≤ 0.079 milligrams per litre (95 th percentile)																		
									Endosulfan		≤ 0.0013 milligrams per litre (95 th percentile)																		
									Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95 th percentile)																		
							Habitat	Geomorphology	GAI score	GAI score should be within C category (52-67%).	C category (62-77%)																		
									VEGRAI score		C category (62-77%)																		
									Marginal zone cover abundance	VEGRAI level 3 should be within a C category (52-67%).	No exotic species, no terrestrial woody species																		
									Lower zone cover abundance		No exotic species, no terrestrial woody species																		
							Biota	Fish	Upper zone cover abundance		Exotic species < 5%, terrestrial woody species > 30%																		
									FRAI score	FRAI should be within a D category (42-57%).	D category (42-57%)																		
									Invertebrates	MIRAI score	MIRAI score to be within D	D category (42-57%)																	

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
								Invertebrate diversity	category (42-57%).	SASS score < 45, ASPT > 4.3
								Number of families		> 14 families at A - C abundance
						Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Breede River in a condition equal to or better than a D category.	Months Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
										0 13.406 8.861 3.095 2.454 2.911 1.301 3.367 4.395 9.942 13.992 19.944 17.315
										Low High
										Flows (million cubic metres)
										Maintenance
										≤ 0.075 milligrams/litre (50 th percentile)
										≤ 1.75 milligrams/litre (50 th percentile)
										95 th percentile
										95 th tile ≤ 220 milliSiemens/metre EC
										6.5 ≥ pH ≤ 8.5 (5 th and 95 th percentiles)
										≥ 6 milligrams litre (5 th percentile)
										No more than 2°C change in natural monthly range (minimum and maximum)
										n/a
										95 th tile ≤ 165 cfu/100ml Escherichia coli

Table 5: Resource Quality Objectives for RIVERS in priority Resource Units in the Integrated Unit of Analysis B4 Riversonderend Theewaters

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																		
B4 Riversonderend Theewaters	III	H60B	B4-R06	Du Toits River	nvii10	B	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Du Toits River in a condition equal to or better than a B category.	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep						
											Maintenance flows (million cubic metres)	High	1.406	0.369	1.041	0.658	0.425	0.362	0.376	0.564	1.032	1.794	2.585	3.218	0.54	1.081			
												Low	1.663																
							Quality	Nutrients	Phosphate (PO ₄ -P) Total inorganic nitrogen (TIN)	Nutrient levels must be maintained in the river in an oligotrophic condition	≤ 0.025 milligrams per litre (50 th percentile)																		
											≤ 0.70 milligrams per litre (50 th percentile)																		
											≤ 30 milliSiemens/metre (95 th percentile)																		
											pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.																		
											6.5 ≥ pH ≤ 8.5 (5 th and 95 th percentiles)																		
							Toxins	System variables	Dissolved oxygen	Toxicity levels must not pose a threat to aquatic ecosystems.	≥ 8 milligrams per litre (5 th percentile)																		
											≤ 0.079 milligrams per litre (95 th percentile)																		
											≤ 0.0013 milligrams per litre (95 th percentile)																		
											≤ 130 counts/100ml (95 th percentile)																		
											≤ 130 counts/100ml (95 th percentile)																		
B4 Riversonderend Theewaters	III	H60D	B4-R07	Riversonderend River	nv7	C	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Riversonderend River in a condition equal to or better than a D category.	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep						
											Maintenance flows (million cubic metres)	High	10.539	0.65	6.134	0.799	0.437	0.593	0.451	0.542	2.32	3.019	2.983	7.927	13.51	19.787	7.927	11.009	
												Low	11.009																
							Quality	Nutrients	Phosphate (PO ₄ -P) Total inorganic nitrogen (TIN)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50 th percentile)																		
											≤ 1.75 milligrams/litre (50 th percentile)																		
											≤ 55 milliSiemens/metre (95 th percentile)																		
											Salt concentrations need to be maintained at levels that do not adversely affect aquatic ecosystems																		
											6.5 ≥ pH ≤ 8.5 (5 th and 95 th percentiles)																		

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																																							
B4 Riversonderend Theewaters	III	H60E	B4-R08	Baviaans River	niv28	B	Quality	variables	Dissolved oxygen	dissolved oxygen are important for the maintenance of ecosystem health.	≥ 6 milligrams litre (5 th percentile)																																							
								Toxins	Atrazine Endosulfan	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.079 milligrams per litre (95 th percentile) ≤ 0.0013 milligrams per litre (95 th percentile)																																							
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95 th percentile)																																							
								Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Baviaans River in a condition equal to or better than a B category.	<table><tr><th>Months</th><th>High flows (million cubic metres)</th><th>Low flows (million cubic metres)</th></tr><tr><td>Oct</td><td>0.026</td><td>0.292</td></tr><tr><td>Nov</td><td>0</td><td>0.24</td></tr><tr><td>Dec</td><td>0</td><td>0.109</td></tr><tr><td>Jan</td><td>0</td><td>0.117</td></tr><tr><td>Feb</td><td>0.026</td><td>0.059</td></tr><tr><td>Mar</td><td>0</td><td>0.029</td></tr><tr><td>Apr</td><td>0.026</td><td>0.049</td></tr><tr><td>May</td><td>0.068</td><td>0.029</td></tr><tr><td>Jun</td><td>0.068</td><td>0.092</td></tr><tr><td>Jul</td><td>0.127</td><td>0.153</td></tr><tr><td>Aug</td><td>0.296</td><td>0.197</td></tr><tr><td>Sep</td><td>0.127</td><td>0.247</td></tr></table>	Months	High flows (million cubic metres)	Low flows (million cubic metres)	Oct	0.026	0.292	Nov	0	0.24	Dec	0	0.109	Jan	0	0.117	Feb	0.026	0.059	Mar	0	0.029	Apr	0.026	0.049	May	0.068	0.029	Jun	0.068	0.092	Jul	0.127	0.153	Aug	0.296	0.197	Sep	0.127	0.247
								Months	High flows (million cubic metres)	Low flows (million cubic metres)																																								
								Oct	0.026	0.292																																								
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May	0.068	0.029																																																
Jun	0.068	0.092																																																
Jul	0.127	0.153																																																
Aug	0.296	0.197																																																
Sep	0.127	0.247																																																
Nutrients	Phosphate (PO ₄ -P) Total inorganic nitrogen (TIN)	Nutrient levels must be maintained in the river at an oligotrophic condition.	≤ 0.025 milligrams per litre PO ₄ -P ≤ 0.70 milligrams per litre TIN																																															
Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained in an Ideal category for aquatic ecosystems	≤ 30 milliSiemens/metre (95 th percentile)																																															
System variables	pH range Dissolved oxygen	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	4.5 ≥ pH ≤ 7.0 (5 th and 95 th percentiles) ≥ 8 milligrams per litre (5 th percentile)																																															
Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Ideal category for full contact recreation.	≤ 130 counts/100ml (95 th percentile)																																															
Geomorphology	GAI score	GAI score should be within B category (82-87%).	B category (82-87%)																																															
Riparian vegetation	VEGRAI score Marginal zone cover abundance Lower zone cover abundance	VEGRAI level 3 should be within a B category (82-87%).	B category (82-87%) No exotic species, no terrestrial woody species No exotic species, no terrestrial woody species																																															

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
B4 Riversonderend Theewaters	III	H60F	B4-R09	Riversonderend River	nv9	D	Quality		Upper zone cover abundance	Exotic species < 5%, terrestrial woody species > 20%	
									Fish	FRAI should be within an A/B category (87-92%).	A/B category (87-92%)
									Invertebrates	MIRAI score to be within A/B category (87-92%).	A/B category (87-92%)
									Invertebrate diversity		
									Number of families		
							Quantity	Low flows High flows	Maintenance low flows	Flows shall be sufficient to maintain the Riviersonderend River in a condition equal to or better than a D category.	Months: Oct, Nov, Dec, Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep Maintenance flows (million cubic metres): 0, 0.087, 0.19, 0.26, 0.3, 0.38, 0.48, 0.53, 0.6, 0.66, 0.7, 0.71, 0.72, 0.73, 0.74, 0.75, 0.76, 0.77, 0.78, 0.79, 0.8, 0.81, 0.82, 0.83, 0.84, 0.85, 0.86, 0.87, 0.88, 0.89, 0.9, 0.91, 0.92, 0.93, 0.94, 0.95, 0.96, 0.97, 0.98, 0.99, 1.0
									Maintenance high flows		
							Nutrients		Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50 th percentile)
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50 th percentile)
							Salts		Electrical conductivity (EC)	Salt concentrations need to be maintained at levels that do not adversely affect aquatic ecosystems	≤ 55 milliSiemens/metre (95 th percentile)
									pH range	4.5 ≥ pH ≤ 7.5 (5 th and 95 th percentiles)	
							System variables		Dissolved oxygen	important for the maintenance of ecosystem health.	≥ 6 milligrams litre (5 th percentile)
									Atrazine	≤ 0.079 milligrams per litre (95 th percentile)	
							Toxins		Endosulfan	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.0013 milligrams per litre (95 th percentile)
									Escherichia coli	Concentrations of waterborne pathogens should be maintained in an acceptable category for full contact recreation.	≤ 165 counts/100ml (95 th percentile)
							Geomorphology		GAI score	GAI score should be within D category (42-57%).	D category (42-57%)
									VEGRAI score	D category (42-57%)	
							Habitat		Marginal zone cover abundance	VEGRAI level 3 should be within a D category (42-57%).	No exotic species, no terrestrial woody species
									Lower zone cover abundance		No exotic species, no terrestrial woody species

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
								Upper zone cover abundance		Exotic species < 5%, terrestrial woody species > 30%
							Fish	FRAI score	FRAI should be within a D category (42-57%).	D category (42-57%)
						Biota	Invertebrates	MIRAI score	MIRAI score to be within C/D category (57-62%).	C/D category (57-62%)
								Invertebrate diversity		SASS score > 40, ASPT score > 4.3
								Number of families		> 25 families at abundance A - C

Table 6: Resource Quality Objectives for RIVERS in priority Resource Units in the Integrated Unit of Analysis F9 Lower Breede Renosterveld

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
F9 Lower Breede Renosterveld	H60L	F9-R10	Riviersonderend River	ni3	D	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Riviersonderend River in a condition equal to or better than a D category.	Months: High, Low Maintenance flows (million cubic metres): 0, 0.49, 0.77, 0.84, 1.04, 1.23, 1.41, 1.73, 2.04, 2.36, 2.68, 3.00, 3.32, 3.64, 3.96, 4.28, 4.60, 4.92, 5.24, 5.56, 5.88, 6.20, 6.52, 6.84, 7.16, 7.48, 7.80, 8.12, 8.44, 8.76, 9.08, 9.40, 9.72, 10.04, 10.36, 10.68, 11.00, 11.32, 11.64, 11.96, 12.28, 12.60, 12.92, 13.24, 13.56, 13.88, 14.20, 14.52, 14.84, 15.16, 15.48, 15.80, 16.12, 16.44, 16.76, 17.08, 17.40, 17.72, 18.04, 18.36, 18.68, 19.00, 19.32, 19.64, 19.96, 20.28, 20.60, 20.92, 21.24, 21.56, 21.88, 22.20, 22.52, 22.84, 23.16, 23.48, 23.80, 24.12, 24.44, 24.76, 25.08, 25.40, 25.72, 26.04, 26.36, 26.68, 27.00, 27.32, 27.64, 27.96, 28.28, 28.60, 28.92, 29.24, 29.56, 29.88, 30.20, 30.52, 30.84, 31.16, 31.48, 31.80, 32.12, 32.44, 32.76, 33.08, 33.40, 33.72, 34.04, 34.36, 34.68, 35.00, 35.32, 35.64, 35.96, 36.28, 36.60, 36.92, 37.24, 37.56, 37.88, 38.20, 38.52, 38.84, 39.16, 39.48, 39.80, 40.12, 40.44, 40.76, 41.08, 41.40, 41.72, 42.04, 42.36, 42.68, 43.00, 43.32, 43.64, 43.96, 44.28, 44.60, 44.92, 45.24, 45.56, 45.88, 46.20, 46.52, 46.84, 47.16, 47.48, 47.80, 48.12, 48.44, 48.76, 49.08, 49.40, 49.72, 50.04, 50.36, 50.68, 51.00, 51.32, 51.64, 51.96, 52.28, 52.60, 52.92, 53.24, 53.56, 53.88, 54.20, 54.52, 54.84, 55.16, 55.48, 55.80, 56.12, 56.44, 56.76, 57.08, 57.40, 57.72, 58.04, 58.36, 58.68, 59.00, 59.32, 59.64, 59.96, 60.28, 60.60, 60.92, 61.24, 61.56, 61.88, 62.20, 62.52, 62.84, 63.16, 63.48, 63.80, 64.12, 64.44, 64.76, 65.08, 65.40, 65.72, 66.04, 66.36, 66.68, 67.00, 67.32, 67.64, 67.96, 68.28, 68.60, 68.92, 69.24, 69.56, 69.88, 70.20, 70.52, 70.84, 71.16, 71.48, 71.80, 72.12, 72.44, 72.76, 73.08, 73.40, 73.72, 74.04, 74.36, 74.68, 75.00, 75.32, 75.64, 75.96, 76.28, 76.60, 76.92, 77.24, 77.56, 77.88, 78.20, 78.52, 78.84, 79.16, 79.48, 79.80, 80.12, 80.44, 80.76, 81.08, 81.40, 81.72, 82.04, 82.36, 82.68, 83.00, 83.32, 83.64, 83.96, 84.28, 84.60, 84.92, 85.24, 85.56, 85.88, 86.20, 86.52, 86.84, 87.16, 87.48, 87.80, 88.12, 88.44, 88.76, 89.08, 89.40, 89.72, 90.04, 90.36, 90.68, 91.00, 91.32, 91.64, 91.96, 92.28, 92.60, 92.92, 93.24, 93.56, 93.88, 94.20, 94.52, 94.84, 95.16, 95.48, 95.80, 96.12, 96.44, 96.76, 97.08, 97.40, 97.72, 98.04, 98.36, 98.68, 99.00, 99.32, 99.64, 99.96, 100.28, 100.60, 100.92, 101.24, 101.56, 101.88, 102.20, 102.52, 102.84, 103.16, 103.48, 103.80, 104.12, 104.44, 104.76, 105.08, 105.40, 105.72, 106.04, 106.36, 106.68, 107.00, 107.32, 107.64, 107.96, 108.28, 108.60, 108.92, 109.24, 109.56, 109.88, 110.20, 110.52, 110.84, 111.16, 111.48, 111.80, 112.12, 112.44, 112.76, 113.08, 113.40, 113.72, 114.04, 114.36, 114.68, 115.00, 115.32, 115.64, 115.96, 116.28, 116.60, 116.92, 117.24, 117.56, 117.88, 118.20, 118.52, 118.84, 119.16, 119.48, 119.80, 120.12, 120.44, 120.76, 121.08, 121.40, 121.72, 122.04, 122.36, 122.68, 123.00, 123.32, 123.64, 123.96, 124.28, 124.60, 124.92, 125.24, 125.56, 125.88, 126.20, 126.52, 126.84, 127.16, 127.48, 127.80, 128.12, 128.44, 128.76, 129.08, 129.40, 129.72, 130.04, 130.36, 130.68, 131.00, 131.32, 131.64, 131.96, 132.28, 132.60, 132.92, 133.24, 133.56, 133.88, 134.20, 134.52, 134.84, 135.16, 135.48, 135.80, 136.12, 136.44, 136.76, 137.08, 137.40, 137.72, 138.04, 138.36, 138.68, 139.00, 139.32, 139.64, 139.96, 140.28, 140.60, 140.92, 141.24, 141.56, 141.88, 142.20, 142.52, 142.84, 143.16, 143.48, 143.80, 144.12, 144.44, 144.76, 145.08, 145.40, 145.72, 146.04, 146.36, 146.68, 147.00, 147.32, 147.64, 147.96, 148.28, 148.60, 148.92, 149.24, 149.56, 149.88, 150.20, 150.52, 150.84, 151.16, 151.48, 151.80, 152.12, 152.44, 152.76, 153.08, 153.40, 153.72, 154.04, 154.36, 154.68, 155.00, 155.32, 155.64, 155.96, 156.28, 156.60, 156.92, 157.24, 157.56, 157.88, 158.20, 158.52, 158.84, 159.16, 159.48, 159.80, 160.12, 160.44, 160.76, 161.08, 161.40, 161.72, 162.04, 162.36, 162.68, 163.00, 163.32, 163.64, 163.96, 164.28, 164.60, 164.92, 165.24, 165.56, 165.88, 166.20, 166.52, 166.84, 167.16, 167.48, 167.80, 168.12, 168.44, 168.76, 169.08, 169.40, 169.72, 170.04, 170.36, 170.68, 171.00, 171.32, 171.64, 171.96, 172.28, 172.60, 172.92, 173.24, 173.56, 173.88, 174.20, 174.52, 174.84, 175.16, 175.48, 175.80, 176.12, 176.44, 176.76, 177.08, 177.40, 177.72, 178.04, 178.36, 178.68, 179.00, 179.32, 179.64, 179.96, 180.28, 180.60, 180.92, 181.24, 181.56, 181.88, 182.20, 182.52, 182.84, 183.16, 183.48, 183.80, 184.12, 184.44, 184.76, 185.08, 185.40, 185.72, 186.04, 186.36, 186.68, 187.00, 187.32, 187.64, 187.96, 188.28, 188.60, 188.92, 189.24, 189.56, 189.88, 190.20, 190.52, 190.84, 191.16, 191.48, 191.80, 192.12, 192.44, 192.76, 193.08, 193.40, 193.72, 194.04, 194.36, 194.68, 195.00, 195.32, 195.64, 195.96, 196.28, 196.60, 196.92, 197.24, 197.56, 197.88, 198.20, 198.52, 198.84, 199.16, 199.48, 199.80, 200.12, 200.44, 200.76, 201.08, 201.40, 201.72, 202.04, 202.36, 202.68, 203.00, 203.32, 203.64, 203.96, 204.28, 204.60, 204.92, 205.24, 205.56, 205.88, 206.20, 206.52, 206.84, 207.16, 207.48, 207.80, 208.12, 208.44, 208.76, 209.08, 209.40, 209.72, 210.04, 210.36, 210.68, 211.00, 211.32, 211.64, 211.96, 212.28, 212.60, 212.92, 213.24, 213.56, 213.88, 214.20, 214.52, 214.84, 215.16, 215.48, 215.80, 216.12, 216.44, 216.76, 217.08, 217.40, 217.72, 218.04, 218.36, 218.68, 219.00, 219.32, 219.64, 219.96, 220.28, 220.60, 220.92, 221.24, 221.56, 221.88, 222.20, 222.52, 222.84, 223.16, 223.48, 223.80, 224.12, 224.44, 224.76, 225.08, 225.40, 225.72, 226.04, 226.36, 226.68, 227.00, 227.32, 227.64, 227.96, 228.28, 228.60, 228.92, 229.24, 229.56, 229.88, 230.20, 230.52, 230.84, 231.16, 231.48, 231.80, 232.12, 232.44, 232.76, 233.08, 233.40, 233.72, 234.04, 234.36, 234.68, 235.00, 235.32, 235.64, 235.96, 236.28, 236.60, 236.92, 237.24, 237.56, 237.88, 238.20, 238.52, 238.84, 239.16, 239.48, 239.80, 240.12, 240.44, 240.76, 241.08, 241.40, 241.72, 242.04, 242.36, 242.68, 243.00, 243.32, 243.64, 243.96, 244.28, 244.60, 244.92, 245.24, 245.56, 245.88, 246.20, 246.52, 246.84, 247.16, 247.48, 247.80, 248.12, 248.44, 248.76, 249.08, 249.40, 249.72, 250.04, 250.36, 250.68, 251.00, 251.32, 251.64, 251.96, 252.28, 252.60, 252.92, 253.24, 253.56, 253.88, 254.20, 254.52, 254.84, 255.16, 255.48, 255.80, 256.12, 256.44, 256.76, 257.08, 257.40, 257.72, 258.04, 258.36, 258.68, 259.00, 259.32, 259.64, 259.96, 260.28, 260.60, 260.92, 261.24, 261.56, 261.88, 262.20, 262.52, 262.84, 263.16, 263.48, 263.80, 264.12, 264.44, 264.76, 265.08, 265.40, 265.72, 266.04, 266.36, 266.68, 267.00, 267.32, 267.64, 267.96, 268.28, 268.60, 268.92, 269.24, 269.56, 269.88, 270.20, 270.52, 270.84, 271.16, 271.48, 271.80, 272.12, 272.44, 272.76, 273.08, 273.40, 273.72, 274.04, 274.36, 274.68, 275.00, 275.32, 275.64, 275.96, 276.28, 276.60, 276.92, 277.24, 277.56, 277.88, 278.20, 278.52, 278.84, 279.16, 279.48, 279.80, 280.12, 280.44, 280.76, 281.08, 281.40, 281.72, 282.04, 282.36, 282.68, 283.00, 283.32, 283.64, 283.96, 284.28, 284.60, 284.92, 285.24, 285.56, 285.88, 286.20, 286.52, 286.84, 287.16, 287.48, 287.80, 288.12, 288.44, 288.76, 289.08, 289.40, 289.72, 290.04, 290.36, 290.68, 291.00, 291.32, 291.64, 291.96, 292.28, 292.60, 292.92, 293.24, 293.56, 293.88, 294.20, 294.52, 294.84, 295.16, 295.48, 295.80, 296.12, 296.44, 296.76, 297.08, 297.40, 297.72, 298.04, 298.36, 298.68, 299.00, 299.32, 299.64, 299.96, 300.28, 300.60, 300.92, 301.24, 301.56, 301.88, 302.20, 302.52, 302.84, 303.16, 303.48, 303.80, 304.12, 304.44, 304.76, 305.08, 305.40, 305.72, 306.04, 306.36, 306.68, 307.00, 307.32, 307.64, 307.96, 308.28, 308.60, 308.92, 309.24, 309.56, 309.88, 310.20, 310.52, 310.84, 311.16, 311.48, 311.80, 312.12, 312.44, 312.76, 313.08, 313.40, 313.72, 314.04, 314.36, 314.68, 315.00, 315.32, 315.64, 315.96, 316.28, 316.60, 316.92, 317.24, 317.56, 317.88, 318.20, 318.52, 318.84, 319.16, 319.48, 319.80, 320.12, 320.44, 320.76, 321.08, 321.40, 321.72, 322.04, 322.36, 322.68, 323.00, 323.32, 323.64, 323.96, 324.28, 324.60, 324.92, 325.24, 325.56, 325.88, 326.20, 326.52, 326.84, 327.16, 327.48, 327.80, 328.12, 328.44, 328.76, 329.08, 329.40, 329.72, 330.04, 330.36, 330.68, 331.00, 331.32, 331.64, 331.96, 332.28, 332.60, 332.92, 333.24, 333.56, 333.88, 334.20, 334.52, 334.84, 335.16, 335.48, 335.80, 336.12, 336.44, 336.76, 337.08, 337.40, 337.72, 338.04, 338.36, 338.68, 339.00, 339.32, 339.64, 339.96, 340.28, 340.60, 340.92, 341.24, 341.56, 341.88, 342.20, 342.52, 342.84, 343.16, 343.48, 343.80, 344.12, 344.44, 344.76, 345.08, 345.40, 345.72, 346.04, 346.36, 346.68, 347.00, 347.32, 347.64, 347.96, 348.28, 348.60, 348.92, 349.24, 349.56, 349.88, 350.20, 350.52, 350.84, 351.16, 351.48, 351.80, 352.12, 352.44, 352.76, 353.08, 353.40, 353.72, 354.04, 354.36, 354.68, 355.00, 355.32, 355.64, 355.96, 356.28, 356.60, 356.92, 357.24, 357.56, 357.88, 358.20, 358.52, 358.84, 359.16, 359.48, 359.80, 360.12, 360.44, 360.76, 361.08, 361.40, 361.72, 362.04, 362.36, 362.68, 363.00, 363.32, 363.64, 363.96, 364.28, 364.60, 364.92, 365.24, 365.56, 365.88, 366.20, 366.52, 366.84, 367.16, 367.48, 367.80, 368.12, 368.44, 368.76, 369.08, 369.40, 369.72, 370.04, 370.36, 370.68, 371.00, 371.32, 371.64, 371.96, 372.28, 372.60, 372.92, 373.24, 373.56, 373.88, 374.20, 374.52, 374.84, 375.16, 375.48, 375.80, 376.12, 376.44, 376.76, 377.08, 377.40, 377.72, 378.04, 378.36, 378.68, 379.00, 379.32, 379.64, 379.96, 380.28, 380.60, 380.92, 381.24, 381.56, 381.88, 382.20, 382.52, 382.84, 383.16, 383.48, 383.80, 384.12, 384.44, 384.76, 385.08, 385.40, 385.72, 386.04, 386.36, 386.68, 387.00, 387.32, 387.64, 387.96, 388.28, 388.60, 388.92, 389.24, 389.56, 389.88, 390.20, 390.52, 390.84, 391.16, 391.48, 391.80, 392.12, 392.44, 392.76, 393.08, 393.40, 393.72, 394.04, 394.36, 394.68, 395.00, 395.32, 395.64, 395.96, 396.28, 396.60, 396.92, 397.24, 397.56, 397.88, 398.20, 398.52, 398.84, 399.16, 399.48, 399.80, 400.12, 400.44, 400.76, 401.08, 401.40, 401.72, 402.04, 402.36, 402.68, 403.00, 403.32, 403.64, 403.96, 404.28, 404.60, 404.92, 405.24, 405.56, 405.88, 406.20, 406.52, 406.84, 407.16, 407.48, 407.80, 408.12, 408.44, 408.76, 409.08, 409.40, 409.72, 410.04, 410.36, 410.68, 411.00, 411.32, 411.64, 411.96, 412.28, 412.60, 412.92, 413.24, 413.56, 413.88, 414.20, 414.52, 414.84, 415.16, 415.48, 415.80, 416.12, 416.44, 416.76, 417.08, 417.40, 417.72, 418.04, 418.36, 418.68, 419.00, 419.32, 419.64, 419.96, 420.28, 420.60, 420.92, 421.24, 421.56, 421.88, 422.20, 422.52, 422.84, 423.16, 423.48, 423.80, 424.12, 424.44, 424.76, 425.08, 425.40, 425.72, 426.04, 426.36, 426.68, 427.00, 427.32, 427.64, 427.96, 428.28, 428.60, 428.92, 429.24, 429.56, 429.88, 430.20, 430.52, 430.84, 431.16, 431.48, 431.80, 432.12, 432.44, 432.76, 433.08, 433.40, 433.72, 434.04, 434.36, 434.68, 435.00, 435.32, 435.64, 435.96, 436.28, 436.60, 436.92, 437.24, 437.56, 437.88, 438.20, 438.52, 438.84, 439.16, 439.48, 439.80, 440.12, 440.44, 440.76, 441.08, 441.40, 441.72, 442.04, 442.36, 442.68, 443.00, 443.32, 443.64, 443.96, 444.28, 444.60, 444.92, 445.24, 445.56, 445.88, 446.20, 446.52, 446.84, 447.16, 447.48, 447.80, 448.12, 448.44, 448.76, 449.08, 449.40, 449.72, 450.04, 450.36, 450.68, 451.00, 451.32, 451.64, 451.96, 452.28, 452.60, 452.92, 453.24, 453.56, 453.88, 454.20, 454.52, 454.84, 455.16, 455.48, 455.80, 456.12, 456.44, 456.76, 457.08, 457.40, 457.72, 458.04, 458.36, 458.68, 459.00, 459.32, 459.64, 459.96, 460.28, 460.60, 460.92, 461.24, 461.56, 461.88, 462.20, 462.52, 462.84, 463.16, 463.48, 463.80, 464.12, 464.44, 464.76, 465.08, 465.40, 465.72, 466.04, 466.36, 466.68, 467.00, 467.32, 467.64, 467.96, 468.28, 468.60,

Table 7: Resource Quality Objectives for RIVERS in priority Resource Units in the Integrated Unit of Analysis B5 Overberg West

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric													
B5 Overberg West	II	G40C	B5-R11	Palmiet River	piii1	C	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Palmiet River in a condition equal to or better than a B category.	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
									Maintenance flows (million cubic metres)	High	1.438	0.413	1.054	0.093	0.56	0.267	0.179	0.169	0.266	0.723	1.413	2.17	0.435	0.871
									Low	0.604	0.723	0.169	0.266	0.127	1.413	0.604	0.723	1.127	1.413	1.523	1.73	0.435	0.871	
							Quality	Nutrients	Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river in an oligotrophic condition.	≤ 0.025 milligrams per litre PO ₄ -P													
									Total inorganic nitrogen (TIN)		≤ 0.70 milligrams per litre TIN													
									Electrical conductivity (EC)		≤ 30 milliSiemens/metre (95 th percentile)													
								System variables	pH range	Salt concentrations need to be maintained at levels that do not adversely affect aquatic ecosystems	4.5 ≥ pH ≤ 7.0 (5 th and 95 th percentiles)													
									Dissolved oxygen		≥ 8 milligrams per litre (5 th percentile)													
									Atrazine		≤ 0.079 milligrams per litre (95 th percentile)													
							Pathogens	Toxins	Endosulfan	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.0013 milligrams per litre (95 th percentile)													
									Escherichia coli		≤ 130 counts/100ml (95 th percentile)													
							Habitat	Geomorphology	GAI score	GAI score should be within D category (42-57%).	B category (82-87%)													
									VEGRAI score		B/C category (77-82%)													
									FRAI score		E category (22-37%)													
							Biota	Invertebrates	MIRAI score	MIRAI score should be within B/C category (77-82%).	B/C category (77-82%)													
									Invertebrate diversity		SASS score > 110, ASPT > 6.5													
									Number of families		Five families, <i>Corydalidae</i> , <i>Elmidae</i> , <i>Hydropsychidae</i> , <i>Cordulidae</i> , <i>Chlorocyphidae</i>													

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																		
B5 Overberg West	II	G40D	B5-R12	Palmiet River	pii2	B/C	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Palmiet River in a condition equal to or better than a B/C category.	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep						
									Maintenance flows (million cubic metres)		High	7.642	1.67	0.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								Nutrients	Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50 th percentile)																		
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50 th percentile)																		
									Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at levels that do not adversely affect aquatic ecosystems	≤ 55 milliSiemens/metre (95 th percentile)																	
								pH range		pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.		6.5 ≥ pH ≤ 8.5 (5 th and 95 th percentiles)																	
								System variables	Dissolved oxygen		Toxicity levels must not pose a threat to aquatic ecosystems.	≥ 6 milligrams litre (5 th percentile)																	
									Atrazine	≤ 0.079 milligrams per litre (95 th percentile)																			
								Toxins	Endosulfan	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 0.0013 milligrams per litre (95 th percentile)																		
							Iron (Mn)		≤ 0.1 milligrams per litre (95 th percentile)																				
							Manganese (Mn)		≤ 0.15 milligrams per litre (95 th percentile)																				
							Pathogens	Escherichia coli	GAI score should be within B category (82-87%).	≤ 165 counts/100ml (95 th percentile)																			
								Geomorphology		B category (82-87%)																			
							Habitat	Riparian vegetation	VEGRAI score	B/C category (77-82%)																			
								Fish	FRAI score	E category (22-37%)																			
Biota	Invertebrates	MIRAI score	B/C category (77-82%)																										
		Invertebrate diversity	SASS score > 110, ASPT > 6.5																										
		Number of families	Five families, <i>Corydalidae</i> , <i>Elmidae</i> , <i>Hydropsychidae</i> , <i>Cordulidae</i> , <i>Chlorocyphidae</i>																										

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																	
B5 Overberg West	II	G40D	B5-R13	Palmiet River	pii3	B	Quantity	Low flows High flows	Maintenance low flows	Flows shall be sufficient to maintain the Palmiet River in a condition equal to or better than a B category.	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep					
									Maintenance high flows		Maintenance flows (million cubic metres)	10.02	0.049	0.097	1.907	0.954	1.118	0.954	2.142	0.954	3.016	8.623	2.385	11.08	12.83	8.302	13.49	14.21
									Low		≤ 0.025 milligrams per litre (50 th percentile)																	
								Nutrients	Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.70 milligrams per litre (50 th percentile)																	
									Total inorganic nitrogen (TIN)																			
							Quality	Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at levels that do not adversely affect aquatic ecosystems	≤ 30 milliSiemens/metre (95 th percentile)																	
									pH range		5.0 ≥ pH ≤ 7.5 (5 th and 95 th percentiles)																	
								System variables	Dissolved oxygen	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	≥ 8 milligrams per litre (5 th percentile)																	
									Toxins		Atrazine	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.079 milligrams per litre (95 th percentile)															
								Pathogens	Toxins	Endosulfan	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.		≤ 0.0013 milligrams per litre (95 th percentile)															
							Escherichia coli			≤ 130 counts/100ml (95 th percentile)																		
							Habitat		Geomorphology	GAI score	GAI score should be within a B category (82-87%). VEGRAI level 3 should be within a B category (82-87%). FRAI should be within a D category (42-57%).	B category (82-87%)																
									Riparian vegetation	VEGRAI score		B category (82-87%)																
									Fish	FRAI score		A category (92-100%)																
							Biota	Invertebrates	MIRAI score	MIRAI score should be within a B category (82-87%).	B category (82-87%)																	
									Invertebrate diversity		SASS score > 110, ASPT > 7.0																	
									Number of families		9 families, Ephemerellidae, Leptophlebiidae, Heptageniidae, Tricorythidae, Elmidae, Corydalidae, Trichoptera cased caddis 2 or > types, Psephenidae, Atherinidae																	

Table 8: Resource Quality Objectives for RIVERS in priority Resource Units in the Integrated Unit of Analysis F10 Overberg East Renosterveld

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																																																																																								
F10 Overberg East Renosterveld	II	G40K	F10-R14	Klein River	nv23	C/D	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Klein River in a condition equal to or better than a C/D category.	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep																																																																												
												Maintenance flows (million cubic metres)	0.398	0.358	0.199	0.091	0.065	0.064	0	0.126	0.196	0.293	0.767	0.516	0.413	0.502	2.013	0.541																																																																							
											Nutrients	Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	Low	0.465	0.358	0.199	0.091	0.065	0.064	0	0.126	0.196	0.293	0.767	0.516	0.413	0.502	2.013	0.541																																																																					
												Total inorganic nitrogen (TIN)		High	0.398	0.358	0.199	0.091	0.065	0.064	0	0.126	0.196	0.293	0.767	0.516	0.413	0.502	2.013	0.541																																																																					
							Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at present day levels.	≤ 0.075 milligrams/litre (50 th percentile)	≤ 1.75 milligrams/litre (50 th percentile)	≤ 180 milliSiemens/metre (95 th percentile)	≤ 180 milliSiemens/metre (95 th percentile)	6.5 ≥ pH ≤ 8.5 (5 th and 95 th percentiles)	≥ 6 milligrams litre (5 th percentile)																																																																																				
								pH range																																																																																											
							System variables	Dissolved oxygen	Toxicity levels must not pose a threat to aquatic ecosystems. Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.																			≤ 0.079 milligrams per litre (95 th percentile)	≤ 0.0013 milligrams per litre (95 th percentile)																																																																						
								Atrazine																																																																																											
							Pathogens	Endosulfan	GAI score should be within C category (62-77%). VEGRAI level 3 should be within a D category (42-57%). FRAI should be within a E category (22-37%).																																			C category (62-77%)	D category (42-57%)	E category (22-37%)	C category (62-77%)																																																				
								Escherichia coli																																																																																											
							Habitat	Geomorphology	GAI score should be within C category (62-77%). VEGRAI level 3 should be within a D category (42-57%). FRAI should be within a E category (22-37%).																																																					C category (62-77%)	D category (42-57%)	E category (22-37%)	C category (62-77%)																																		
								Riparian vegetation																																																																																											
							Biota	Fish	FRAI score should be within a E category (22-37%).																																																																								C category (62-77%)	D category (42-57%)	E category (22-37%)	C category (62-77%)															
								Invertebrates																																																																																											
MIRAI score	MIRAI score should be within C category (62-77%).	C category (62-77%)	D category (42-57%)	E category (22-37%)	C category (62-77%)																																																																																														

Table 9: Resource Quality Objectives for RIVERS in priority Resource Units in the Integrated Unit of Analysis H17 Overberg East Fynbos

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric													
H17 Overberg East Fynbos	II	H17	H17-R15	Nuwejaars River	ni4	C/D	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Nuwejaars River in a condition equal to or better than a C/D category.	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
									Maintenance flows (million cubic metres)	0.115	0.052	0	0	0	0.022	0.022	0.02	0.03	0.035	0.049	0.108	0.393	0.108	
									Low	0.055	0.046	0.03	0.022	0.022	0.02	0.03	0.035	0.049	0.232	0.108	0.393	0.108		
									High	0.115	0.052	0	0	0	0.022	0.022	0.02	0.03	0.035	0.049	0.232	0.108	0.393	0.108
									Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50 th percentile)													
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50 th percentile)													
							Quality	Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at present day levels.	≤ 170 milliSiemens/metre (95 th percentile)													
									pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≥ pH ≤ 8.5 (5 th and 95 th percentiles)													
									Dissolved oxygen	≥ 6 milligrams litre (5 th percentile)														
									Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95 th percentile)												
		Habitat							Geomorphology	GAI score	GAI score should be within a D category (42-57%).	D category (42-57%)												
									Riparian vegetation	VEGRAI score	VEGRAI level 3 should be within an E category (22-37%).	E category (22-37%)												
									Fish	FRAI score	FRAI should be within a E category (22-37%).	E category (22-37%)												
									Biota	Invertebrates	MIRAI score	MIRAI score to be within D category (42-57%).	D category (42-57%)											
H17 Overberg East Fynbos	II	G50D	H17-R16	Kars River	nv24	B/C	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Kars River in a condition equal to or better than a B/C category.	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
									Maintenance flows (million cubic metres)	0.301	0.282	0.168	0.121	0.109	0.119	0.191	0.204	0.25	0.255	0.304	0.283			
							Quality	Nutrients	Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50 th percentile)													
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50 th percentile)													

IUA Class	Quaternary Catchment	RU Name	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
							Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at present day levels.	≤ 310 milliSiemens/metre (95 th percentile)
							System variables	pH range Dissolved oxygen	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	$6.5 \geq \text{pH} \leq 8.5$ (5 th and 95 th percentiles) ≥ 6 milligrams litre (5 th percentile)
							Toxins	Ammonia Atrazine Endosulfan	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.073 milligrams per litre (95 th percentile) ≤ 0.079 milligrams per litre (95 th percentile) ≤ 0.0013 milligrams per litre (95 th percentile)
							Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95 th percentile)
						Habitat	Geomorphology	GAI score	GAI score should be within B category (82-87%).	B category (82-87%)
							Riparian vegetation	VEGRAI score	VEGRAI level 3 should be within a B category (82-87%).	B category (82-87%)
						Biota	Fish	FRAI score	FRAI should be within a E category (22-37%).	E category (22-37%)
							Invertebrates	MIRAI score	MIRAI score to be within B category (82-87%).	B category (82-87%)

Table 10: Resource Quality Objectives for RIVERS in priority Resource Units in the Integrated Unit of Analysis F11 Lower Breede Renosterveld

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																												
F11 Lower Breede Renosterveld	H70G	F11-R17	Breede River	niii4	C	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Breede River in a condition equal to or better than a B/C category.	Months	High	Maintenance flows (million cubic metres)	Oct	0	42.827	Nov	5.055	Dec	0	Jan	0	Feb	0	Mar	0	Apr	5.055	May	58.796	Jun	11.469	Jul	56.997	Aug	26.206	Sep	0	55.658
													Low	42.827	28.026	9.569	7.407	8.604	3.827	10.237	13.818	31.627	44.934	64.391														
													Low	42.827	28.026	9.569	7.407	8.604	3.827	10.237	13.818	31.627	44.934	64.391														
													Low	42.827	28.026	9.569	7.407	8.604	3.827	10.237	13.818	31.627	44.934	64.391														
													Low	42.827	28.026	9.569	7.407	8.604	3.827	10.237	13.818	31.627	44.934	64.391														
							Nutrients	Phosphate (PO ₄ -P) Total inorganic nitrogen (TIN)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50 th percentile) ≤ 1.75 milligrams/litre (50 th percentile)																												
						Quality	Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained in a Tolerable category for Irrigation water supply.	≤ 270 milliSiemens/metre (95 th percentile)																												
							System	pH range	pH, temperature, and	6.5 ≥ pH ≤ 8.5 (5th and 95 th percentiles)																												

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
						variables	Dissolved oxygen Water temperature	dissolved oxygen are important for the maintenance of ecosystem health.	≥ 6 milligrams/litre (5 th percentile)
						Toxins	Ammonia Atrazine Endosulfan	Toxicity levels must not pose a threat to aquatic ecosystems.	No more than 2°C change in natural monthly range (minimum and maximum)
						Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 0.073 milligrams per litre (95 th percentile) ≤ 0.079 milligrams per litre (95 th percentile) ≤ 0.0013 milligrams per litre (95 th percentile)
						Geomorphology	GAI score	GAI score should be within B category (82-87%).	≤ 165 counts/100ml (95 th percentile)
							VEGRAI score		B category (82-87%)
						Habitat	Marginal zone cover abundance Lower zone cover abundance Upper zone cover abundance	VEGRAI level 3 should be within a C category (62-77%).	C category (62-77%) No exotic species, no terrestrial woody species No exotic species, no terrestrial woody species Exotic species < 5%, terrestrial woody species > 30%
						Biota	Fish	FRAI should be within a C category (62-77%).	C category (62-77%)
							MIRAI score Invertebrate diversity Number of families	MIRAI score to be within D category (42-57%).	D category (42-57%) SASS score > 40, ASPT score > 4.3 > 15 families at abundances A - C

Table 11: Resource Quality Objectives for RIVERS in priority Resource Units in the Integrated Unit of Analysis E8 Touws

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
E8 Touws	III	J12L	E8-R18	Doring River	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Doring River an ecological condition that is equal to or better than the ecological condition in summer 2014 (Category C/D).	0.012 0.012 0.01 0.013 0.017 0.016 0.015 0.009 0.012 0.031 0.019 0.021 0.031 0.017 0.031 Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
							Phosphate (PO ₄ -P) Total inorganic nitrogen (TIN)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50 th percentile) ≤ 1.75 milligrams/litre (50 th percentile)

IUA Class	Quaternary Catchment	RU Name	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
E8 Tows	J12L	E8-R19	Touws River	gv5	B/C	Quantity	Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at present day levels.	≤ 1500 milliSiemens/metre (95 th percentile)
								pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≥ pH ≤ 8.5 (5 th and 95 th percentiles)
							System variables	Dissolved oxygen		≥ 6 milligrams litre (5 th percentile)
								Pathogens	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95 th percentile)
						Habitat	Geomorphology	GAI score	GAI score should equate to a C/D.	C/D category (57-62%)
								VEGRAI score		C/D category (57-62%)
								Marginal zone cover abundance	No exotic species, no terrestrial woody species	
								Lower zone cover abundance	VEGRAI level 4 of at ~58% for the riparian zone.	Exotic species < 5%, terrestrial woody species < 10%
						Biota	Fish	Upper zone cover abundance		Exotic species < 10%, terrestrial woody species < 15%
								FRAI score	FRAI shall yield a C/D (58.3%).	C/D category (57-62%)
								MIRA score		D category (42-57%)
								Invertebrate diversity	MIRA score to be within D (40-59%) Category	SASS score > 90, ASPT score > 4.5
E8 Tows	J12L	E8-R19	Touws River	gv5	B/C	Quantity	Low flows High flows	Number of families	Flows shall be sufficient to maintain the Touws River an ecological condition that is equal to or better than the ecological condition in summer 2014 (Category C).	> 15 families at abundances A - C
								Maintenance low flows		
								Maintenance high flows		
								Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50 th percentile)
						Quality	Nutrients	Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50 th percentile)
								Electrical conductivity (EC)	Salt concentrations need to be maintained at present day levels.	≤ 1500 milliSiemens/metre (95 th percentile)
								pH range	pH, temperature, and	6.5 ≥ pH ≤ 8.5 (5 th and 95 th percentiles)
								System		
						Quantity	Low flows High flows	Number of families	Flows shall be sufficient to maintain the Touws River an ecological condition that is equal to or better than the ecological condition in summer 2014 (Category C).	> 15 families at abundances A - C
								Maintenance low flows		
								Maintenance high flows		
								Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50 th percentile)
						Quality	Nutrients	Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50 th percentile)
								Electrical conductivity (EC)	Salt concentrations need to be maintained at present day levels.	≤ 1500 milliSiemens/metre (95 th percentile)
								pH range	pH, temperature, and	6.5 ≥ pH ≤ 8.5 (5 th and 95 th percentiles)
								System		

IUA Class	Quaternary Catchment	RU Name	Resource Name	Biophysical Node Name	TEC	Component	Sub-component variables	Indicator	RQO Narrative	RQO Numeric
E8 Tlous	J11H	E8-R20	Buffels River	gv4	C	Quantity	Low flows High flows	Dissolved oxygen	dissolved oxygen are important for the maintenance of ecosystem health.	≥ 6 milligrams litre (5 th percentile)
								Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95 th percentile)
								Geomorphology	GAI score should equate to a B	B category (82-87%)
								VEGRAI score	B/C category (77-82%)	
						Habitat	Riparian vegetation	Marginal zone cover abundance	No exotic species, no terrestrial woody species	
								Lower zone cover abundance	VEGRAI level 4 of at least 78% % for the riparian zone.	Exotic species < 5%, terrestrial woody species < 5%
								Upper zone cover abundance	Exotic species < 5%, terrestrial woody species < 5%	
								FRAI score	FRAI shall yield a C/D (59%).	C/D category (57-62%)
						Biota	Invertebrates	MIRA score	B/C category (77-82%)	
								Invertebrate diversity	MIRA score to be within B/C (78 - 82%) Category	SASS score > 45, ASPT?>4.0
								Number of families	> 10 families, 5 with SASS score > 5, abundance A-C	
								Maintenance low flows	Flows shall be sufficient to maintain the Buffels River an ecological condition that is equal to or better than the ecological condition in summer 2014 (Category C).	
								Maintenance high flows		
						Quality	Nutrients	Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50 th percentile)
								Total inorganic nitrogen (TIN)	Salt concentrations need to be maintained at present day levels.	≤ 1.75 milligrams/litre (50 th percentile)
								Electrical conductivity (EC)		≤ 320 millSiemens/metre (95 th percentile)
								pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≥ pH ≤ 8.5 (5 th and 95 th percentiles)
						System variables	Dissolved oxygen			≥ 6 milligrams litre (5 th percentile)

IUA Class	Quaternary Catchment	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric				
E8 Towns	J11J	Groot River	gw6	D		Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95 th percentile)				
						Geomorphology	GAI score	GAI score should equate to a D	D category (42-57%)				
						Riparian vegetation	VEGRAL score	VEGRAL level 4 of at ~57% for the riparian zone.	D category (42-57%)				
							Marginal zone cover abundance		No exotic species, no terrestrial woody species				
							Lower zone cover abundance		Exotic species < 5%, terrestrial woody species < 5%				
					Fish	Upper zone cover abundance	Exotic species < 10%, terrestrial woody species < 30%						
						FRAI score	FRAI shall yield a B/C (79%).	B/C category (77-82%)					
						MIRAI score	C category (62-77%)						
					Invertebrates	Invertebrate diversity	MIRAI score to be within C Category	SASS score > 90, ASPT > 5.0					
						Number of families	> 15 families, 7 with SASS score > 6, abundances A - C						
					Quantity	Low flows	Flows shall be sufficient to maintain the Groot River an ecological condition that is equal to or better than the ecological condition in summer 2014 (Category D).	Maintenance low flows Maintenance high flows	Months	Oct	0.016	0.559	0.018
						High flows			Nov	0.018	1.719	0.019	
						Nutrients	Phosphate (PO ₄ -P)	Total inorganic nitrogen (TIN)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	Low	0.016	0.015	0.018
										High	0.019	0.024	0.027
										May	0.027	0.029	0.027
Jun	0.027	0.027	0.027										
Jul	0.027	0.027	0.027										
Quality	Salts	Electrical conductivity (EC)	pH range	Salt concentrations need to be maintained at present day levels.	Aug	0.027	0.027	0.027					
					Sep	0.027	0.027	0.027					
					Oct	0.027	0.027	0.027					
					Nov	0.027	0.027	0.027					
					Dec	0.027	0.027	0.027					
System variables	Dissolved oxygen	pH	Temperature, and dissolved oxygen are important for the maintenance of ecosystem health.		Jan	0.027	0.027	0.027					
					Feb	0.027	0.027	0.027					
					Mar	0.027	0.027	0.027					
Toxins	Atrazine	Endosulfan	Toxicity levels must not pose a threat to aquatic ecosystems.	Toxicity levels must not pose a threat to aquatic ecosystems.	Apr	0.027	0.027	0.027					
					May	0.027	0.027	0.027					

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																																			
E8 Tows	J13C	E8-R22	Groot River	gii3	B	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Groot River an ecological condition that is equal to or better than the ecological condition in summer 2014 (Category D).	Months	Oct	0.583	0.603	Nov	0.746	1.092	Dec	0.752	1.123	Jan	0.732	1.178	Feb	0.593	0.589	Mar	0.582	0.765	Apr	0.803	1.208	May	0.791	0	Jun	0.903	0	Jul	0.808	1.118	Aug	0.587	0.532	Sep	0.587
											Low	0.583	0.603	0.746	1.092	0.752	1.123	0.732	1.178	0.593	0.582	0.803	0.903	0.791	0.808	0.587																			
							Maintenance flows (million cubic metres)	High		0.583	0.603	0.746	1.092	0.752	1.123	0.732	1.178	0.593	0.582	0.803	0.903	0.791	0.808	0.587																					
								Low		0.583	0.603	0.746	1.092	0.752	1.123	0.732	1.178	0.593	0.582	0.803	0.903	0.791	0.808	0.587																					
						Quality	Nutrients	Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50 th percentile)																																			
								Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50 th percentile)																																			
							Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at present day levels.	≤ 620 milliSiemens/metre (95 th percentile)																																			
								pH range		6.5 ≥ pH ≤ 8.5 (5 th and 95 th percentiles)																																			
							System variables	Dissolved oxygen	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	≥ 6 milligrams litre (5 th percentile)																																			

Table 12: Resource Quality Objectives for RIVERS in priority Resource Units in the Integrated Unit of Analysis D7 Gouritz-Olifants

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																																							
D7 Gouritz-Olifants	J25A	D7-R23	Gamka River	giv20	C	Quantity	Low flows High flows	Maintenance low flows	Flows shall be sufficient to maintain the Gamka River an ecological condition that is equal to or better than the ecological condition in summer 2014 (Category C).	Months	Low	0.192	0.342	Oct	0.232	0.94	Nov	0.262	2.707	Dec	0.232	0.94	Jan	0.241	0.94	Feb	0.487	2.707	Mar	0.382	0.94	Apr	0.22	0	May	0.16	0	Jun	0.162	0	Jul	0.157	0	Aug	0.342	0	Sep	0.167	0
								High			0.167	0.342	Oct	0.232	0.94	Nov	0.262	2.707	Dec	0.232	0.94	Jan	0.241	0.94	Feb	0.487	2.707	Mar	0.382	0.94	Apr	0.22	0	May	0.16	0	Jun	0.162	0	Jul	0.157	0	Aug	0.342	0	Sep	0.167	0	
							Quality	Nutrients		Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50 th percentile)																																					
										Total inorganic nitrogen (TIN)			≤ 1.75 milligrams/litre (50 th percentile)																																				
										Electrical conductivity (EC)																																							
						Quality	Salts	pH	Salt concentrations need to be maintained at present day levels.	≤ 90 milliSiemens/metre (95 th percentile)																																							
								Dissolved oxygen			pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≥ pH ≤ 8.5 (5 th and 95 th percentiles)																																					
								System variables					≥ 6 milligrams litre (5 th percentile)																																				
						Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation	≤ 165 counts/100ml (95 th percentile)																																								

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
D7 Gouritz-Ofifants	III	J31C	D7-R24	Ofifants River	giii2	C	Quality	Geomorphology	GAI score	GAI score should equate to a C	C category (62-77%)
									VEGRAI score		C category (62-77%)
								Riparian vegetation	Marginal zone cover abundance	VEGRAI level 4 of at least 61% for the riparian zone.	No exotic species, no terrestrial woody species
									Lower zone cover abundance		Exotic species < 10%, terrestrial woody species < 5%
									Upper zone cover abundance		Exotic species < 10%, terrestrial woody species < 15%
									Fish	FRAI shall yield a C (71.6%).	C category (62-77%)
							Biota		MIRAI score	MIRAI score to be within B/C (78 - 82%) Category	B/C category (77-82%)
								Invertebrate diversity			
								Number of families			SASS score > 100, ASPT > 5.5
							Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Olifants River an ecological condition that is equal to or better than the ecological condition in summer 2014 (Category C/D).	> 15 families, 5 with SASS score > 5, abundance A - C
											Months
											Sep
											Aug
							Nutrients	Phosphate (PO ₄ -P) Total inorganic nitrogen (TIN)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50 th percentile) ≤ 1.75 milligrams/litre (50 th percentile)	Jul
											Jun
											May
											Apr
D7 Gouritz-Ofifants	III	J31C	D7-R24	Ofifants River	giii2	C	Quality	Salts	Electrical conductivity (EC) pH range	Salt concentrations need to be maintained at present day levels. pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	0.035
											0.046
											0.037
											0.036
							System variables	Dissolved oxygen	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 680 milliSiemens/metre (95 th percentile) 6.5 ≥ pH ≤ 8.5 (5 th and 95 th percentiles) ≥ 6 milligrams litre (5 th percentile)	0.053
											0.068
											0.109
											0.127
							Pathogens	Escherichia coli	≤ 165 counts/100ml (95 th percentile)		0.079
											0.05
											0.137
											0.057
							Geomorphology	GAI score	GAI score should equate to a C/D		0.035
											0.046
											High
											Low
							Habitat	Riparian vegetation	VEGRAI score Marginal zone cover abundance Lower zone cover abundance	VEGRAI level 4 of at ~70% for the riparian zone.	0.035
											0.046
											0.055
											0.13

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
D7 Gourtz-Olifants	J34C	D7-R25	Kammanassie River	gv36	C/D	Biota	Invertebrates	Upper zone cover abundance	MIRAL score should equate to a C	No exotic species, no terrestrial woody species
								MIRAL score		C category (62-77%)
						Quantity	Low flows High flows	Maintenance low flows	Flows shall be sufficient to maintain the Kammanassie River an ecological condition that is equal to or better than the ecological condition in summer 2014 (Category C/D).	Months
								Maintenance high flows		Low flows (million cubic metres)
						Nutrients	Nutrients	Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	0
								Total inorganic nitrogen (TIN)		0
						Salts	Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained in a D class for aquatic ecosystems.	0
								pH range		0
					Quality	System variables	System variables	Dissolved oxygen	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	0
								Escherichia coli		0
					Habitat	Riparian vegetation	Riparian vegetation	VEGRAI score	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	0
								Marginal zone cover abundance		0
					Fish	Fish	Fish	Lower zone cover abundance	VEGRAI level 4 of at ~58% for the riparian zone.	0
								Upper zone cover abundance		0
					Biota	Invertebrates	Invertebrates	FRAI score	FRAI shall yield a D (46.9%).	0
								MIRAL score		0
								Invertebrate diversity	MIRAL score to be within C/D (58-62%) Category	0
								Number of families		0

Table 13: Resource Quality Objectives for RIVERS in priority Resource Units in the Integrated Unit of Analysis F13 Lower Gouritz

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																			
F13 Lower Gouritz	J40B	F13-R26	Gouritz River	gi4	C	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Gouritz River an ecological condition that is equal to or better than the ecological condition in summer 2014 (Category C).	Months	Low	High	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep					
								Maintenance flows (million cubic metres)	2.752	4.818	2.474	2.398	2.267	1.804	2.398	1.627	2.223	2.134	2.041	2.021	2.137	2.213							
							Nutrients	Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50 th percentile)																			
								Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50 th percentile)																			
								Electrical conductivity (EC)	Salt concentrations need to be maintained at present day levels.	≤ 600 milliSiemens/metre (95 th percentile)																			
						Salts																							
						System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≥ pH ≤ 8.5 (5 th and 95 th percentiles)																				
							Dissolved oxygen		≥ 6 milligrams litre (5 th percentile)																				
						Pathogens																							
						Habitat	Geomorphology	GAI score	GAI score should equate to a B	B category (82-87%)																			
								VEGRAI score		B/C category (77-82%)																			
							Riparian vegetation	Marginal zone cover abundance	No exotic species, no terrestrial woody species																				
								Lower zone cover abundance	VEGRAI level 4 of at ~57% for the riparian zone.																				
								Upper zone cover abundance																					
						Biota	Fish	FRAI score	FRAI shall yield a D (50.1%).	D category (42-57%)																			
MIRAI score		C category (62-77%)																											
Invertebrates	Invertebrate diversity	MIRAI score to be within C (60-79%) Category	SASS score > 90, ASPT > 5.0																										
	Number of families		> 19 families, 7 with SASS score > 7, abundance A - C																										

Table 14: Resource Quality Objectives for RIVERS in priority Resource Units in the Integrated Unit of Analysis F12 Duiwenhoks

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric													
F12 Duiwenhoks	H80D	F12-R27	Duiwenhoks River	giii8	D	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Duiwenhoks River an ecological condition that is equal to or better than the ecological condition in summer 2014.	Maintenance flows (million cubic metres)	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
									0.418	1.676	1.151	0.648	0.861	0.981	1.014	0	0	0	0	1.426			
							Nutrients	Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50 th percentile)													
								Total inorganic nitrogen (TIN)															
						Quality	Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained in a Tolerable category for irrigation.	≤ 270 milliSiemens/metre (95 th percentile)													
								pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≥ pH ≤ 8.5 (5 th and 95 th percentiles)													
							System variables	Dissolved oxygen	≥ 6 milligrams litre (5 th percentile)														
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95 th percentile)												
						Habitat	Geomorphology	GAI score	GAI score should equate to a D	D category (42-57%)													
								VEGRAI score															
							Riparian vegetation	Marginal zone cover abundance	No exotic species, no terrestrial woody species														
								Lower zone cover abundance	VEGRAI level 4 of at least 61% for the riparian zone. Exotic species < 5%, terrestrial woody species < 5%														
						Biota	Fish	Upper zone cover abundance	Exotic species < 10%, terrestrial woody species < 20%														
								FRAI score	FRAI shall yield a D in the Duiwenhoks River	D category (42-57%)													
Invertebrates	MIRAI score	D category (42-57%)																					
	Invertebrate diversity	SASS score > 60, ASPT score > 5																					
							Number of families	MIRAI (40 - 59%) shall yield a D in the Duiwenhoks River.			> 10 families, abundance A - C, presence of Emiliidae, Simuliidae, Ancylidae												

Table 15: Resource Quality Objectives for RIVERS in priority Resource Units in the Integrated Unit of Analysis I18 Hessequa

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
I18 Hessequa	H90C	I18-R28	Goukou River	giii7	C/D	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Duiwenhoks River an ecological condition that is equal to or better than the ecological condition in summer 2014 (Category C/D).	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
								Low	0.794	1.734	0.764	1.734	0.171	0	0.139	0.381	0.688	0.688	0.653	0.598	0.567	0.691
						Quality		Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	Maintenance flows (million cubic metres)												
								Total inorganic nitrogen (TIN)	≤ 0.075 milligrams/litre (50 th percentile)													
								Electrical conductivity (EC)	≤ 1.75 milligrams/litre (50 th percentile)													
								pH	≤ 130 milliSiemens/metre (95 th percentile)													
								Dissolved oxygen	6.5 ≥ pH ≤ 8.5 (5 th and 95 th percentiles)													
								Atrazine	≥ 6 milligrams litre (5 th percentile)													
						Toxins	Endosulfan	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.079 milligrams per litre (95 th percentile)													
							Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 0.0013 milligrams per litre (95 th percentile)													
							Geomorphology	GAI score should equate to a D	≤ 165 counts/100ml (95 th percentile)													
							VEGRAI score	D category (42-57%)														
Habitat		Riparian vegetation	Marginal zone cover abundance	VEGRAI level 4 of at least 71% for the riparian zone.	C category (62-77%)																	
			Lower zone cover abundance		No exotic species, no terrestrial woody species																	
			Upper zone cover abundance		Exotic species < 5%, terrestrial woody species < 5%																	
			Fish		Exotic species < 10%, terrestrial woody species < 10%																	
Biota		Invertebrates	MIRAI score	FRAI shall yield a D (50.8%).	D category (42-57%)																	
			Invertebrate diversity	MIRAI score to be within the D EC (40 - 59%) Category	D category (42-57%)																	
			Number of families	SASS score > 90, ASPT score > 5.8																		
				> 12 families, 5 with SASS score > 8, abundance A - C																		

Table 16: Resource Quality Objectives for RIVERS in priority Resource Units in the Integrated Unit of Analysis G14 Groot Brak

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric														
G14 Groot Brak	K20A	G14-R29	Groot Brak River	gviii2	B/C	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Groot Brak River in an ecological condition that is equal to or better than Category B/C.	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep		
										High	1.171	0.073	0.147	0	0.147	0.533	0.257	0	0	0	0.112	0.134		
										Low	0.112	0.299	0.287	0.199	0.141	0.134	0.068	0.087	0	0	0.087	0.151		
								Phosphate (PO ₄ -P)		Nutrient levels must be maintained in the river at an oligotrophic condition.	Maintenance flows (million cubic metres)													
								Total inorganic nitrogen (TIN)			≤ 0.025 milligrams per litre (50 th percentile)													
						Quality	System variables	Salts	Salt concentrations need to be maintained in a B class for aquatic ecosystem health.	≤ 0.70 milligrams per litre (50 th percentile)														
								Electrical conductivity (EC)		≤ 55 milliSiemens/metre (95 th percentile)														
								pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≥ pH ≤ 8.5 (5 th and 95 th percentiles)														
								Dissolved oxygen		≥ 8 milligrams litre (5 th percentile)														
						Habitat	Geomorphology	Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation in the downstream Wolwedans Dam.	GAI score should equate to a B	GAI score	B category (82-87%)											
												Sediment particle size	D16 = 1mm, D50 = 32mm, D84 = 128 mm											
												VEGRAI score	B category (82-87%)											
												Marginal zone cover abundance	No exotic species, no terrestrial woody species											
												Lower zone cover abundance	VEGRAI level 4 of Category B. Exotic species <5%, terrestrial woody species < 15%											
Biota	Fish	Invertebrates	MIRAI score Invertebrate diversity	FRAI shall yield a B (82-87%). MIRAI score to be within A (92-100%).	Upper zone cover abundance	Exotic species < 30%, terrestrial woody species > 40%																		
					FRAI score	B category (82-87%)																		
						A category (92-100%) SASS score > 170, ASPT > 7.9																		

Table 17: Resource Quality Objectives for RIVERS in priority Resource Units in the Integrated Unit of Analysis G15 Coastal

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
G15 Coastal	K30B	G15-R30	Malgas River	gvi19	C	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Malgas in an ecological condition that is equal to or better than Category C.	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
								Low			0.296	1.044	0.219	0.219	0.042	0.219	0.077	0.085	0.123	0.211	0.204	0.169
						Quality	Nutrients	Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	Maintenance flows (million cubic metres)												
								Total inorganic nitrogen (TIN)		≤ 0.075 milligrams/litre (50 th percentile)												
								Electrical conductivity (EC)		≤ 1.75 milligrams/litre (50 th percentile)												
								pH range		≤ 55 milliSiemens/metre (95 th percentile)												
								Dissolved oxygen		5.0 ≥ pH ≤ 7.5 (5 th and 95 th percentiles)												
						Toxins	Pathogens	Ammonia	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≥ 6 milligrams litre (5 th percentile)												
								Atrazine		≤ 0.073 milligrams per litre (95 th percentile)												
								Endosulfan		≤ 0.079 milligrams per litre (95 th percentile)												
						Geomorphology	Habitat	Escherichia coli	GAI score should equate to a B/C	≤ 0.0013 milligrams per litre (95 th percentile)												
								GAI score		≤ 165 counts/100ml (95 th percentile)												
						Fish	Biota	Sediment particle size	VEGRAI level 4 of Category D	B/C category (77-82%)												
								VEGRAI score		D16 = 2mm, D50 = 4 mm, D84 = 32mm												
								Marginal zone cover abundance		D category (42-57%)												
								Lower zone cover abundance		No exotic species, no terrestrial woody species												
								Upper zone cover abundance		Exotic species < 5%, terrestrial woody species < 15%												
						Invertebrates	Biota	FRAI score	FRAI shall yield a C/D (57-62%).	Exotic species < 30%, terrestrial woody species > 50%												
								MIRAI score		C/D category (57-62%)												
						Invertebrates	Biota	Invertebrate diversity	MIRAI score to be within A	A category (92-100%)												
										SASS score ≥ 160, ASPT > 8												

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
G15 Coastal	K30C	G15-R31	Kaaimans River	gvii11	B	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Kaaimans River in an ecological condition that is equal to or better than Category B.	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
								Low			0.592	0.249	0.371	0.445	0.335	0.445	0.538	0.483	0.359	0.371	0.371	0.369
						Quality	Nutrients	Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at an oligotrophic condition.	≤ 0.025 milligrams per litre (50 th percentile)												
								Total inorganic nitrogen (TIN)		≤ 0.70 milligrams per litre (50 th percentile)												
								Electrical conductivity (EC)		≤ 30 milliSiemens/metre (95 th percentile)												
								pH range		4.5 ≥ pH ≤ 7.5 (5 th and 95 th percentiles)												
						Pathogens	System variables	Dissolved oxygen	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	≥ 8 milligrams per litre (5 th percentile)												
								Escherichia coli		≤ 130 counts/100ml (95 th percentile)												
					Habitat	Geomorphology	Sediment particle size	GAI score	GAI score should equate to a B/C	B/C category (77-82%)												
								VEGRAI score		D16 = 2mm, D50 = 16 mm, D84 = 64 mm												
								Marginal zone cover abundance		A category (92-100%)												
								Lower zone cover abundance		No exotic species, no terrestrial woody species												
					Biota	Fish	Upper zone cover abundance	Upper zone cover abundance	VEGRAI level 4 of Category A.	Exotic species < 5%, terrestrial woody species < 15%												
								FRAI score		Exotic species < 5%, terrestrial woody species < 5%												
								MIRAI score		B category (82-87%)												
								Invertebrate diversity		A category (92-100%)												
										SASS score > 160, ASPT > 8												

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																		
G15 Coastal	K40A	G15-R32	Diep River	giii10	B	Quantity	Low flows High flows	Maintenance low flows	Flows shall be sufficient to maintain the Upper Diep River in an ecological condition that is equal to or better than Category B.	Months	High	0.412	0.107	0	0.237	0.18	0.173	0.206	0.199	0.107	0	0.201	0.176	0.173	0.213	0	0	0
								Maintenance			Low	0.331	0.344	0.237	0.173	0.412	0.107	0.206	0.199	0.176	0.173	0.213	0.252					
								flows (million cubic metres)			≤ 0.025 milligrams per litre (50 th percentile)																	
						Quality	Nutrients	Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at an oligotrophic condition.	≤ 0.70 milligrams per litre (50 th percentile)																		
								Total inorganic nitrogen (TIN)																				
								Electrical conductivity (EC)		Salt concentrations need to be maintained in an Ideal category for aquatic ecosystems.	≤ 30 milliSiemens/metre (95 th percentile)																	
						System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	5 ≥ pH ≤ 7 (5 th and 95 th percentiles)																			
							Dissolved oxygen		≥ 8 milligrams per litre (5 th percentile)																			
							Pathogens		Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95 th percentile)																	
						GAI score		GAI score should equate to a B.	B category (82-87%)																			
						Sediment particle size			D16 = 10mm, D50 = 100 mm, D84 = 300 mm																			
						Habitat	Riparian vegetation		VEGRAI score	VEGRAI level 4 of Category A/B.	A/B category (87-92%)																	
								Marginal zone cover abundance	No exotic species, no terrestrial woody species																			
								Lower zone cover abundance	Exotic species < 20%, terrestrial woody species < 5%																			
								Upper zone cover abundance	Exotic species < 5%, terrestrial woody species < 5%																			
						Biota	Fish	FRAI score	FRAI shall yield a B.	B category (82-87%)																		
								MIRAI score		B category (82-87%)																		
						Invertebrates		MIRAI score	MIRAI score to be within B Category (80-90%).	SASS score > 190, ASPT > 7																		
								Invertebrate diversity																				

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
G15 Coastal	K40C	G15-R33	Karatarā River	gvi13	B	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Karatara River in an ecological condition that is equal to or better than Category A/B.	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
								Maintenance flows (million cubic metres)			0.188	0.192	0.169	0.149	0.144	0.283	0.029	0.153	0.129	0.12	0.149	0.17
								High			0.471	0.283	0	0	0	0	0	0	0	0	0	0
						Quality	Nutrients	Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at an oligotrophic condition.	≤ 0.025 milligrams per litre (50 th percentile)												
								Total inorganic nitrogen (TIN)		≤ 0.70 milligrams per litre (50 th percentile)												
							Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained in an Ideal category for aquatic ecosystems.	≤ 30 milliSiemens/metre (95 th percentile)												
								pH range		4.0 ≥ pH ≤ 7.0 (5 th and 95 th percentiles)												
							System variables	Dissolved oxygen	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	≥ 8 milligrams per litre (5 th percentile)												
								Pathogens		Escherichia coli	≤ 130 counts/100ml (95 th percentile)											
						Habitat	Geomorphology	GAI score	Concentrations of waterborne pathogens should be maintained in an Ideal category for full contact recreation.	GAI score should equate to a A.	A category (92-100%)											
								Sediment particle size			D16 = 30mm, D50 = 80 mm, D84 = 200 mm											
							Riparian vegetation	VEGRAI score	VEGRAI level 4 of Category A/B.	A/B category (87-92%)												
								Marginal zone cover abundance		No exotic species, no terrestrial woody species												
								Lower zone cover abundance		Exotic species < 10%, terrestrial woody species < 5%												
						Biota	Fish	Upper zone cover abundance	Exotic species < 10%, terrestrial woody species < 5%	Exotic species < 10%, terrestrial woody species < 5%												
								FRAI score		B category (82-87%)												
							Invertebrates	MIRAI score	FRAI shall yield a B.	A category (92-100%)												
								Invertebrate diversity		MIRAI score to be within A. SASS score > 120, ASPT > 7												

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric													
G15 Coastal	K40E	G15-R34	Goukamma	gviili9	B/C	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Goukamma River in an ecological condition that is equal to or better than Category B/C.	Months	High Low Maintenance flows (million cubic metres)	0.645	0.821	0.821	0.445	0.445	0.445	0.445	0.401	0.387	0.431	0.554	0.536
								≤ 0.075 milligrams/litre (50 th percentile)	≤ 0.075 milligrams/litre (50 th percentile)														
							Nutrients	Phosphate (PO ₄ -P) Total inorganic nitrogen (TIN)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 1.75 milligrams/litre (50 th percentile)													
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained in an Acceptable category for aquatic ecosystems.	≤ 55 milliSiemens/metre (95 th percentile)												
						Quality	System variables		pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	4 ≥ pH ≤ 7 (5 th and 95 th percentiles)												
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95 th percentile)												
						Habitat	Geomorphology			GAI score Sediment particle size	GAI score should equate to a B.	B category (82-87%) D16 = 2mm, D50 = 24 mm, D84 = 128 mm											
								Riparian vegetation	VEGRAI score Marginal zone cover abundance Lower zone cover abundance Upper zone cover abundance	VEGRAI level 4 of Category B.	B category (82-87%) No exotic species, no terrestrial woody species Exotic species < 5%, terrestrial woody species < 15% Exotic species < 5%, terrestrial woody species < 5%												
							Biota		Fish Invertebrates	FRAI score MIRAI score Invertebrate diversity	FRAI shall yield a C. MIRAI score to be within A.	C category (62-77%) A category (92-100%) SASS score > 100, ASPT > 7.4											

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
G15 Coastal	K50A	G15-R35	Knysna River	gvii14	B	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Knysna River in an ecological condition that is equal to or better than Category B.	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
								Maintenance flows (million cubic metres)			0.686	0.664	0.546	0.437	0.411	0.239	0.441	0.478	0.476	0.447	0.474	0.579
						Quality	Nutrients	Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at an oligotrophic condition.	≤ 0.025 milligrams per litre (50 th percentile)												
								Total inorganic nitrogen (TIN)		≤ 0.70 milligrams per litre (50 th percentile)												
							Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained in an Ideal category for aquatic ecosystem health.	≤ 30 milliSiemens/metre (95 th percentile)												
							System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	4.5 ≥ pH ≤ 7.0 (5 th and 95 th percentiles)												
						Dissolved oxygen		Concentrations of waterborne pathogens should be maintained in an Ideal category for full contact recreation.	≥ 8 milligrams per litre (5 th percentile)													
						Pathogens	Escherichia coli	≤ 130 counts/100ml (95 th percentile)														
							Geomorphology	GAI score Sediment particle size	GAI score should equate to a A/B.	A/B category (87-92%) D16 = 30mm, D50 = 120 mm, D84 = 300 mm												
						Habitat	Riparian vegetation	VEGRAI score	VEGRAI level 4 of Category A/B.	A/B category (87-92%)												
								Marginal zone cover abundance		No exotic species, no terrestrial woody species												
								Lower zone cover abundance		Exotic species < 20%, terrestrial woody species < 5%												
								Upper zone cover abundance		Exotic species < 40%, terrestrial woody species < 5%												
						Biota	Fish	FRAI score	FRAI shall yield a B.	B category (82-87%)												
								MIRAI score		B category (82-87%)												
							Invertebrates	Invertebrate diversity	MIRAI score to be within B Category.	SASS score > 150, ASPT > 6.7												

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
G15 Coastal	K50B	G15-R36	Gouna River	gvihi11	A/B	Quantity	Low flows High flows	Maintenance low flows	Flows shall be sufficient to maintain the Gouna River in an ecological condition that is equal to or better than Category A/B.	Months	High	Low	1.44	0.342	Oct	1.328	1.197	Nov	0	Dec	0	Jan	0	Feb	0.692	0.76	0.684	Mar	0.781	0.342	Apr	0	May	0	Jun	0	Jul	0.964	1.202	Aug	0.067																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
								Maintenance flows (million cubic metres)					1.377	0.898	0.875																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
							Nutrients	Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at an oligotrophic condition.	≤ 0.025 milligrams per litre (50 th percentile)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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								pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	4.0 ≥ pH ≤ 7.0 (5 th and 95 th percentiles)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
							System variables	Dissolved oxygen	Concentrations of waterborne pathogens should be maintained in an Ideal category for full contact recreation.	≥ 8 milligrams per litre (5 th percentile)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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						Habitat	Geomorphology	GAI score	GAI score should equate to a A/B.	A/B category (87-92%)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
								Sediment particle size		D16 = 10mm, D50 = 50 mm, D84 = 200 mm																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
Riparian vegetation	VEGRAI score	VEGRAI level 4 of Category A/B.	A/B category (87-92%)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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Biota	Fish	Lower zone cover abundance	FRAI shall yield a B.	Exotic species < 10%, terrestrial woody species < 5%																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
		Upper zone cover abundance		Exotic species < 10%, terrestrial woody species < 5%																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric													
G15 Coastal	K60C	G15-R37	Keurbooms River	giv6	C	Quantity	Low flows High flows	Maintenance low flows	Flows shall be sufficient to maintain the Keurbooms River an ecological condition that is equal to or better than the ecological condition in summer 2014 (Category B).	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
								Maintenance high flows			High	0.758	0	0.758	0	0	0.627	0	0.669	0.833	0	1.123	1.395
											Low	1.697	1.448	1.157	0.788	0.508	0.627	0	0.669	0.833	0	1.123	1.395
						Quality	Nutrients	Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at an oligotrophic condition.	≤ 0.025 milligrams per litre (50 th percentile)													
								Total inorganic nitrogen (TIN)		≤ 0.70 milligrams per litre (50 th percentile)													
							Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained in an Ideal category for aquatic ecosystem health.	≤ 30 milliSiemens/metre (95 th percentile)													
							System variables	pH range		5.5 ≥ pH ≤ 8.0 (5 th and 95 th percentiles)													
								Dissolved oxygen		≥ 8 milligrams per litre (5 th percentile)													
						Habitat	Riparian vegetation	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Ideal category for full contact recreation.	≤ 130 counts/100ml (95 th percentile)													
								Geomorphology		GAI score	B category (82-87%)												
								VEGRAI score		B/C category (77-82%)													
Biota	Invertebrates	Fish		Marginal zone cover abundance	VEGRAI level 4 of at ~58% for the riparian zone.	No exotic species, no terrestrial woody species																	
				Lower zone cover abundance		Exotic species < 5%, terrestrial woody species < 15%																	
				Upper zone cover abundance		Exotic species < 30%, terrestrial woody species < 20%																	
				FRAI score		B category (82-87%)																	
				MIRAI score		B category (82-87%)																	
				Invertebrate diversity	FRAI shall yield a B	SASS score > 180, ASPT > 6.5																	
				Number of families		> 15 families, 2 with SASS scores > 12, abundance A - C																	

IUA Class	Quaternary Catchment	Resource RU Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
					Microalgae	Biomass and composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Maintain low phytoplankton biomass; maintain microalgal group diversity as measured for the baseline survey; phytoplankton biomass should not increase by more than 20% above baseline concentrations; phytoplankton group diversity should not change by more than 20% from baseline conditions
					Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Area covered by different plant community types should not change by more than 20% from baseline open and closed mouth conditions, no invasive species should be present, prevent excessive filamentous macroalgal growth, area covered should be less than 50 % of the open water surface area, macroalgae cover should not exceed 50% in 1 m ² quadrats or occupy more than 50% of the open water surface area in the eastern channel and above sand bank in the lower reaches of the estuary, macroalgal wet biomass should remain below 500 g m ⁻²
				Biota	Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Density of sandprawn burrow openings should exceed 75 per m ² in the highest density areas in the lower estuary; amphipods should numerically dominate the benthic fauna (<i>Grandidierella</i> sp. and <i>Corophium triaenonyx</i>) living on the sediment surface in the middle and upper estuarine reaches respectively; in the zooplankton, the density of <i>Pseudodiaptomus hessei</i> should range between 100 and 5000 m ⁻³ in the summer in the mid-estuary region
					Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Retain the following fish assemblages in the estuary (based on abundance): estuarine species (10-20%); estuarine associated marine species (80-90%); and indigenous freshwater species (~1%); all numerically dominant species should be represented by 0+ juveniles.
					Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	Retain regular representation of waders, gulls, and terns, and overall waterbird species richness of seven or more species; estuary should not be regularly used by waterfowl species such as Redknobbed Coot; waders or terns should not be absent from the estuary for >5 consecutive counts

Table 19: Resource Quality Objectives for ESTUARIES in priority Resource Units in the Integrated Unit of Analysis H16 Overberg West Coastal

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric													
H16 Overberg West Coastal	G40B	H16-E02	Buffels Estuary	bxi1	B	Quantity	Flow	MMR/MAR (% Nat)	Maintain at least present-day base flows	Months	84.4	69.5	28.7	11.2	8.9	13.4	35.3	64.3	87.8	91.2	91.7	89.8	81.9
								Annual	Sep	Aug	Jul	Jun	May	Apr	Mar	Feb	Jan	Dec	Nov	Oct			
						Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	<100µg/l	<10 µg/l	>6 mg/l	System variables not to exceed TPCs for biota	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation	≤185 Enterococci/100 ml (90 th percentile)	≤500 E. coli/100 ml (90 th percentile)	Closed mouth state should not increase by >10% from established baseline	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline	Area occupied by different macrophyte groups should no change by >20 % change in the area covered by habitats, submerged macrophytes such as pondweed (<i>Potamogeton pectinatus</i>) should be present during low flow conditions				
								DIP															
								Dissolved oxygen															
								Enterococci															
						Habitat	Hydrodynamics	Mouth state	Sediment characteristics, Channel shape/size	Biomass and community composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	<20 µg l-1											
													Escherichia coli										
												Biota	Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species								

IUA Class	Quaternary Catchment	RU Name	Resource Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																													
H16 Overberg West Coastal	G40B	H16-E03	Rooteis Estuary	B	Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Estuary should have viable populations of <i>Callinassa kraussi</i> in sandy zones and <i>Upogebia africana</i> in muddy zones.																													
						Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Maintain fish assemblage that includes at least 2 estuarine breeding species (Category I), 3 estuary dependent marine species (Category IIa & IIb) and 1 indigenous catadromous species (Category V). Estuarine residents should dominate numerically, but the proportion of estuary dependent marine species (based on abundance) should not fall below 2%.																												
					Quantity	Flow	MMR/MAR (% Nat)	Maintain at least present-day base flows	<table><tr><td>Months</td><td>Oct</td><td>Nov</td><td>Dec</td><td>Jan</td><td>Feb</td><td>Mar</td><td>Apr</td><td>May</td><td>Jun</td><td>Jul</td><td>Aug</td><td>Sep</td><td>98.6 Annual</td></tr><tr><td>MMR/MAR (% Nat)</td><td>99.0</td><td>98.9</td><td>98.4</td><td>98.0</td><td>98.3</td><td>98.0</td><td>98.1</td><td>98.3</td><td>98.5</td><td>98.6</td><td>98.6</td><td>98.8</td><td>98.6</td></tr></table>	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	98.6 Annual	MMR/MAR (% Nat)	99.0	98.9	98.4	98.0	98.3	98.0	98.1	98.3	98.5	98.6	98.6	98.8	98.6
						Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	98.6 Annual																		
					MMR/MAR (% Nat)	99.0	98.9	98.4	98.0	98.3	98.0	98.1	98.3	98.5	98.6	98.6	98.8	98.6																			
					Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	<100µg/l																													
						DIP	System variables not to exceed TPCs for biota	<10 µg/l																													
					Quality	System variables	Dissolved oxygen	System variables not to exceed TPCs for biota	>6 mg/l																												
						Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation	≤ 130 counts/100ml (95 th percentile)																												
					Habitat	Hydrodynamics	Mouth state	Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary	Closed mouth state should not increase by >10% from established baseline																												
Sediments	Sediment characteristics, Channel shape/size	Flood regime is sufficient to maintain natural bathymetry and sediment characteristics	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline																																		

IUA Class	Quaternary Catchment	Resource RU Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric				
H16 Overberg West Coastal	G40G	H16-E04	Bot Estuary	C	Quantity	Flow	MMR/MAR (% Nat)	Maintain a flow regime to create the required habitat for birds, fish, macrophytes, microalgae and water quality	Months MMR/MAR (% Nat)	Annual Sep 85.0 Aug 87.7 Jul 85.8 Jun 83.8 May 80.9 Apr 75.5 Mar 63.7 Feb 60.3 Jan 58.2 Dec 63.9 Nov 75.7 Oct 80.2			
								River inflow (low flows): DIN <100 µg/l; River inflow high flows: DIN <300 µg/l; Estuary (low flows): DIN <100 µg/l (except during upwelling events); Estuary (high flows): DIN <300 µg/l in Zones A & B (upper reaches) and <100 µg/l in Zones C & D (lower reaches) (except during upwelling events)					
					Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	River inflow (low flows): DRP <50 µg/l; River inflow high flows: DRP <80 µg/l; Estuary (low flows): DRP <50 µg/l (except during upwelling events); Estuary (high flows): DRP <80 µg/l in Zones A & B (upper reaches) and <50 µg/l in Zones C & D (lower reaches) (except during upwelling events)				
							DIP						
					Biota					Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	<20 µg l ⁻¹
										Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Area occupied by different macrophyte groups should no change by >20 % change in the area covered by habitats, submerged macrophytes such as pondweed (<i>Potamogeton pectinatus</i>) should be present during low flow conditions
										Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Estuary should have viable populations of <i>Callianassa kraussi</i> in sandy zones and <i>Upogebia africana</i> in muddy zones.
										Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Maintain fish assemblage that includes at least 2 estuarine breeding species (Category I), 3 estuary dependent marine species (Category Ila & Iib) and 1 indigenous catadromous species (Category V). Estuarine residents should dominate numerically, but the proportion of estuary dependent marine species (based on abundance) should not fall below 2%.

IUA Class	Quaternary Catchment	Resource RU Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
					Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Summer: 8<Salinity<40
					System variables	pH	System variables not to exceed TPCs for biota	6 < pH < 8.5
						Dissolved oxygen		>4 mg/l
					Pathogens	Enterococci	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation	≤185 Enterococci/100 ml) (90 th percentile)
						Escherichia coli		≤500 E. coli/100 ml (90 th percentile)
					Hydrodynamics	Mouth state	Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary	Closed mouth state should not increase by >10% from established baseline
				Habitat	Sediments	Sediment characteristics, Channel shape/size	Flood regime is sufficient to maintain natural bathymetry and sediment characteristics	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline
					Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Maintain low phytoplankton biomass (< 6 ug l ⁻¹); phytoplankton biomass should not rise above 10 ug l ⁻¹ for greater than 6 months; maintain microalgal group diversity as measured for the baseline survey (an increase in Cyanophytes (blue greens) would be a cause for concern); phytoplankton group diversity should not decrease below 20% of that found for baseline conditions; maintain present benthic microalgal biomass (< 4 ug g ⁻¹); benthic microalgal biomass should not rise above 10 ug g ⁻¹ for greater than 6 months
				Biota	Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Maintain the present area (2011) covered by the macrophyte habitats: submerged macrophytes (476 ha); reeds and sedges (60 ha); salt marsh (69 ha); and macroalgae (238 ha); prevent excessive filamentous macroalgal growth; the present ratio of macroalgae to submerged macrophytes must be maintained (i.e. 50%).

IUA Class	Quaternary Catchment	Resource RU Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric														
H16 Overberg West Coastal	G40H	H16-E05	Onrus Estuary	D	Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Zooplankton: Density of <i>Pseudodiaptomus hessei</i> should range between 100 and 5000 m ³ in the summer in the mid-estuary region; Benthic macrofauna: density of sandprawn <i>Callinassa kraussi</i> burrow openings should exceed 75 per m ² in the highest density areas in the lower estuary, burrow density in the lower estuary should not drop below 50 counts per m ² in the highest density areas, all size classes of sand prawn should be present in the population														
						Fish	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/incr ease of alien species	Fish community composition, abundance and richness	Juvenile estuary dependant marine fish should not be absent from the estuary for more than two years in a row; % contribution by juvenile estuary dependant marine fish to assemblage by number should not drop to <60% of residents; Alien species abundance should remain below 5 % of biomass in main body of estuary; % contribution of adult & sub-adult estuary-dependent fish to assemblage by number should not drop below 15%													
					Birds		Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	Number of non-passerine waterbird species recorded in counts should not decrease by more than 10% over a five-year period; overall numbers of waders, wading birds or gulls & terns, or numbers of any of the species in these groups should not decrease relative to the baseline average by more than 10% over a five-year period, after correcting for regional/global population changes; total summer numbers of waterfowl should not exceed 15 000 for more than 4 years.													
						Flow	MMR/MAR (% Nat)	Maintain a flow regime to create the required habitat for birds, fish, macrophytes, microalgae and water quality	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					MMR/MAR (% Nat)		55.5	54.2		53.8	52.9	51.2	49.7	49.0	50.0	49.8	51.7	54.8	51.8			
									Quality	Nutrients	DIN	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Entire estuary and river inflow: DIN <300µg/l									
											DIP		Entire estuary and river inflow: DIP < 25 µg/l									
										Salinity	Salinity	10 < Salinity <40										

IUA Class	Quaternary Catchment	RU Name	Resource Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
					System variables	Dissolved oxygen Turbidity	System variables not to exceed TPCs for biota	Entire estuary and river inflow: DO >5 mg/l
					Pathogens	Enterococci Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation	Turbidity <5 NTU ≤185 Enterococci/100 ml (90 th percentile) ≤500 E. coli/100 ml (90 th percentile)
				Habitat	Hydrodynamics	Mouth state	Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary	Closed mouth state should not increase by >10% from established baseline
					Sediments	Sediment characteristics, Channel shape/size	Flood regime is sufficient to maintain natural bathymetry and sediment characteristics	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline
					Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Control nutrient input from sewage spills to prevent microalgal blooms (> 20 µg l ⁻¹) and the occurrence of harmful algal bloom species; maintain the distribution of different phytoplankton groups (diverse community composition) and prevent dominance of Cyanophytes (blue-green algae) that occur under nutrient rich, freshwater conditions
				Biota	Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Maintain the present area (2014) covered by the macrophyte habitats: open surface water area: 2.59, sand and mudflats: 1.86, reeds and sedges: 6.57, prevent further spread of reeds by reducing nutrient input and occurrence of aquatic invasive such as water fern <i>Azolla</i> ., prevent further disturbance and development in the riparian zone; remove alien plants from the riparian zone and control the spread of garden invasive

IUA Class	Quaternary Catchment	Resource RU Name	Resource Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
					Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	The estuary should have viable populations of <i>Callinassa kraussi</i> in sandy zones and <i>Upogebia africana</i> in muddy zones. Breeding in both species ceases at salinities lower than 17 ppt during prolonged mouth phase. In <i>U. africana</i> and export of larvae into marine and postlarvae back to estuary ceases; prolonged mouth closure should be avoided as this will result in a loss of marine species (e.g. <i>Pseudodiaptomus</i> sp.) from the zooplankton community
					Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Maintain fish assemblage that includes at least 2 estuarine breeding species (Category I), 2 estuary dependent marine species (Category II), 1 indigenous catadromous species (Category V) and two freshwater indigenous species (Category IV). Estuarine residents should dominate numerically (>50%), but estuary dependent marine species, indigenous catadromous and freshwater species should be present

Table 20: Resource Quality Objectives for ESTUARIES in priority Resource Units in the Integrated Unit of Analysis H17 Overberg East Fynbos

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																											
H17 Overberg East Fynbos	G40L	H17-E06	Klein Estuary	nxi7	C	Quantity	Flow	MMR/MAR (% Nat)	Flood and breaching regimes to maintain the sediment distribution patterns and aquatic habitat (instream physical habitat) so as not to exceed TPCs for biota	Months	84.2	Oct	83.1	Nov	85.5	Dec	73.7	Jan	69.4	Feb	78.8	Mar	78.0	Apr	83.9	May	82.3	Jun	86.9	Jul	89.7	Aug	90.3	Sep	85.6	Annual
										MMR/MAR (% Nat)	Entire estuary and river inflow: DIN <300µg/l																									
						Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	Entire estuary and river inflow: DIP <25 µg/l																										
								DIP																												
						Quality	Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	5 < Salinity <40																										
										Entire estuary and river inflow: DO >5mg/l, turbidity < 5 NTU																										
										Turbidity <5 NTU																										
										System variables	Pathogens	Enterococci	Concentrations of	≤185 Enterococci/100 ml) (90 th percentile)																						

IUA Class	Quaternary Catchment	RU Name	Resource Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
						Escherichia coli	waterborne pathogens should be maintained in an Acceptable category for full contact recreation	≤500 E. coli/100 ml (90 th percentile)
				Habitat	Hydrodynamics	Mouth state	Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary	Closed mouth state should not increase by >10% from established baseline
					Sediments	Sediment characteristics, Channel shape/size	Flood regime is sufficient to maintain natural bathymetry and sediment characteristics	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline
					Microalgae	Biomass and composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Phytoplankton biomass, measured as water column chlorophyll-a should not exceed 10 µg l ⁻¹ ; maintain high subtidal benthic microalgae biomass during the closed mouth phase and high intertidal benthic microalgae biomass during the open phase; phytoplankton biomass should not exceed 10 µg l ⁻¹ ; benthic microalgae biomass should not deviate more than 20 % compared with Present State concentrations; no brackish epipellic diatoms should be found during the closed phase
				Biota	Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Maintain the present area (2014) covered by the macrophyte habitats: open surface water area: 741.6 ha; sand and mud banks: 79 ha; submerged macrophytes: 92 ha; salt marsh: 170 ha; reeds and sedges: 127 ha; floodplain: 280 ha (mostly intact) and 110 ha (disturbed); maintain the distribution of plant community types i.e. submerged macrophyte, <i>Ruppia cirrhosa</i> beds during closed mouth brackish conditions, salt marsh, <i>Salicornia meyeriana</i> marsh during open mouth conditions, <i>Phragmites australis</i> stands in the middle / upper reaches and salt marsh grasses indicative of brackish conditions

IUA Class	Quaternary RU Catchment	Resource Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
					Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Benthic invertebrates: The estuary should have viable populations of <i>Callinassa kraussi</i> in sandy zones and <i>U. africana</i> in muddy zones. Breeding in both species ceases at salinities lower than 17 ppt during prolonged mouth phase. In <i>U. africana</i> and export of larvae into marine and postlarvae back to estuary ceases; abundance of <i>C. kraussi</i> and <i>U. africana</i> should not drop below 50% of recorded total abundances in each season; recruits should be recorded in population (Identify zones where these are abundant from the baseline study and these would be where the above would be assessed); Zooplankton: Prolonged close mouth would result in a loss of marine species (e.g. <i>Pseudodiaptomus</i> sp.) from the zooplankton community; abundance of indicator marine species (e.g. <i>Pseudodiaptomus</i> sp.) should not change by more than 50% of current levels.
					Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Retain the following fish assemblages in the estuary (based on abundance): estuarine species (20-30%), estuarine associated marine species (60-70%) and indigenous freshwater species (<1%). All numerically dominant species are represented by 0+ juveniles. abundance of estuary associated marine species should not drop below 50% of total abundance; abundance of estuarine species should not increase above 50% of total abundance.; alien freshwater species should not be present in the estuary; 0+ juveniles of all of the dominant fish species should be present
					Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	The estuary should contain a rich avifaunal community that includes representatives of all the original groups, significant numbers of migratory waders and terns, as well as a healthy breeding population of resident waders; the estuary should support thousands of birds in summer and hundreds in winter; numbers of waterfowl should not drop below 600, waders below 100 in summer, and terns below 250; overall numbers of bird species should not drop below 1000 for 3 consecutive counts

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																			
H17 Overberg East Fynbos	G40M	H17-E07	Ulukraal Estuary	nx15	C/D	Quantity	Flow	MMR/MAR (% Nat)	Maintain a flow regime to create the required habitat for birds, fish, macrophytes, microalgae and water quality	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual						
										MMR/MAR (% Nat)	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8
						Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	Entire estuary and river inflow: DIN <300µg/l																			
								DIP	exceed TPCs for macrophytes and microalgae	Entire estuary and river inflow: DIP <25 µg/l																			
							Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	10 < Salinity <40																			
							System variables	Dissolved oxygen	System variables not to exceed TPCs for biota	Entire estuary and river inflow: DO > 6 mg/l																			
								Turbidity	exceed TPCs for biota	Turbidity < 5 NTU																			
						Habitat	Pathogens	Enterococci	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation	≤185 Enterococci/100 ml) (90 th percentile)																			
								Escherichia coli		≤500 E. coli/100 ml (90 th percentile)																			
							Hydrodynamics	Mouth state		Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary	Closed mouth state should not increase by >10% from established baseline																		
										Flood regime is sufficient to maintain natural bathymetry and sediment characteristics	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline																		
						Biota	Sediments		Sediment characteristics, Channel shape/size																				
									Biomass and community composition of phytoplankton and benthic microalgae																				

IUA Class	Quaternary Catchment	RU Name	Resource Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
H17 Overberg East Fynbos	G50A	H17-E08	Ratel Estuary	C	Quantity	Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Maintain the distribution of plant community types i.e. submerged macrophyte, <i>Ruppia cirrhosa</i> beds during closed mouth brackish conditions, salt marsh, <i>Salicornia meyeriana</i> marsh during open mouth conditions, <i>Phragmites australis</i> stands in the middle / upper reaches and salt marsh grasses indicative of brackish conditions.
						Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	The estuary should have viable populations of <i>Callinassa kraussi</i> in sandy zones and U. Africana in muddy zones
						Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Retain the following fish assemblages in the estuary (based on abundance): estuarine species (30-40%), estuarine associated marine species (60-70%) and indigenous freshwater species (<1%). All numerically dominant species are represented by 0+ juveniles
						Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	The estuary should contain a rich avifaunal community that includes representatives of all the original groups, significant numbers of migratory waders and terns, as well as a healthy breeding population of resident waders; the estuary should support thousands of birds in summer and hundreds in winter
						Flow	MMR/MAR (% Nat)	Maintain at least present-day base flows	Months MMR/MAR (% Nat)
					Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	Annual 90.0 Sep 90.0 Aug 90.0 Jul 90.0 Jun 90.0 May 90.0 Apr 90.0 Mar 90.2 Feb 90.2 Jan 90.3 Dec 90.1 Nov 90.0 Oct 90.0
						Salinity	DIP	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Entire estuary and river inflow: DIN <300µg/l
						Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Entire estuary and river inflow: DIP <25 µg/l
						System variables	Dissolved oxygen Turbidity	System variables not to exceed TPCs for biota	10 < Salinity <40
						Pathogens	Enterococci	Concentrations of	Entire estuary and river inflow: DO > 6 mg/l Turbidity < 5 NTU ≤185 Enterococci/100 ml) (90 th percentile)

IUA Class	Quaternary Catchment	Resource RU Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
						Escherichia coli	waterborne pathogens should be maintained in an Acceptable category for full contact recreation	≤500 E. coli/100 ml (90 th percentile)
					Hydrodynamics	Mouth state	Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary	Closed mouth state should not increase by >10% from established baseline
					Sediments	Sediment characteristics, Channel shape/size	Flood regime is sufficient to maintain natural bathymetry and sediment characteristics	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline
					Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Maintain the distribution of different phytoplankton groups and low biomass (< 20 µg l ⁻¹)
					Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Maintain the distribution of current macrophyte habitats, <20 % change in the area covered by different macrophyte habitats (accounts for natural changes due to the dynamic nature of estuaries); submerged macrophytes such as pondweed (<i>Potamogeton pectinatus</i>) should be present during low flow conditions
					Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	The estuary should have viable populations of <i>Callinassa kraussi</i> in sandy zones and <i>Upogebia africana</i> in muddy zones
					Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Maintain fish assemblage that includes at least 2 estuarine breeding species (Category I), 3 estuary dependent marine species (Category IIa & IIb) and 1 indigenous catadromous species (Category V); estuarine residents should dominate numerically, but the proportion of estuary dependent marine species (based on abundance) should not fall below 2%.

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric														
H17 Overberg East Fynbos	G50F	H17-E09	Heuningnes Estuary	nxi1	A/B	Quantity	Flow	MMR/MAR (% Nat)	Flood and breaching regimes to maintain the sediment distribution patterns and aquatic habitat (instream physical habitat) so as not to exceed TPCs for biota	Months	79.6	77.5	73.1	71.5	72.5	76.2	79.1	79.2	79.0	78.4	78.7	78.2	78.2
										MMR/MAR (% Nat)	Entire estuary and river inflow: DIN <300µg/l	Entire estuary and river inflow: DIP <25 µg/l	Average salinity in the estuary is artificially elevated at present due to reduced freshwater inflow, target levels for the various zones are as follows: Zone A: 30, Zone B: 14, Zone C: 6, Zone D: 2	Entire estuary and river inflow: DO >5 mg/l	8 < pH <9	≤185 Enterococci/100 ml) (90 th percentile)	≤500 E. coli/100 ml (90 th percentile)	Closed mouth state should not increase by >10% from established baseline	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline	Phytoplankton biomass, measured as water column chlorophyll-a should not exceed 10 µg l ⁻¹ in both the estuary and Soetendalslei (Zone D); maintain diversity of phytoplankton groups i.e. diatoms abundant during marine phase.			
						Quality	Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	System variables not to exceed TPCs for biota	Enterococci	Pathogens	Mouth state	Hydrodynamics	Habitat	Sediment characteristics, Channel shape/size	Biomass and community composition of phytoplankton and benthic microalgae community	Microalgae	Biota	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Phytoplankton biomass, measured as water column chlorophyll-a should not exceed 10 µg l ⁻¹ in both the estuary and Soetendalslei (Zone D); maintain diversity of phytoplankton groups i.e. diatoms abundant during marine phase.		
						Nutrients	DIN	DIP	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	Dissolved oxygen pH	Escherichia coli	Pathogens	Mouth state	Hydrodynamics	Habitat	Sediment characteristics, Channel shape/size	Biomass and community composition of phytoplankton and benthic microalgae community	Microalgae	Biota	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Phytoplankton biomass, measured as water column chlorophyll-a should not exceed 10 µg l ⁻¹ in both the estuary and Soetendalslei (Zone D); maintain diversity of phytoplankton groups i.e. diatoms abundant during marine phase.		

IUA Class	Quaternary Catchment	RU Name	Resource Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
					Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Area covered by different macrophyte habitats particularly intertidal and supratidal salt marsh should be allowed to revert to a more natural state through restoration of a more natural flow regime (particularly summer base flows) and by allowing mouth operate normally as far as possible (minimum height for artificial breaching to be increased to 2.5 m) breaching which will increase backflooding and soil salinity; present area (2014) covered by the macrophyte habitats is as follows: Open surface water area :907.92, Sand and mudflats :43.35, Submerged macrophytes :10.17, Reeds and sedges :1154.98, Intertidal salt marsh :16.18 , Supratidal salt marsh:942.4
					Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Benthic invertebrates: Abundance of <i>C. kraussi</i> and <i>U. Africana</i> should not drop below 50% of recorded total abundances in each season, recruits should be recorded in population (Identify zones where these are abundant from the baseline study and these would be where the above would be assessed; Zooplankton: Prolonged close mouth would result in a loss of marine species (e.g. <i>Pseudodiaptomus</i> sp.) from the zooplankton community, abundance of indicator marine species (e.g. <i>Pseudodiaptomus</i> sp.) should not change by more than 50% of current levels
					Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Retain the following fish assemblages in the estuary (based on abundance): estuarine species (20-30%), estuarine associated marine species (60-70%) and indigenous freshwater species (<1%); all numerically dominant species are represented by 0+ juveniles; abundance of estuary associated marine species should not drop below 50% of total abundance; abundance of estuarine species should not increase above 50% of total abundance; alien freshwater species should not be present in the estuary; 0+ juveniles of all of the dominant fish species should be present

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																						
H17 Overberg East Fynbos	G50K	H17-E10	Klipdriffontein Estuary	bx13	A	Quality	Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	The estuary should contain a rich avifaunal community that includes representatives of all the original groups, significant numbers of migratory waders and terns, as well as a healthy breeding population of resident waders. The estuary should support thousands of birds in summer and hundreds in winter; numbers of waterfowl should not drop below 600; waders below 100 in summer, and terns below 250; overall numbers of bird species should not drop below 1000 for 3 consecutive counts																						
							Flow	MMR/MAR (% Nat)	Maintain at least present-day base flows	<table><tr><th>Months</th><th>Annual</th></tr><tr><td>MMR/MAR (% Nat)</td><td>64.8</td></tr><tr><td>Jan</td><td>64.3</td></tr><tr><td>Feb</td><td>66.8</td></tr><tr><td>Mar</td><td>61.2</td></tr><tr><td>Apr</td><td>60.2</td></tr><tr><td>May</td><td>64.4</td></tr><tr><td>Jun</td><td>60.2</td></tr><tr><td>Jul</td><td>61.2</td></tr><tr><td>Aug</td><td>66.8</td></tr><tr><td>Sep</td><td>64.3</td></tr></table>	Months	Annual	MMR/MAR (% Nat)	64.8	Jan	64.3	Feb	66.8	Mar	61.2	Apr	60.2	May	64.4	Jun	60.2	Jul	61.2	Aug	66.8	Sep	64.3
							Months	Annual																								
							MMR/MAR (% Nat)	64.8																								
							Jan	64.3																								
							Feb	66.8																								
							Mar	61.2																								
							Apr	60.2																								
							May	64.4																								
							Jun	60.2																								
Jul	61.2																															
Aug	66.8																															
Sep	64.3																															
Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	Entire estuary and river inflow: DIN <300µg/l																													
	DIP		Entire estuary and river inflow: DIP <25 µg/l																													
	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	10 < Salinity <40																													
System variables	Dissolved oxygen	System variables not to exceed TPCs for biota	Entire estuary and river inflow: DO > 6 mg/l																													
	Turbidity		Turbidity < 5 NTU																													
	Enterococci	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation	≤185 Enterococci/100 ml (90 th percentile)																													
Pathogens	Escherichia coli		≤500 E. coli/100 ml (90 th percentile)																													
Hydrodynamics	Mouth state	Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary	Closed mouth state should not increase by >10% from established baseline																													
	Habitat	Sediment characteristics, Channel shape/size	Flood regime is sufficient to maintain natural bathymetry and sediment characteristics	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline																												

IUA Class	Quaternary Catchment	RU Name	Resource Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
					Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Maintain the distribution of different phytoplankton groups and low biomass (< 20 µg l-1)
				Biota	Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Maintain the distribution of current macrophyte habitats, <20 % change in the area covered by different macrophyte habitats (accounts for natural changes due to the dynamic nature of estuaries); submerged macrophytes such as pondweed (<i>Potamogeton pectinatus</i>) should be present during low flow conditions
					Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	The estuary should have viable populations of <i>Callinassa kraussi</i> in sandy zones and <i>Upogebia africana</i> in muddy zones
					Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Maintain fish assemblage that includes at least 2 estuarine breeding species (Category I), 3 estuary dependent marine species (Category IIa & IIb) and 1 indigenous catadromous species (Category V); estuarine residents should dominate numerically, but the proportion of estuary dependent marine species (based on abundance) should not fall below 2%.

Table 21: Resource Quality Objectives for ESTUARIES in priority Resource Units in the Integrated Unit of Analysis F11 Lower Breede Renosterveld

IUA Class	Quaternary Catchment	R Resource U	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																										
F11 Lower Breede Renosterveld	H70K	F11-E11	Breede Estuary	Quantity	Flow	MMR/MAR (% Nat)	Maintain flow regime as per recommended ecological flow	Months	57.6	Oct	50.1	Nov	34.0	Dec	33.0	Jan	34.6	Feb	41.7	Mar	59.7	Apr	56.6	May	61.2	Jun	47.6	Jul	51.3	Aug	27.3	Sep	47.2	Annual
								MMR/MAR (% Nat)	Entire estuary and river inflow: DIN <300µg/l																									
				Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	Entire estuary and river inflow: DIP <25 µg/l																										
						DIP																												
						Salinity		Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Zone A (0-15 km upstream of mouth): 40> Salinity >20, Zone B (15-30 km): 30> Salinity >10, Zone C (30-40 km): 20> Salinity >5, Zone D (40-50 km): <10																									

IUA Class	Quaternary Catchment	R	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
							System variables	Dissolved oxygen	System variables not to exceed TPCs for biota	Entire estuary and river inflow: DO >5 mg/l
							Pathogens	Enterococci	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation	≤185 Enterococci/100 ml (90 th percentile)
								Escherichia coli		≤500 E. coli/100 ml (90 th percentile)
							Hydrodynamics	Mouth state	Maintain connectivity with marine environment	Estuary mouth permanently open
								Tidal variation		Average tidal amplitude near the mouth during low flows (summer) must not change by >10% from established baseline.
							Sediments	Sediment characteristics, Channel shape/size	Flood regime to maintain natural bathymetry and the sediment characteristics	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline
							Microalgae	Biomass and composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Median phytoplankton chlorophyll a (minimum 5 sites) not to exceed 3.5 µg/l; prevent formation of localised phytoplankton blooms; maintain a high median intertidal benthic microalgal biomass; median intertidal benthic chlorophyll a (minimum 5 sites) not to exceed 42 mg/m ² site specific chlorophyll a concentration not to exceed 20 µg/l and cell density not to exceed 10 000 cells/l.
										Maintain the present area (2014) covered by the macrophyte habitats: intertidal salt marsh: 20.5 ha, supratidal salt marsh: 29.55 ha, submerged macrophytes: 6 ha, reeds & sedges: 4.8 ha, sand/mud banks: 136 ha; maintain the integrity of the remaining supratidal salt marsh; maintain the reed and sedge stands in the upper reaches of the estuary; rehabilitate 20% of the floodplain habitat by removing any agricultural berms and invasive plants; maintain the integrity of the riparian zone.; invasive plants (e.g. <i>Eucalyptus</i> , prickly pear, <i>Tamarix</i>) cover not to exceed 5% of total floodplain area
							Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	

IUA Class	Quaternary Catchment	R U	Resource Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
						Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Maintain rich populations of the mudprawn <i>Upogebia africana</i> on mudbanks in the middle estuary (Zone B); maintain rich invertebrate communities associated with the REI zone in the upper estuary (zooplankton and benthos); mudprawn density should not deviate from average baseline levels by more than 25% in each season; dominant species in the zone (zooplankton and benthos) should not deviate from average baseline levels by more than 40% in each season
						Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Fish assemblage should comprise the 5 estuarine association categories in similar proportions (diversity and abundance) to that under the reference (see 2015 EWR report); numerically assemblage should comprise: Ia estuarine residents (50-80% of total abundance), Ib marine and estuarine breeders (10-20%), IIa obligate estuarine-dependent (10-20%), IIb estuarine associated species (5-15%), IIc marine opportunists (20-80%), III marine vagrants (not more than 5%), IV indigenous fish (1-5%), V catadromous species (1-5%); Category Ia species should contain viable populations of at least 4 species; Category IIa obligate dependents should be well represented by large exploited species
						Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	The estuary should contain a diverse avifaunal community that includes representatives of all the original taxonomic groups (see 2015 EWR report); tern roosts should be seen at the estuary on a regular basis; apart from gulls, terns and regionally increasing species such as Egyptian Goose, the estuary should generally support more than 200 birds; numbers of birds other than gulls, terns and regionally increasing species should not fall below 120 for three consecutive counts; numbers of waterbird species drop should not below 15 for 3 consecutive counts

Table 22: Resource Quality Objectives for ESTUARIES in priority Resource Units in the Integrated Unit of Analysis F13 Lower Gouritz

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																	
F13 Lower Gourtiz	J40E	F13-E12	Gourtiz Estuary	gxi1	C	Quantity	Flow	MMR/MAR (% Nat)	Maintain flow regime as per recommended ecological flow	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual				
										59.7	57.8	74.1	62.8	62.2	66.7	61.8	59.7	53.3	46.4	53.5	59.8	53.2					
										River inflow: NOx-N not to exceed 100 µg/l over 2 consecutive months, NH ₃ -N not to exceed 20 µg/l over 2 consecutive months; Estuary (except during upwelling or floods): average NOx-N not to exceed 100 µg/l, average NH ₃ -N not to exceed 20 µg/l during survey, no single measurement to exceed 100 µg/l																	
						Quality	Salinity	System variables	Dissolved oxygen	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	DIN	DIP	River inflow: PO ₄ -P not to exceed 20 µg/l over 2 consecutive months; Estuary (except during upwelling or floods): average PO ₄ -P not to exceed 20 µg/l during survey, no single measurement to exceed 50 µg/l												
															Salinity should not exceed 0 at head of estuary, average salinity in Zone C < 20, Average salinity 11 km upstream from mouth > 20 for no more than 3 months of the year, salinity <40 in saltmarsh sediments												
						Habitat	Hydrodynamics	Pathogens	Enterococci	Escherichia coli	System variables not to exceed TPCs for biota	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation	Entire estuary and river inflow: DO >5 mg/l														
													≤185 Enterococci/100 ml) (90 th percentile)														
													≤500 E. coli/100 ml (90 th percentile)														
													Estuary mouth permanently open														
						Habitat	Hydrodynamics	Mouth state	Average tidal amplitude near the mouth during low flows (summer) must not change by >10% from established baseline.																		
									Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline																		

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
							Microalgae	Biomass and composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Median phytoplankton chlorophyll a (minimum 5 sites) should not exceed 3.5 µg/l; prevent formation of localised phytoplankton blooms; site specific chlorophyll a concentration exceeds 20 µg/l and cell density exceeds 10 000 cells/ml; Median intertidal benthic chlorophyll a (minimum 5 sites) exceeds 42 mg/m ²
							Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Maintain the present area (2013) covered by the macrophyte habitats: surface water area: 298.04 ha, sand and mud banks : 81.02 ha, reeds and sedges 6.72 ha, floodplain (supratidal salt marsh): 137.77 ha. Maintain the integrity of the remaining supratidal salt marsh; maintain the reed and sedge stands in the upper reaches of the estuary; rehabilitate 20% of the floodplain habitat by removing any agricultural berms and invasive plants; maintain the integrity of the riparian zone; change in the area covered by salt marsh, reeds and sedges not to exceed 20% from baseline; invasive plants (e.g. Eucalyptus, prickly pear, Tamarix) cover not to exceed 5% of total floodplain area
							Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Maintain rich populations of the mudprawn <i>Upogebia africana</i> on mudbanks in the middle estuary (Zones A and B); mudprawn density should not deviate from average baseline levels by more than 25% in each season; maintain rich invertebrate communities associated with the REI zone in the upper estuary (zooplankton and benthos); the dominant species in the zone (zooplankton and benthos) should not deviate from average baseline levels by more than 40% in each season

IUA Class	Quaternary Catchment	Resource RU Name	Resource Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
					Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Fish assemblage should comprise the 5 estuarine association categories in similar proportions (diversity and abundance) to that under the reference (see 2015 EWR report); numerically assemblage should comprise: Ia estuarine residents (50-80% of total abundance), Ib marine and estuarine breeders (10-20%), IIa obligate estuarine-dependent (10-20%), IIc marine opportunists (20-80%), III marine vagrants (not more than 5%), IV indigenous fish (1-5%), V catadromous species (1-5%); Category Ia species should contain viable populations of at least 4 species; Category IIa obligate dependents should be well represented by large exploited species
					Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	The estuary should contain a diverse avifaunal community that includes representatives of all the original taxonomic groups (see 2015 EWR report);, tern roosts should be seen at the estuary on a regular basis; apart from gulls, terns and regionally increasing species such as Egyptian Goose, the estuary should generally support more than 200 birds; numbers of birds other than gulls, terns and regionally increasing species should not fall below 120 for three consecutive counts; numbers of waterbird species drop should not below 15 for 3 consecutive counts

Table 23: Resource Quality Objectives for ESTUARIES in priority Resource Units in the Integrated Unit of Analysis F12 Duiwenhoks

IUA Class	Quaternary Catchment	Resource RU Name	Resource Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																															
F12 Duiwenhoks	H80E	F12-E13	Duiwenhoks Estuary	Quantity	Flow	MMR/MAR (% Nat)	Maintain flow regime as per TEC	Months	92.2	Oct	92.0	Nov	87.7	Dec	84.0	Jan	84.7	Feb	90.7	Mar	92.9	Apr	93.5	May	93.5	Jun	93.8	Jul	94.4	Aug	93.5	Sep	91.9	Annual					
								MMR/MAR (% Nat)																															
								River inflow: NOx-N not to exceed 100 µg/l over 2 consecutive months; NH3-N not to exceed 20 µg/l over 2 consecutive months; Estuary (except during upwelling or floods): average NOx-N not to exceed 100 µg/l, no single measurement to exceed 150 µg/l, average NH3-N not to exceed 20 µg/l during survey, no single measurement to exceed 100 µg/l																															
				Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae																																

IUA Class	Quaternary Catchment	Resource RU Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
							DIP		River inflow: PO ₄ -P not to exceed 20 µg/l over 2 consecutive months; Estuary (except during upwelling or floods): average PO ₄ -P not to exceed 20 µg/l during survey, no single measurement to exceed 50 µg/l
						Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Salinity should not exceed 0 at head of estuary, average salinity in Zone C < 20, Average salinity 11 km upstream from mouth > 20 for no more than 3 months of the year
						System variables	Dissolved oxygen	System variables not to exceed TPCs for biota	Entire estuary and river inflow: DO > 5 mg/l
							Enterococci	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation	≤ 185 Enterococci/100 ml (90 th percentile)
						Pathogens	Escherichia coli		≤ 500 E. coli/100 ml (90 th percentile)
							Mouth state	Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary	Estuary mouth permanently open
						Hydrodynamics	Tidal variation		Average tidal amplitude near the mouth does not change more than 30% from present during low flows (summer).
						Sediment	Sediment characteristics, Channel shape/size	Flood regime is sufficient to maintain natural bathymetry and sediment characteristics	Channel shape/size, sediment grain size and organic matter must not change by > 10% from established baseline
						Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Median phytoplankton chlorophyll a (minimum 5 sites) not to exceed 3.5 µg/l; prevent formation of localised phytoplankton blooms; maintain a high median intertidal benthic microalgal biomass; median intertidal benthic chlorophyll a (minimum 5 sites) not to exceed 42 mg/m ² ; site specific chlorophyll a concentration not to exceed 20 µg/l and cell density not to exceed 10 000 cells/l.
						Biota			

IUA Class	Quaternary Catchment	Resource RU Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
					Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Maintain the present area (2013) covered by the macrophyte habitats: surface water area: 40 ha, Sand and mud banks : 29 ha, Salt marsh: 26 ha, Reeds and sedges 3 ha, Floodplain: 6 ha; Invasive plants (e.g. black wattle, prickly pear, Tamarix) cover must remain < 5% of total floodplain area; maintain the integrity of the salt marsh; maintain the reed and sedge stands in the middle and upper reaches of the estuary; rehabilitate 10% of the floodplain habitat by removing any agricultural berms and invasive plants; maintain the integrity of the riparian zone
					Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Maintain rich populations of the mudprawn <i>Upogebia africana</i> on mudbanks in the middle estuary (Zones A and B); mudprawn density should not deviate from average baseline levels by more than 25% in each season; maintain rich invertebrate communities associated with the REI zone in the upper estuary (zooplankton and benthos); the dominant species in the zone (zooplankton and benthos) should not deviate from average baseline levels by more than 40% in each season
					Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Fish assemblage should comprise the 5 estuarine association categories in similar proportions (diversity and abundance) to that under the reference (see 2015 EWR report); numerically assemblage should comprise: Ia estuarine residents (50-80% of total abundance), Ib marine and estuarine breeders (10-20%), IIa obligate estuarine-dependent (10-20%), IIb estuarine associated species (5-15%), IIc marine opportunists (20-80%), III marine vagrants (not more than 5%), IV indigenous fish (1-5%), V catadromous species (1-5%); Category Ia species should contain viable populations of at least 4 species; Category IIa obligate dependents should be well represented by large exploited species
					Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	The estuary should contain a diverse avifaunal community that includes representatives of all the original taxonomic groups (see 2015 EWR report);; tern roosts should be seen at the estuary on a regular basis; apart from gulls, terns and regionally increasing species such as Egyptian Goose, the estuary should generally support more than 200 birds; numbers of birds other than gulls, terns and regionally increasing species should not fall below 120 for three consecutive counts; numbers of waterbird species drop should not below 15 for 3 consecutive counts

IUA Class	Quaternary Catchment	R Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
							Tidal variation	marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary	Average tidal amplitude near the mouth during low flows (summer) must not change by >10% from established baseline.
						Sediment	Sediment characteristics, Channel shape/size	Flood regime is sufficient to maintain natural bathymetry and sediment characteristics	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline
						Microalgae	Biomass and composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Median phytoplankton chlorophyll <i>a</i> (minimum 5 sites) not to exceed 3.5 µg/l; prevent formation of localised phytoplankton blooms; maintain a high median intertidal benthic microalgal biomass; median intertidal benthic chlorophyll <i>a</i> (minimum 5 sites) not to exceed 42 mg/m ² ; ³⁵ µg/l specific chlorophyll <i>a</i> concentration not to exceed 20 µg/l and cell density not to exceed 10000 cells/l.
					Biota	Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Maintain the present area (2014) covered by the macrophyte habitats: Open surface water area: 206, Sand and mud banks: 35, Submerged macrophytes: 5, Salt marsh: 57, Reeds and sedges: 21; maintain pockets of reeds in lower and middle reaches (linked to freshwater seepage sites); maintain the reed and sedge stands in the upper reaches of the estuary; rehabilitate 20% of the floodplain habitat by removing agriculture and invasive plants; maintain the integrity of the riparian zone
						Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Maintain rich populations of the mudprawn <i>Upogebia africana</i> on mudbanks in the middle estuary (Zones A and B); mudprawn density should not deviate from average baseline levels by more than 25% in each season; maintain rich invertebrate communities associated with the REI zone in the upper estuary (zooplankton and benthos); the dominant species in the zone (zooplankton and benthos) should not deviate from average baseline levels by more than 40% in each season

IUA Class	Quaternary Catchment	R Resource U	Resource Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
						Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Fish assemblage should comprise the 5 estuarine association categories in similar proportions (diversity and abundance) to that under the reference (see 2015 EWR report); numerically assemblage should comprise: Ia estuarine residents (50-80% of total abundance), Ib marine and estuarine breeders (10-20%), IIa obligate estuarine-dependent (10-20%), IIb estuarine associated species (5-15%), IIc marine opportunists (20-80%), III marine vagrants (not more than 5%), IV indigenous fish (1-5%), V catadromous species (1-5%); Category Ia species should contain viable populations of at least 4 species (, Category IIa obligate dependents should be well represented by large exploited species
						Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	The estuary should contain a diverse avifaunal community that includes representatives of all the original taxonomic groups (see 2015 EWR report); tern roosts should be seen at the estuary on a regular basis; apart from gulls, terns and regionally increasing species such as Egyptian Goose, the estuary should generally support more than 200 birds; numbers of birds other than gulls, terns and regionally increasing species should not fall below 120 for three consecutive counts; numbers of waterbird species drop should not be below 15 for 3 consecutive counts

Table 25: Resource Quality Objectives for ESTUARIES in priority Resource Units in the Integrated Unit of Analysis G14 Groot-Brak

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
G14 Groot-Brak	III	K10F	G14-E15	Klein-Brak Estuary	gxi4	C	Quantity	Maintain a flow regime to create the required habitat for birds, fish, macrophytes, microalgae and water quality	Months MMR/MAR (% Nat)
						Flow	MMR/MAR (% Nat)		77.4 77.4 77.4 75.1 71.7 70.2 75.8 77.9 78.5 78.0 78.1 79.5 78.8 77.0
						Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	River inflow: NOx-N not to exceed 100 µg/l over 2 consecutive months, NH ₃ -N not to exceed 20 µg/l over 2 consecutive months; Estuary (except during upwelling or floods): average NOx-N not to exceed 100 µg/l, no single measurement to exceed 150 µg/l, average NH ₃ -N not to exceed 20 µg/l during survey, no single measurement to exceed 100 µg/l

IUA Class	Quaternary Catchment	Resource RU Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
							DIP		River inflow: PO ₄ -P not to exceed 20 µg/l over 2 consecutive months; Estuary (except during upwelling or floods): average PO ₄ -P not to exceed 20 µg/l during survey, no single measurement to exceed 50 µg/l
						Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	A salinity gradient should always be present in the upper reaches of the estuary (Zone D and F), an REI zone should always be present in the upper reaches of the estuary (Zone D and F), salinity should not exceed 35
						System variables	Dissolved oxygen	System variables not to exceed TPCs for biota	Entire estuary and river inflow: DO >5 mg/l
							TSS		TSS <5 mg/ l (low flow)
							pH		7.0 < pH < 8.5
							Enterococci	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation	≤185 Enterococci/100 ml) (90 th percentile)
						Pathogens	Escherichia coli		≤500 E. coli/100 ml (90 th percentile)
								Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary	
					Habitat	Hydrodynamics	Mouth state		Closed mouth state should not increase by >10% from established baseline
						Sediment	Sediment characteristics, Channel shape/size	Flood regime is sufficient to maintain natural bathymetry and sediment characteristics	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline
						Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Maintain low/median phytoplankton/benthic microalgae biomass: phytoplankton not to exceed 3.5 µg/l (median), phytoplankton not to exceed 20 µg/l (and/or cell density not to exceed 10 000 cells/ml (once-off); benthic microalgae not to exceed 23 mg/m ² (median); prevent formation of phytoplankton blooms
					Biota	Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Maintain distribution of macrophyte habitats; prevent the spread of reeds into open water; prevent an increase in nutrients and macroalgal blooms; prevent the spread of invasive trees (e.g. <i>Acacia</i> spp.) in the riparian zone

IUA Class	Quaternary Catchment	RU Name	Resource Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
					Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Maintain rich populations of the mudprawn <i>Upogebia africana</i> on mudbanks in the middle estuary (Zones A and B); mudprawn density should not deviate from average baseline levels by more than 25% in each season; maintain rich invertebrate communities associated with the REI zone in the upper estuary (zooplankton and benthos); the dominant species in the zone (zooplankton and benthos) should not deviate from average baseline levels by more than 40% in each season
					Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Fish assemblage should comprise the 5 estuarine association categories in similar proportions (diversity and abundance) to that under the reference (see 2015 EWR report); numerically assemblage should comprise: Ia estuarine residents (50-80% of total abundance), Ib marine and estuarine breeders (10-20%), IIa obligate estuarine-dependent (10-20%), IIb estuarine associated species (5-15%), IIc marine opportunists (20-80%), III marine vagrants (not more than 5%), IV indigenous fish (1-5%), V catadromous species (1-5%); Category Ia species should contain viable populations of at least 4 species; Category IIa obligate dependents should be well represented by large exploited species
					Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	Estuary should contain a diverse avifaunal community that includes representatives of all the original groups. Saltmarsh/wetlands in the floodplain should be rich in birdlife. Intertidal areas should have a good density and diversity of both larger and smaller waders; numbers of waterbirds on the entire system should not drop below 30 species or below 250 birds for three consecutive counts; numbers of waterbirds in the lower estuary should not drop below 10 species or 50 birds (excluding terns and gulls) for three consecutive counts

IUA Class	Quaternary Catchment	Resource RU Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric													
G14 Groot-Brak	K20A	G14-E16	Groot-Brak Estuary	E	Quality	Flow	MMR/MAR (% Nat)	Maintain a flow regime to create the required habitat for birds, fish, macrophytes, microalgae and water quality.	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual
									MMR/MAR (% Nat)	62.2	67.3	55.3	48.2	43.4	55.7	49.2	54.9	38.3	43.7	63.4	63.8	56.2
						Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	River inflow: NOx-N not to exceed 100 µg/l over 2 consecutive months, NH ₃ -N not to exceed 20 µg/l over 2 consecutive months; Estuary (except during upwelling or floods): average NOx-N not to exceed 100 µg/l, no single measurement to exceed 150 µg/l, average NH ₃ -N not to exceed 20 µg/l during survey, no single measurement to exceed 100 µg/l													
									River inflow: PO ₄ -P not to exceed 20 µg/l over 2 consecutive months; Estuary (except during upwelling or floods): average PO ₄ -P not to exceed 20 µg/l during survey, no single measurement to exceed 50 µg/l													
									A salinity gradient should always be present in the upper reaches of the estuary (Zone D and F), an REI zone should always be present in the upper reaches of the estuary (Zone D and F), salinity should not exceed 35													
						Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Entire estuary and river inflow: DO >5 mg/l													
									6 < pH > 8.5 in estuary													
									≤185 Enterococci/100 ml (90 th percentile)													
						System variables	Dissolved oxygen pH	System variables not to exceed TPCs for biota	≤500 E. coli/100 ml (90 th percentile)													
									Pathogens	Enterococci	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation											
						Hydrodynamics	Mouth state	Escherichia coli			Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary											
									Sediment	Sediment characteristics, Channel shape/size	Flood regime is sufficient to maintain natural bathymetry and sediment characteristics											
Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline																						

IUA Class	Quaternary Catchment	Resource RU Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
					Microalgae	Biomass and composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Maintain low phytoplankton biomass. Maintain microalgal group diversity as measured for the baseline survey; phytoplankton biomass should not increase by more than 20% above baseline concentrations; phytoplankton group diversity should not change more than 20% from baseline conditions; maintain high subtidal benthic microalgal biomass during the closed mouth phase and low intertidal benthic microalgal biomass during the open phase; Epipellic diatoms indicative of brackish conditions should be found during the closed phase.
								Maintain distribution of macrophyte habitats as for present (2013): Submerged macrophyte, <i>Ruppia cirrhosa</i> beds: ~5 ha, <i>Zostera capensis</i> present during open mouth conditions, intertidal salt marsh: ~13 ha, supratidal and floodplain salt marsh: ~26.6 ha), Reed (<i>Phragmites australis</i>) and sedge stands in the middle / upper reaches: ~2.5 ha); prevent excessive filamentous macroalgal growth. Area covered should be half that covered by submerged macrophytes and less than 50 % of the open water surface area; maintain the zonation of salt marsh and distribution of different species along an elevation gradient. Ensure the long-term persistence of intertidal salt marsh species such as <i>Triglochin</i> spp. and <i>Cotula coronopifolia</i> ; prevent hypersaline sediment and groundwater conditions in the salt marsh. Sediment electrical conductivity should be approximately 30 mS and similar to groundwater values.
				Biota	Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Density of mudprawns should exceed 100 – 150 burrow counts per m2 in the highest density areas; in the zooplankton, the density of <i>Pseudodiaptomus hessei</i> should exceed levels of about 5000-10000 m3 in the upper estuary in spring. Salinity variation in the estuary is highly variable and the mouth remains closed for extended periods - this may also lead to the temporary absence of some invertebrate species that might be expected to occur here.
					Invertebrates	Macrofauna community abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	

QUA Class	Quaternary Catchment	Resource RU Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric														
G14 Groot-Brak	K10A	Blinde Estuary	gxi19	B	Quantity	Flow	MMR/MAR (% Nat)	Maintain flow regime as close to present as possible (small system needs most flows)	Months MMR/MAR (% Nat)	Oct 69.6	Nov 69.9	Dec 67.8	Jan 65.6	Feb 64.8	Mar 68.7	Apr 69.3	May 70.1	Jun 69.0	Jul 69.9	Aug 70.7	Sep 70.3	Annual 69.2
						Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	DIN not to exceed 100 µg/l (average)													
							DIP	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	DIP not to exceed 20 µg/l (average)													
					Quality	Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	<20 (expected range 5-15)													
						System variables	Dissolved oxygen	System variables not to exceed TPCs for biota	>5 mg/l													
							Turbidity	Enterococci	System variables not to exceed TPCs for biota	Turbidity not to exceed 10 NTU in low flow season ≤185 Enterococci/100 ml) (90 th percentile)												
						Habitat	Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation	≤500 E. coli/100 ml (90 th percentile)												
					Hydrodynamics				Mouth state	Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary	Closed mouth state should not increase by >10% from established baseline											

IUA Class	Quaternary Catchment	RU Name	Resource Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
						Sediment	Sediment characteristics, Channel shape/size	Flood regime is sufficient to maintain natural bathymetry and sediment characteristics	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline
						Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Maintain low/median phytoplankton/benthic microalgae biomass; phytoplankton not to exceed 3.5 µg/l (median); phytoplankton not to exceed 20 µg/l and/or cell density not to exceed 10 000 cells/ml (once-off); benthic microalgae not to exceed 23 mg/m ² (median); prevent formation of phytoplankton blooms
						Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Maintain distribution of macrophyte habitats: Reeds & sedges: 0.04 ha, Sand/mud banks: 0.05 ha, Open water: 1.66 ha; prevent the spread of reeds into open water; prevent an increase in nutrients and macroalgal blooms; prevent the spread of invasive trees (e.g. <i>Acacia</i> spp.) in the riparian zone
						Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Establish presence/absence of sand prawn <i>Callinectes kraussi</i> on sand banks in lower estuary; establish presence/absence of the copepod <i>Pseudodaptomus hesser</i> or estuarine congeneric in the zooplankton of the estuary; populations of these species should not deviate from average baselines (as determined in first three visits) by more 30%
						Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Maintain fish assemblage that includes at least 2 estuarine breeding species (Category I), 3 estuary dependent marine species (Category IIa & IIb) and 1 indigenous catadromous species (Category V); estuarine residents should dominate numerically, but the proportion of estuary dependent marine species (based on abundance) should not fall below 2%.
						Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	Maintain population of original groups of birds present on the estuary; number of birds in any group, other than species that are increasing regionally such as Egyptian geese, should not drop below the baseline median (determined by past data and or initial surveys) number of species and/or birds counted for three consecutive summer or winter counts

IUA Class	Quaternary Catchment	Resource RU Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric														
G14 Groot-Brak	K10A	Tweekuilen Estuary	gx120	D	Quantity	Flow	MMR/MAR (% Nat)	Maintain flow regime as close to present as possible (small system needs most flows)	Months	72.3 Oct	72.3 Nov	72.3 Dec	72.3 Jan	72.3 Feb	72.3 Mar	72.3 Apr	72.3 May	72.3 Jun	72.3 Jul	72.3 Aug	72.3 Sep		
							MMR/MAR (% Nat)																
					Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	DIN not to exceed 100 µg/l (average)														
							DIP	exceed TPCs for macrophytes and microalgae	DIP not to exceed 20 µg/l (average)														
						Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	<20 (expected range 5-15)														
						System variables	Dissolved oxygen	System variables not to exceed TPCs for biota	>5 mg/l														
						Pathogens	Enterococci	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation	≤185 Enterococci/100 ml) (90 th percentile)														
					Escherichia coli																		
					Habitat	Hydrodynamics	Mouth state	Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary	Closed mouth state should not increase by >10% from established baseline														
									Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline														
					Biota	Sediment	Sediment characteristics, Channel shape/size	Flood regime is sufficient to maintain natural bathymetry and sediment characteristics	Maintain low/median phytoplankton/benthic microalgae biomass: phytoplankton not to exceed 3.5 µg/l (median), phytoplankton not to exceed 20 µg/l and/or cell density not to exceed 10 000 cells/ml (once-off); benthic microalgae not to exceed 23 mg/m ² (median); prevent formation of phytoplankton blooms														
						Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass															
Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Maintain distribution of macrophyte habitats: Reeds & sedges: 0.04 ha, Sand/mud banks: 0.05 ha, Open water: 1.66 ha; prevent the spread of reeds into open water; prevent an increase in nutrients and macroalgal blooms; prevent the spread of invasive trees (e.g. <i>Acacia</i> spp.) in the riparian zone																				

IUA Class	Quaternary Catchment	Resource RU Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																																										
					Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Establish presence/absence of sand prawn <i>Callichirus kraussi</i> on sand banks in lower prawn establish presence/absence of the copepod <i>Pseudodiaptomus hessi</i> or estuarine congeneric in the zooplankton of the estuary; populations of these species should not deviate from average baselines (as determined in first three visits) by more 30%																																										
					Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Maintain fish assemblage that includes at least 2 estuarine breeding species (Category I), 3 estuary dependent marine species (Category IIa & IIb) and 1 indigenous catadromous species (Category V); estuarine residents should dominate numerically, but the proportion of estuary dependent marine species (based on abundance) should not fall below 2%.																																										
					Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	Maintain population of original groups of birds present on the estuary; number of birds in any group, other than species that are increasing regionally such as Egyptian geese, should not drop below the baseline median (determined by past data and or initial surveys) number of species and/or birds counted for three consecutive summer or winter counts																																										
				Quantity	Flow	MMR/MAR (% Nat)	Maintain flow regime as close to present as possible (small system needs most flows)	<table><tr><th>Months</th><th>72.3 Oct</th><th>72.3 Nov</th><th>72.3 Dec</th><th>72.3 Jan</th><th>72.3 Feb</th><th>72.3 Mar</th><th>72.3 Apr</th><th>72.3 May</th><th>72.3 Jun</th><th>72.3 Jul</th><th>72.3 Aug</th><th>72.3 Sep</th><th>72.3 Annual</th></tr><tr><td>MMR/MAR (% Nat)</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="14">DIN not to exceed 100 µg/l (average)</td></tr></table>	Months	72.3 Oct	72.3 Nov	72.3 Dec	72.3 Jan	72.3 Feb	72.3 Mar	72.3 Apr	72.3 May	72.3 Jun	72.3 Jul	72.3 Aug	72.3 Sep	72.3 Annual	MMR/MAR (% Nat)														DIN not to exceed 100 µg/l (average)													
Months	72.3 Oct	72.3 Nov	72.3 Dec	72.3 Jan	72.3 Feb	72.3 Mar	72.3 Apr	72.3 May	72.3 Jun	72.3 Jul	72.3 Aug	72.3 Sep	72.3 Annual																																					
MMR/MAR (% Nat)																																																		
DIN not to exceed 100 µg/l (average)																																																		
G14 Groot-Brak	K10A	G14-E19	Gerike Estuary	D	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	DIN not to exceed 100 µg/l (average)																																										
						DIP	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	DIP not to exceed 20 µg/l (average)																																										
						Salinity	Salinity	<20 (expected range 5-15)																																										
					Quality	System variables	Dissolved oxygen	System variables not to exceed TPCs for biota	>5 mg/l																																									
						Pathogens	Enterococci	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation	≤185 Enterococci/100 ml (90 th percentile)																																									
						Escherichia coli		≤500 E. coli/100 ml (90 th percentile)																																										

IUA Class	Quaternary Catchment	Resource RU Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
				Habitat	Hydrodynamics	Mouth state	Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary	Closed mouth state should not increase by >10% from established baseline
					Sediment	Sediment characteristics, Channel shape/size	Flood regime is sufficient to maintain natural bathymetry and sediment characteristics	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline
					Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Maintain low/median phytoplankton/benthic microalgae biomass: phytoplankton not to exceed 3.5 µg/l (median), phytoplankton not to exceed 20 µg/l (and/or cell density not to exceed 10 000 cells/ml (once-off); benthic microalgae not to exceed 23 mg/m ² (median); prevent formation of phytoplankton blooms
				Biota	Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Maintain distribution of macrophyte habitats: Reeds & sedges: 0.04 ha, Sand/mud banks: 0.05 ha, Open water: 1.66 ha; prevent the spread of reeds into open water; prevent an increase in nutrients and macroalgal blooms; prevent the spread of invasive trees (e.g. <i>Acacia</i> spp.) in the riparian zone
					Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Establish presence/absence of sand prawn <i>Callinectes kraussi</i> on sand banks in lower estuary; establish presence/absence of the copepod <i>Pseudodiaptomus hesselii</i> or estuarine congeneric in the zooplankton of the estuary; populations of these species should not deviate from average baselines (as determined in first three visits) by more 30%
					Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Maintain fish assemblage that includes at least 2 estuarine breeding species (Category I), 3 estuary dependent marine species (Category IIa & IIb) and 1 indigenous catadromous species (Category V); estuarine residents should dominate numerically, but the proportion of estuary dependent marine species (based on abundance) should not fall below 2%.

IUA Class	Quaternary Catchment	Resource RU Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																													
G14 Groot-Brak	K10B	G14-E20	Hartenbos Estuary	D	Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	Maintain population of original groups of birds present on the estuary; number of birds in any group, other than species that are increasing regionally such as Egyptian geese, should not drop below the baseline median (determined by past data and or initial surveys) number of species and/or birds counted for three consecutive summer or winter counts																													
						Flow	MMR/MAR (% Nat)	Maintain at least present-day base flows	<table><tr><th>Months</th><th>Oct</th><th>Nov</th><th>Dec</th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>Jun</th><th>Jul</th><th>Aug</th><th>Sep</th><th>Annual</th></tr><tr><td>MMR/MAR (% Nat)</td><td>59.7</td><td>64.0</td><td>68.7</td><td>71.1</td><td>67.4</td><td>60.3</td><td>64.2</td><td>64.7</td><td>65.9</td><td>60.8</td><td>66.1</td><td>66.9</td><td>65.0</td></tr></table> Entire estuary and river inflow: DIN <200µg/l	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual	MMR/MAR (% Nat)	59.7	64.0	68.7	71.1	67.4	60.3	64.2	64.7	65.9	60.8	66.1	66.9	65.0
							Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual																	
					MMR/MAR (% Nat)	59.7	64.0	68.7	71.1	67.4	60.3	64.2	64.7	65.9	60.8	66.1	66.9	65.0																			
					Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	Entire estuary and river inflow: DIP <50 µg/l																													
						DIP																															
					Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Average salinity along the estuary should not drop more than 5 below baseline average																													
						Quality	Turbidity		Turbidity <20 NTU in low flow season																												
					Secchi depth		System variables not to exceed TPCs for biota	Secchi depth should >0.5 m in the fresher part of the estuary																													
					Dissolved oxygen			>5 mg/l																													
Habitat	Pathogens	Enterococci	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation	≤185 Enterococci/100 ml) (90 th percentile)																																	
		Escherichia coli		≤500 E. coli/100 ml (90 th percentile)																																	
	Hydrodynamics	Mouth state	Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary	Closed mouth state should not increase by >10% from established baseline																																	
Sediment	Sediment characteristics, Channel shape/size	Sediment characteristics, Channel shape/size	Flood regime is sufficient to maintain natural bathymetry and sediment characteristics	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline																																	

IUA Class	Quaternary Catchment	Resource RU Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
					Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Maintain low/median phytoplankton/benthic microalgae biomass: Phytoplankton not to exceed 8 µg/l (median), Phytoplankton not to exceed 20 µg/l and/or cell density not to exceed 10 000 cells/ml (once-off); Benthic microalgae not to exceed 42 mg/m ² (median), Dinoflagellates, chlorophytes and/or cyanobacteria > 10% of relative abundance
					Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Maintain distribution of macrophyte habitats; prevent the spread of reeds into open water; prevent an increase in nutrients and macroalgal blooms; prevent the spread of invasive trees (e.g. <i>Acacia</i> spp.) in the riparian zone
					Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Establish presence/absence of sand prawn <i>Callinectes kraussi</i> on sand banks in lower estuary, establish presence/absence of the copepod <i>Pseudodiaptomus hessel</i> or estuarine congeneric in the zooplankton of the estuary, populations of these species should not deviate from average baselines (as determined in first three visits) by more 30%
				Biota	Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Fish assemblage should comprise the 5 estuarine association categories in similar proportions (diversity and abundance) to that under the reference (see 2015 EWR report); numerically assemblage should comprise: Ia estuarine residents (50-80% of total abundance), Ib marine and estuarine breeders (10-20%), IIa obligate estuarine-dependent (10-20%), IIb estuarine associated species (5-15%), IIc marine opportunists (20-80%), III marine vagrants (not more than 5%), IV indigenous fish (1-5%), V catadromous species (1-5%); Category Ia species should contain viable populations of at least 4 species; Category IIa obligate dependents should be well represented by large exploited species
					Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	Maintain population of original groups of birds present on the estuary; number of birds in any group, other than species that are increasing regionally such as Egyptian geese, should not drop below the baseline median (determined by past data and or initial surveys) number of species and/or birds counted for three consecutive summer or winter counts

Table 26: Resource Quality Objectives for ESTUARIES in priority Resource Units in the Integrated Unit of Analysis G15 Coastal

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																								
G15 Coastal	K30A	G15-E21	Maalgate Estuary	gx16	B	Quantity	Flow	MMR/MAR (% Nat)	Maintain flow regime (small system needs most flows)	Months	80.3	Oct	79.1	Nov	74.5	Dec	73.4	Jan	71.3	Feb	80.5	Mar	82.1	Apr	85.9	Jun	84.3	Jul	83.7	Aug	81.9	Sep	79.3	Annual
								MMR/MAR (% Nat)	Entire estuary and river inflow: DIN <100µg/l	Entire estuary and river inflow: DIP <20 µg/l																								
						Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Average salinity >10																						
								DIP	System variables not to exceed TPCs for biota		<10 NTU in low flow season																							
							System variables	Turbidity	System variables not to exceed TPCs for biota	>5 mg/l																								
								Dissolved oxygen	Enterococci	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation	≤185 Enterococci/100 ml (90 th percentile)																							
						Pathogens	Escherichia coli	Acceptable category for full contact recreation	≤500 E. coli/100 ml (90 th percentile)																									
							Hydrodynamics	Mouth state	Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary	Closed mouth state should not increase by >10% from established baseline																								
						Habitat		Sediment characteristics, Channel shape/size	Flood regime is sufficient to maintain natural bathymetry and sediment characteristics	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline																								
							Biota	Biomass and community composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Maintain low/median phytoplankton/benthic microalgae biomass: phytoplankton not to exceed 3.5 µg/l (median), phytoplankton not to exceed 20 µg/l and/or cell density not to exceed 10 000 cells/ml (once-off); benthic microalgae not to exceed 23 mg/m ² (median); prevent formation of phytoplankton blooms																								

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric		
G15 Coastal	K30B	G15-E22	Gwaing Estuary	gxi7	B	Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Maintain distribution of macrophyte habitats; prevent the spread of reeds into open water; prevent an increase in nutrients and macroalgal blooms; prevent the spread of invasive trees (e.g. <i>Acacia</i> spp.) in the riparian zone		
							Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Establish presence/absence of sand prawn <i>Callichirus kraussi</i> on sand banks in lower estuary, establish presence/absence of the copepod <i>Pseudodiaptomus hessei</i> or estuarine congeneric in the zooplankton of the estuary, populations of these species should not deviate from average baselines (as determined in first three visits) by more 30%	
						Fish		Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Maintain fish assemblage that includes at least 2 estuarine breeding species (Category I), 3 estuary dependent marine species (Category IIa & IIb) and 1 indigenous catadromous species (Category V); estuarine residents should dominate numerically, but the proportion of estuary dependent marine species (based on abundance) should not fall below 2%.	
							Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	Maintain population of original groups of birds present on the estuary; number of birds in any group, other than species that are increasing regionally such as Egyptian geese, should not drop below the baseline median (determined by past data and or initial surveys) number of species and/or birds counted for three consecutive summer or winter counts	
						Flow		Quantity	MMR/MAR (% Nat)	Maintain flow regime (small system needs most flows)	Months MMR/MAR (%) Nat
							Nutrients	DIN	DIP	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	Entire estuary and river inflow: DIN <100µg/l
						Quality					
							System variables	Turbidity	System variables not to exceed TPCs for biota	Average salinity >10	
								Dissolved oxygen			<10 NTU in low flow season

IUA Class	Quaternary Catchment	RU Name	Resource Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
					Pathogens	Enterococci	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation	≤185 Enterococci/100 ml (90 th percentile)
					Hydrodynamics	Mouth state	Maintain connectivity with marine environment	Closed mouth state should not increase by >10% from established baseline
				Habitat	Sediment	Sediment characteristics, Channel shape/size	Flood regime to maintain natural bathymetry and the sediment characteristics	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline
					Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Maintain low/median phytoplankton/benthic microalgae biomass: phytoplankton not to exceed 3.5 µg/l (median), phytoplankton not to exceed 20 µg/l and/or cell density not to exceed 10 000 cells/ml (once-off); benthic microalgae not to exceed 23 mg/m ² (median); prevent formation of phytoplankton blooms
					Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Maintain distribution of macrophyte habitats; prevent the spread of reeds into open water; prevent an increase in nutrients and macroalgal blooms; prevent the spread of invasive trees (e.g. <i>Acacia</i> spp.) in the riparian zone
				Biota	Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Establish presence/absence of sand prawn <i>Callichirus kraussi</i> on sand banks in lower estuary, establish presence/absence of the copepod <i>Pseudodiaptomus hessei</i> or estuarine congeneric in the zooplankton of the estuary, populations of these species should not deviate from average baselines (as determined in first three visits) by more 30%
					Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Maintain fish assemblage that includes at least 2 estuarine breeding species (Category I), 3 estuary dependent marine species (Category IIa & IIb) and 1 indigenous catadromous species (Category V); estuarine residents should dominate numerically, but the proportion of estuary dependent marine species (based on abundance) should not fall below 2%.

IUA Class	Quaternary Catchment	Resource RU Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric		
G15 Coastal	K30C	G15-E23	Kaalmans Estuary	B	Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	Maintain population of original groups of birds present on the estuary; number of birds in any group, other than species that are increasing regionally such as Egyptian geese, should not drop below the baseline median (determined by past data and or initial surveys) number of species and/or birds counted for three consecutive summer or winter counts		
					Flow	Quantity	MMR/MAR (% Nat)	Maintain flow regime (small system needs most flows)	Months MMR/MAR (%) Annual	
						Nutrients		DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	70.9 74.5 74.7 70.7 70.4 72.8 72.3 73.7 73.7 69.5 67.3 74.1 73.8 72.5
					Salinity			DIP	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Entire estuary and river inflow: DIN <100µg/l
						Quality		Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Entire estuary and river inflow: DIP <20 µg/l
					System variables			Turbidity	System variables not to exceed TPCs for biota	Average salinity > 10
								Dissolved oxygen	System variables not to exceed TPCs for biota	<10 NTU in low flow season
					Pathogens			Enterococci	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation	>5 mg/l
								Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation	≤185 Enterococci/100 ml) (90 th percentile)
						≤500 E. coli/100 ml (90 th percentile)				
						Estuary mouth permanently open				
						Average tidal amplitude near the mouth during low flows (summer) must not change by >10% from established baseline.				
						Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline				

IUA Class	Quaternary Catchment	RU Name	Resource Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
G15 Coastal	K30D	G15-Wilderness Estuary (Touw)	gx19	B Quantity	Flow	Biomass and community composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Maintain low/median phytoplankton/benthic microalgae biomass: phytoplankton not to exceed 3.5 µg/l (median), phytoplankton not to exceed 20 µg/l and/or cell density not to exceed 10 000 cells/ml (once-off); benthic microalgae not to exceed 23 mg/m ² (median); prevent formation of phytoplankton blooms												
							Macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Maintain distribution of macrophyte habitats; prevent the spread of reeds into open water; prevent an increase in nutrients and macroalgal blooms; prevent the spread of invasive trees (e.g. <i>Acacia</i> spp.) in the riparian zone											
							Invertebrates	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Establish presence/absence of sand prawn <i>Callichirus kraussi</i> on sand banks in lower estuary; establish presence/absence of the copepod <i>Pseudodiaptomus hessei</i> or estuarine congeneric in the zooplankton of the estuary, populations of these species should not deviate from average baselines (as determined in first three visits) by more 30%											
							Fish	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Maintain fish assemblage that includes at least 2 estuarine breeding species (Category I), 3 estuary dependent marine species (Category IIa & IIb) and 1 indigenous catadromous species (Category V); estuarine residents should dominate numerically, but the proportion of estuary dependent marine species (based on abundance) should not fall below 2%.											
							Birds	Avifauna community composition, abundance and richness	Maintain population of original groups of birds present on the estuary; number of birds in any group, other than species that are increasing regionally such as Egyptian geese, should not drop below the baseline median (determined by past data and or initial surveys) number of species and/or birds counted for three consecutive summer or winter counts											
								Maintain composition, richness and abundance of different avifauna groups												
						Maintain a flow regime to maintain water quality and the required habitat for birds, fish, macrophytes	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																	
								and macrophytes. Abstraction should not result in flow differing more than 5% from the present day (2017) keeping in mind the percentage nMAR to be maintained in the system (88.6%) to keep it in its ecological category.	MMR/MAR (% Nat)	89.7	90.9	87.2	84.5	83.5	85.5	86.9	90.8	88.7	88.1	93.1	92.8	9.88				
										River inflow, NOx-N not to exceed 50 µg/l over two consecutive months, NH3-N not to exceed 10 µg/l over two consecutive months; Estuary: Average NOx-N <50 µg/l, no single measure >100 µg/l, average NH3-N <10 µg/l, no single measure >100 µg/l; Lakes: average NOx-N <50 µg/l, no single measure >100 µg/l, average NH3-N <20 µg/l																
					Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	River inflow, PO4-P not to exceed 10 µg/l over two consecutive months; Estuary: average PO4-P <10 µg/l, no single sample >50 µg/l ; Lakes: average PO4-P <20 µg/l																		
									DIP																	
					Quality	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Estuary in the closed state: average salinity in Zone A < 12, average salinity in Zone B: < 10, average salinity in Zone C < 5; Lakes average salinity +2 from baseline (2013) and variability should not increase as below: Serpentine: 12 ± 10, Eilandvlei: 8 ± 5 , Langvlei: 10 ±4 , Rondevlei: 11 ±6																		
									System variables	Turbidity Dissolved oxygen pH	System variables not to exceed TPCs for biota	Average <5 NTU (low flow) throughout >5 mg/l throughout River inflow: 6.0 < pH < 7.0 (Touw), 7.0 < pH < 8.0 (Duiwe), Estuary: 7.0 < pH > 8.5, Lakes: 7.5 < pH < 9														
													Pathogens	Enterococci Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the catchment	≤185 Enterococci/100 ml) (90 th percentile) ≤500 E. coli/100 ml (90 th percentile)										
																	Habitat	Hydrodynamics	Mouth state	Closed mouth state should not increase by >10% from established baseline						

IUA Class	Quaternary Catchment	RU Name	Resource Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
					Sediment	Sediment characteristics, Channel shape/size	Flood regime is sufficient to maintain natural bathymetry and sediment characteristics	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline
					Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Maintain low/median phytoplankton/benthic microalgae biomass: phytoplankton not to exceed 3.5 µg/l (median), phytoplankton not to exceed 20 µg/l and/or cell density not to exceed 10 000 cells/ml (once-off); benthic microalgae not to exceed 23 mg/m ² (median); prevent formation of phytoplankton blooms caused by anthropogenic eutrophication
					Macrophytes	Extent, distribution and richness of macrophytes	Have no further loss to extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Have no further loss to the present area (2014) covered by the macrophyte habitats; have no further loss to the distribution of sensitive macrophyte habitats (e.g. salt marsh, submerged macrophytes); control/eliminate invasive plants; prevent the spread of reeds into open water that results in loss of sandbank areas and has a negative impact on biota and hydrological processes
					Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Maintain presence of sand prawn <i>Callichirus kraussi</i> on sand banks in lower Touw Estuary; maintain rich populations of the benthic amphipod <i>Grandiderella lignorum</i> throughout the lakes and estuary
				Biota				Fish assemblage should comprise the 5 estuarine association categories in similar proportions (diversity and abundance) to that under the reference (see 2015 EWR report); numerically assemblage should comprise: Ia estuarine residents (50-80% of total abundance), Ib marine and estuarine breeders (10-20%), IIa obligate estuarine-dependent (10-20%), IIb estuarine associated species (5-15%), IIc marine opportunists (20-80%), III marine vagrants (not more than 5%), IV indigenous fish (1-5%), V catadromous species (1-5%); Category Ia species should contain viable populations of at least 4 species (<i>G. aestuaria</i> , <i>Hyporhamphus capensis</i> , <i>Ombrobranchus woodii</i>); Category IIa obligate dependents should be well represented by large exploited species (<i>A. japonicus</i> , <i>L. lithognathus</i> , <i>P. commersonii</i> , <i>Lichia amia</i>); REI species dominated by both <i>Myxus capensis</i> and <i>G. aestuaria</i>
					Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	

IUA Class	Quaternary Catchment	RU Name	Resource Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric					
G15 Coastal	K40D	G15-E25	Swartvlei Estuary	B	Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	The estuarine lake system should contain a diverse avifaunal community that includes representatives of all the original groups, and that sustains the populations that meet RAMSAR requirements; numbers of waterbirds on the entire system, other than those that have or are increasing regionally such as Egyptian Goose, should not drop below 40 species or below 3000 birds for three consecutive counts					
								Months	Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Annual				
					Flow	Quantity	MMR/MAR (% Nat)	Maintain a flow regime to create the required habitat for birds, fish, macrophytes, microalgae and water quality	MMR/MAR (%) Nat)	86.6 90.2 90.6 88.4 85.9 88.3 86.8 86.8 81.3 78.7 80.9 87.9 88.9			
									River inflow, NOx-N not to exceed 50 µg/l over two consecutive months, NH3-N not to exceed 10 µg/l over two consecutive months; Estuary: Average NOx-N <50 µg/l, no single measure >100 µg/l, average NH3-N <10 µg/l, no single measure >100 µg/l; Lake: average NOx-N <50 µg/l, no single measure >100 µg/l, average NH3-N <20 µg/l				
					Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	River inflow, PO4-P not to exceed 10 µg/l over two consecutive months; Estuary: average PO4-P <10 µg/l, no single sample >50 µg/l; Lakes: average PO4-P <20 µg/l					
									DIP	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae			
					Salinity	Quality	Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Estuary in the closed state: average salinity <12; Lake average salinity +2 from baseline (2013)			
										System variables	Turbidity	System variables (temperature, pH, turbidity, dissolved oxygen, suspended solids and turbidity) not to exceed TPCs for biota	Average <5 NTU (low flow) throughout
											Dissolved oxygen	>5 mg/l throughout	
											pH	River inflow: 6.0 < pH < 7.0, Estuary: 6.0 < pH < 8.5, Lake: 7.0 < pH < 8.5	
Pathogens	Enterococci	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation	≤185 Enterococci/100 ml (90th percentile)										
			Escherichia coli	≤500 E. coli/100 ml (90th percentile)									

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IUA Class	Quaternary Catchment	RU Name	Resource Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
				Habitat	Hydrodynamics	Mouth state	Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary	Closed mouth state should not increase by >10% from established baseline
					Sediment	Sediment characteristics Channel shape/size	Flood regime is sufficient to maintain natural bathymetry and sediment characteristics	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline
				Biota	Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Maintain low/median phytoplankton/benthic microalgae biomass; phytoplankton not to exceed 3.5 µg/l (median), phytoplankton not to exceed 20 µg/l and/or cell density not to exceed 10 000 cells/ml (once-off); benthic microalgae not to exceed 23 mg/m2 (median); prevent formation of phytoplankton blooms
					Macrophytes	Extent, distribution and richness of macrophytes	No further loss to extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	No further loss to the present area (2014) covered by the macrophyte habitats; no further loss to the distribution of sensitive macrophyte habitats (e.g. salt marsh, submerged macrophytes); control/eliminate invasive plants; prevent the spread of reeds into open water that results in loss of sandbank areas and has a negative impact on biota and hydrological processes
					Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Maintain presence of sand prawn <i>Callinectes kraussi</i> on sand banks in lower Touw Estuary; maintain rich populations of the benthic amphipod <i>Grandidierella lignorum</i> throughout the lakes and estuary

IUA Class	Quaternary Catchment	RU Name	Resource Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
G15 Coastal	K40E	G15-E26	Goukamma Estuary	B	Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Fish assemblage should comprise the 5 estuarine association categories in similar proportions (diversity and abundance) to that under the reference (see 2015 EWR report); numerically assemblage should comprise: Ia estuarine residents (50-80% of total abundance), Ib marine and estuarine breeders (10-20%), IIa obligate estuarine-dependent (10-20%), IIb estuarine associated species (5-15%), IIc marine opportunists (20-80%), III marine vagrants (not more than 5%), IV indigenous fish (1-5%), V catadromous species (1-5%); Category Ia species should contain viable populations of at least 4 species (<i>G. aestuaria</i> , <i>Hyporhamphus capensis</i> , <i>Ombrobranchus woodii</i>); Category IIa obligate dependents should be well represented by large exploited species (<i>A. japonicus</i> , <i>L. lithognathus</i> , <i>P. commersonii</i> , <i>Lichia amia</i>); REI species dominated by both <i>Myxus capensis</i> and <i>G. aestuaria</i>
					Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	The estuarine lake system should contain a diverse avifaunal community that includes representatives of all the original groups, and that sustains the populations for which the system has acquired RAMSAR status; numbers of waterbirds on the entire system, other than those that have or are increasing regionally such as Egyptian Goose, should not drop below 40 species or below 1500 birds for three consecutive counts
G15 Coastal	II	G15-E26	Goukamma Estuary	B	Flow	MMR/MAR (% Nat)	Maintain flow regime	Months MMR/MAR (% Nat) DIN not >100 µg/L once-off.
					Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	DIP not > 20 µg/L once-off.
					Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Turbidity >10 NTU in low flow
					System	Turbidity	System variables not to	

IUA Class	Quaternary Catchment	RU Name	Resource Biophysical Node Name	TEC Component	Sub-component variables	Indicator	RQO Narrative	RQO Numeric
					variables	Dissolved oxygen	exceed TPCs for biota	>5 mg/L in estuary.
					Pathogens	Enterococci	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation	≤185 Enterococci/100 ml) (90 th percentile)
						Escherichia coli		≤500 E. coli/100 ml (90 th percentile)
						Mouth state	Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary	Estuary mouth permanently open
					Hydrodynamics	Tidal variation		Average tidal amplitude near the mouth during low flows (summer) must not change by >10% from established baseline.
				Habitat	Sediment	Sediment characteristics, Channel shape/size	Flood regime is sufficient to maintain natural bathymetry and sediment characteristics	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline
					Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Maintain median phytoplankton/benthic microalgae biomass: phytoplankton not > 1.0 µg/L (median); benthic microalgae not > 11 mg/m ² (median); Phytoplankton not > 20 µg/L and/or cell density not > 10 000 cells/ml (once-off); Prevent formation of phytoplankton blooms
				Biota	Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Maintain distribution of macrophyte habitats; prevent the spread of invasive trees (e.g. <i>Acacia</i> spp.) in the riparian zone.
					Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Establish presence/absence of sand prawn <i>Callinectes kraussi</i> on sand banks in lower estuary, establish presence/absence of the copepod <i>Pseudodiaptomus hessi</i> or estuarine congeneric in the zooplankton of the estuary, populations of these species should not deviate from average baselines (as determined in first three visits) by more 30%

IUA Class	Quaternary Catchment	RU Name	Resource Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
G15 Coastal	K50B	G15-E27	Kynsna Estuary	B	Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Fish assemblage should comprise the 5 estuarine association categories in similar proportions (diversity and abundance) to that under the reference (see 2015 EWR report); numerically assemblage should comprise: Ia estuarine residents (50-80% of total abundance), Ib marine and estuarine breeders (10-20%), IIa obligate estuarine-dependent (10-20%), IIc marine opportunists (20-80%), III marine vagrants (not more than 5%), IV indigenous fish (1-5%), V catadromous species (1-5%); Category Ia species should contain viable populations of at least 4 species; Category IIa obligate dependents should be well represented by large exploited species
					Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	Maintain population of original groups of birds present on the estuary; number of birds in any group, other than species that are increasing regionally such as Egyptian geese, should not drop below the baseline median (determined by past data and or initial surveys) number of species and/or birds counted for three consecutive summer or winter counts
				Quantity	Flow	MMR/MAR (% Nat)	Maintain flow regime as close to natural as possible	Months MMR/MAR (% Nat)
					Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	Annual 86.8 90.5 88.3 86.8 87.5 87.1 84.7 82.5 86.1 83.9 82.7 87.6 87.5 Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
				Quality	Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	DIP not > 20 µg/L once-off.
						Turbidity	Turbidity > 10 NTU in low flow	
					System variables	Dissolved oxygen	System variables not to exceed TPCs for biota	
					Pathogens	Enterococci	Concentrations of	> 5 mg/L in estuary. ≤ 185 Enterococci/100 ml) (90 th percentile)

IUA Class	Quaternary Catchment	RU Name	Resource Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
						<i>Escherichia coli</i>	waterborne pathogens should be maintained in an Acceptable category for full contact recreation	≤500 <i>E. coli</i> /100 ml (90 th percentile)
						Mouth state	Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary	Estuary mouth permanently open
					Hydrodynamics	Tidal variation	Flood regime is sufficient to maintain natural bathymetry and sediment characteristics	Average tidal amplitude near the mouth during low flows (summer) must not change by >10% from established baseline.
					Sediment	Sediment characteristics, Channel shape/size		Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline
					Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Maintain low/median phytoplankton/benthic microalgae biomass: phytoplankton not to exceed 3.5 µg/l (median); phytoplankton not to exceed 20 µg/l and/or cell density not to exceed 10 000 cells/ml (once-off); benthic microalgae not to exceed 23 mg/m ² (median); prevent formation of phytoplankton blooms
					Macrophytes	Extent, distribution and richness of macrophytes	No further loss to extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	No further loss to the present area (2014) covered by the macrophyte habitats; no further loss to the distribution of sensitive macrophyte habitats (e.g. salt marsh, submerged macrophytes); control/eliminate invasive plants
					Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Maintain rich populations of the mudprawn <i>Upogebia africana</i> on mudbanks in the middle estuary (Zones A and B); mudprawn density should not deviate from average baseline levels by more than 25% in each season; maintain rich invertebrate communities associated with the REI zone in the upper estuary (zooplankton and benthos); the dominant species in the zone (zooplankton and benthos) should not deviate from average baseline levels by more than 40% in each season

IUA Class	Quaternary Catchment	Resource RU Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric														
G15 Coastal	K60G	Noetsie Estuary	gx13	B	Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Fish assemblage should comprise the 5 estuarine association categories in similar proportions (diversity and abundance) to that under the reference (see 2015 EWR report); numerically assemblage should comprise: Ia estuarine residents (50-80% of total abundance), Ib marine and estuarine breeders (10-20%), IIa obligate estuarine-dependent (10-20%), IIc marine opportunists (20-80%), III marine vagrants (not more than 5%), IV indigenous fish (1-5%), V catadromous species (1-5%); Category Ia species should contain viable populations of at least 4 species ; Category IIa obligate dependents should be well represented by large exploited species; REI species dominated by both <i>Myxus capensis</i> and <i>G. aestuaria</i>														
								Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	Estuary should contain a diverse avifaunal community that includes representatives of all the original groups. Saltmarsh/wetlands in the floodplain should be rich in birdlife. Intertidal areas should have a good density and diversity of both larger and smaller waders; numbers of waterbirds on the entire system should not drop below 35 species or below 2000 birds for three consecutive counts											
					Flow	MMR/MAR (% Nat)	Maintain flow regime (small system needs most flows)	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual
									MMR/MAR (%)	93.5	93.4	90.7	87.1	85.5	89.8	92.1	94.0	93.0	92.8	94.3	94.3	92.5
					Nutrients	DIN	DIP	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	DIN not >100 µg/L once-off.												
											DIP not > 20 µg/L once-off.											
					Quality	Salinity	Salinity	System variables not to exceed TPCs for biota	10 < Salinity <40													
										Turbidity	> 10 NTU in low flow											
Dissolved oxygen	>5 mg/L in estuary.																					
Pathogens	Enterococci	Concentrations of	≤185 Enterococci/100 ml) (90 th percentile)																			

IUA Class	Quaternary Catchment	RU Name	Resource Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
						Escherichia coli	waterborne pathogens should be maintained in an Acceptable category for full contact recreation	≤500 E. coli/100 ml (90 th percentile)
					Hydrodynamics	Mouth state	Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary	Closed mouth state should not increase by >10% from established baseline
					Sediment	Sediment characteristics, Channel shape/size	Flood regime is sufficient to maintain natural bathymetry and sediment characteristics	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline
					Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Maintain median phytoplankton/benthic microalgae biomass: phytoplankton not > 1.0 µg/L (median); benthic microalgae not > 11 mg/m ² (median); Phytoplankton not > 20 µg/L and/or cell density not >10 000 cells/ml (once-off); Prevent formation of phytoplankton blooms
					Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Maintain distribution of macrophyte habitats; prevent an increase in nutrient input leading to macroalgal blooms; control the spread of invasive plants in the riparian zone
					Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Establish presence/absence of sand prawn <i>Callinectes kraussi</i> on sand banks in lower estuary, establish presence/absence of the copepod <i>Pseudodiaptomus hesslei</i> or estuarine congeneric in the zooplankton of the estuary, populations of these species should not deviate from average baselines (as determined in first three visits) by more 30%

IUA Class	Quaternary Catchment	Resource RU Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																												
					Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Fish assemblage should comprise the 5 estuarine association categories in similar proportions (diversity and abundance) to that under the reference (see 2015 EWR report); numerically assemblage should comprise: Ia estuarine residents (50-80% of total abundance), Ib marine and estuarine breeders (10-20%), IIa obligate estuarine-dependent (10-20%), IIc marine opportunists (20-80%), III marine vagrants (not more than 5%), IV indigenous fish (1-5%), V catadromous species (1-5%); Category Ia species should contain viable populations of at least 4 species; Category IIa obligate dependents should be well represented by large exploited species; REI species dominated by both <i>Myxus capensis</i> and <i>G. aestuaria</i>																												
					Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	Maintain population of original groups of birds present on the estuary; number of birds in any group, other than species that are increasing regionally such as Egyptian geese, should not drop below the baseline median (determined by past data and or initial surveys) number of species and/or birds counted for three consecutive summer or winter counts																												
G15 Coastal	K60G	Piesang Estuary	gx14	Quantity	Flow	MMR/MAR (% Nat)	Maintain at least present-day base flows	<table><thead><tr><th>Months</th><th>Oct</th><th>Nov</th><th>Dec</th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>Jun</th><th>Jul</th><th>Aug</th><th>Sep</th><th>Annual</th></tr></thead><tbody><tr><td>MMR/MAR (%)</td><td>71.4</td><td>77.2</td><td>69.5</td><td>68.8</td><td>63.6</td><td>69.2</td><td>70.9</td><td>81.5</td><td>68.1</td><td>66.8</td><td>74.7</td><td>86.1</td><td>73.8</td></tr></tbody></table>	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual	MMR/MAR (%)	71.4	77.2	69.5	68.8	63.6	69.2	70.9	81.5	68.1	66.8	74.7	86.1	73.8
					Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual																		
				MMR/MAR (%)	71.4	77.2	69.5	68.8	63.6	69.2	70.9	81.5	68.1	66.8	74.7	86.1	73.8																			
				Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	DIN not >100 µg/L once-off.																												
					Salinity	DIP	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	DIP not > 20 µg/L once-off.																												
						Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	5 < Salinity <40																											
System variables	Turbidity	System variables not to exceed TPCs for biota	> 10 NTU in low flow																																	
Pathogens	Enterococci	Concentrations of	>5 mg/L in estuary.	≤185 Enterococci/100 ml (90 th percentile)																																

IUA Class	Quaternary Catchment	RU Name	Resource Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
						Escherichia coli	waterborne pathogens should be maintained in an Acceptable category for full contact recreation	≤500 E. coli/100 ml (90 th percentile)
				Habitat	Hydrodynamics	Mouth state	Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary	Closed mouth state should not increase by >10% from established baseline
					Sediment	Sediment characteristics, Channel shape/size	Flood regime is sufficient to maintain natural bathymetry and sediment characteristics	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline
					Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Maintain low/median phytoplankton/benthic microalgae biomass; phytoplankton not to exceed 3.5 µg/l (median); phytoplankton not to exceed 20 µg/l and/or cell density not to exceed 10 000 cells/ml (once-off); benthic microalgae not to exceed 23 mg/m ² (median); prevent formation of phytoplankton blooms
				Biota	Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Maintain distribution of macrophyte habitats (reeds and sedges currently cover 3.14 ha, submerged macrophytes and salt marsh present); prevent the spread of reeds into open water; prevent an increase in nutrients and macroalgal blooms; prevent the spread of invasive trees (e.g. <i>Acacia</i> spp.) in the riparian zone
					Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Establish presence/absence of sand prawn <i>Callinectes kraussi</i> on sand banks in lower estuary, establish presence/absence of the copepod <i>Pseudodiaptomus hessei</i> or estuarine congeneric in the zooplankton of the estuary, populations of these species should not deviate from average baselines (as determined in first three visits) by more 30%

UA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	
G15 Coastal	K60G	G15-E30	Keurbooms Estuary	gxi15	A	Quantity	Flow	MMR/MAR (% Nat)	Maintain flow regime as close to natural as possible	Fish community composition, abundance and richness Fish Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Fish assemblage should comprise the 5 estuarine association categories in similar proportions (diversity and abundance) to that under the reference (see 2015 EWR report); numerically assemblage should comprise: Ia estuarine residents (50-80% of total abundance), Ib marine and estuarine breeders (10-20%), IIa obligate estuarine-dependent (10-20%), IIb estuarine associated species (5-15%), IIc marine opportunists (20-80%), IV III marine vagrants (not more than 5%), IV IIndigenous fish (1-5%), V catadromous species (1-5%); Category Ia species should contain viable populations of at least 4 species ; Category IIa obligate dependents should be well represented by large exploited species
								Birds	Avifauna community composition, abundance and richness Birds Maintain composition, richness and abundance of different avifauna groups		
						Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	DIN not >100 µg/L once-off.	
								DIP	DIP not >20 µg/L once-off.		
								Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Average salinity >10 at the top of the estuary in the Keurbooms and/or Bitou Arm, average salinity >20 along the length of the system	
								System variables	Turbidity Dissolved oxygen	System variables not to exceed TPCs for biota >5 mg/L in estuary.	
						Pathogens	Enterococci	Concentrations of	≤185 Enterococci/100 ml) (90 th percentile)		

IUA Class	Quaternary Catchment	RU Name	Resource Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
						Escherichia coli	waterborne pathogens should be maintained in an Acceptable category for full contact recreation	≤500 E. coli/100 ml (90 th percentile)
						Mouth state	Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary	Estuary mouth permanently open
				Habitat	Hydrodynamics	Tidal variation	Flood regime is sufficient to maintain natural bathymetry and sediment characteristics	Average tidal amplitude near the mouth during low flows (summer) must not change by >10% from established baseline.
					Sediment	Sediment characteristics, Channel shape/size	Flood regime to maintain natural bathymetry and the sediment characteristics	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline
					Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Maintain low/median phytoplankton/benthic microalgae biomass: phytoplankton not to exceed 3.5 µg/l (median), phytoplankton not to exceed 20 µg/l and/or cell density not to exceed 10 000 cells/ml (once-off); benthic microalgae not to exceed 23 mg/m ² (median); prevent formation of phytoplankton blooms
				Biota	Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Maintain the distribution of sensitive macrophyte habitats (e.g. salt marsh, submerged macrophytes, reeds and sedges) (of special importance are the submerged macrophytes in the Bitou Arms as habitat for the endangered seahorses <i>H. capensis</i>); rehabilitate the Bitou wetlands by removing weirs, berms, old bridges; limit the spread of invasive plants; maintain the integrity of the riparian zone
					Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Maintain high biomass and diversity of benthic invertebrates in the lagoon area in the lower estuary; maintain rich invertebrate communities associated with the REI zone in the upper estuary (zooplankton and benthos).

IUA Class	Quaternary Catchment	RU Name	Resource Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
G15 Coastal	K70A	G15-E31	Matjies Estuary	C	Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Fish assemblage should comprise the 5 estuarine association categories in similar proportions (diversity and abundance) to that under the reference (see 2015 EWR report); numerically assemblage should comprise: Ia estuarine residents (50-80% of total abundance), Ib marine and estuarine breeders (10-20%), IIa obligate estuarine-dependent (10-20%), IIc marine opportunists (20-80%), III marine vagrants (not more than 5%), IV indigenous fish (1-5%), V catadromous species (1-5%); Category Ia species should contain viable populations of at least 4 species; Category IIa obligate dependents should be well represented by large exploited species
					Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	Maintain population of original groups of birds present on the estuary; number of birds in any group, other than species that are increasing regionally such as Egyptian geese, should not drop below the baseline median (determined by past data and or initial surveys) number of species and/or birds counted for three consecutive summer or winter counts
				Quantity	Flow	MMR/MAR (% Nat)	Maintain flow regime (small system needs most flows)	Months MMR/MAR (%) Nat
					Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	73.9 Oct 73.9 Nov 69.1 Dec 68.0 Jan 65.0 Feb 67.9 Mar 67.9 Apr 68.4 May 65.8 Jun 66.8 Jul 71.6 Aug 74.1 Sep 70.5 Annual
				Quality	Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	DIP not >20 µg/L once-off. Average Salinity > 20 for more than 20% of the time (indicative of flow reduction), average Salinity < 5 for more than 20% of the time (indicative of extended closure).
					System variables	Turbidity Dissolved oxygen	System variables not to exceed TPCs for biota	>10 NTU in low flow >5 mg/L in estuary.
					Pathogens	Enterococci	Concentrations of	≤185 Enterococci/100 ml) (90 th percentile)

IUA Class	Quaternary Catchment	RU Name	Resource Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
						Escherichia coli	waterborne pathogens should be maintained in an Acceptable category for full contact recreation	≤500 E. coli/100 ml (90 th percentile)
					Hydrodynamics	Mouth state	Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary	Closed mouth state should not increase by >10% from established baseline
					Sediment	Sediment characteristics, Channel shape/size	Flood regime is sufficient to maintain natural bathymetry and sediment characteristics	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline
					Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Maintain low/median phytoplankton/benthic microalgae biomass; phytoplankton not to exceed 3.5 µg/l (median); phytoplankton not to exceed 20 µg/l (and/or cell density not to exceed 10 000 cells/ml (once-off); benthic microalgae not to exceed 23 mg/m ² (median); prevent formation of phytoplankton blooms
					Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Maintain distribution of macrophyte habitats, prevent an increase in nutrient input leading to macroalgal blooms, control the spread of invasive plants in the riparian zone
					Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Establish presence/absence of sand prawn <i>Callinectes kraussi</i> on sand banks in lower estuary, establish presence/absence of the copepod <i>Pseudodiaptomus hesslei</i> or estuarine congeneric in the zooplankton of the estuary, populations of these species should not deviate from average baselines (as determined in first three visits) by more 30%
					Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Maintain fish assemblage that includes at least 2 estuarine breeding species (Category I), 3 estuary dependent marine species (Category IIa & IIb) and 1 indigenous catadromous species (Category V); estuarine residents should dominate numerically, but the proportion of estuary dependent marine species (based on abundance) should not fall below 2%.

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric		
						Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	Maintain population of original groups of birds present on the estuary; number of birds in any group, other than species that are increasing regionally such as Egyptian geese, should not drop below the baseline median (determined by past data and or initial surveys) number of species and/or birds counted for three consecutive summer or winter counts		
G15 Coastal	K70A	G15-E32	Sout (Oos) Estuary	gx17	A	Flow	Quantity	MMR/MAR (% Nat)	Maintain flow regime (small system needs most flows)	Months MMR/MAR (%) Nat	
								DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	DIN not >100 µg/L once-off.	
						Nutrients		DIP	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	DIP not >20 µg/L once-off.	
							Salinity		Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Average salinity <10 at the head of the estuary (expected average range 5 - 10 for most of the system)
						System variables			Turbidity	System variables not to exceed TPCs for biota	> 10 NTU in low flow
									Dissolved oxygen	Enterococci	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation
						Pathogens		Escherichia coli	Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary	≤185 Enterococci/100 ml (90 th percentile) ≤500 E. coli/100 ml (90 th percentile)	
							Hydrodynamics		Mouth state	Mouth must remain permanently open	
						Habitat					

IUA Class	Quaternary Catchment	RU Name	Resource Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
G15 Coastal	K70A	G15-E33	Groot (Wes) Estuary	Biota	Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Maintain low/median phytoplankton/benthic microalgae biomass: phytoplankton not to exceed 3.5 µg/l (median), phytoplankton not to exceed 20 µg/l and/or cell density not to exceed 10 000 cells/ml (once-off); benthic microalgae not to exceed 23 mg/m ² (median); prevent formation of phytoplankton blooms
						Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Maintain distribution of macrophyte habitats, prevent an increase in nutrient input leading to macroalgal blooms, control the spread of invasive plants in the riparian zone
						Macrophytes		
						Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton
					Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Maintain fish assemblage that includes at least 2 estuarine breeding species (Category I), 3 estuary dependent marine species (Category IIa & IIb) and 1 indigenous catadromous species (Category V); estuarine residents should dominate numerically, but the proportion of estuary dependent marine species (based on abundance) should not fall below 2%.
						Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups
					Flow	MMR/MAR (% Nat)	Maintain flow regime (small system needs most flows)	Months MMR/MAR (% Nat) Oct 87.9 Nov 88.0 Dec 87.2 Jan 84.3 Feb 82.7 Mar 84.1 Apr 85.3 May 87.3 Jun 86.7 Jul 86.7 Aug 86.9 Sep 87.9 Annual 86.7
						DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	
						Quality	DIP	DIP not >20 µg/L once-off.

IUA Class	Quaternary Catchment	RU Name	Resource Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
					Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Average salinity <10 at the head of the estuary (expected average range 5 - 10 for most of the system)
					System variables	Turbidity Dissolved oxygen	System variables not to exceed TPCs for biota	>10 NTU in low flow >5 mg/L in estuary.
					Pathogens	Enterococci Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation	≤185 Enterococci/100 ml (90 th percentile) ≤500 E. coli/100 ml (90 th percentile)
					Hydrodynamics	Mouth state	Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary	Closed mouth state should not increase by >10% from established baseline
					Sediment	Sediment characteristics, Channel shape/size	Flood regime is sufficient to maintain natural bathymetry and sediment characteristics	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline
					Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Maintain low/median phytoplankton/benthic microalgae biomass: phytoplankton not to exceed 3.5 µg/l (median), phytoplankton not to exceed 20 µg/l and/or cell density not to exceed 10 000 cells/ml (once-off); benthic microalgae not to exceed 23 mg/m ² (median); prevent formation of phytoplankton blooms
					Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Maintain distribution of macrophyte habitats, prevent an increase in nutrient input leading to macroalgal blooms, control the spread of invasive plants in the riparian zone
					Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Establish presence/absence of sand prawn <i>Callinectes kraussi</i> on sand banks in lower estuary, establish presence/absence of the copepod <i>Pseudodiaptomus hessei</i> or estuarine congeneric in the zooplankton of the estuary, populations of these species should not deviate from average baselines (as determined in first three visits) by more 30%

IUA Class	Quaternary Catchment	RU Name	Resource Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
G15 Coastal	II	K70B	G15-E34	Bloukrans Estuary	gx118	A	Fish	Fish assemblage should comprise the 5 estuarine association categories in similar proportions (diversity and abundance) to that under the reference (see 2015 EWR report); numerically assemblage should comprise: Ia estuarine residents (50-80% of total abundance), Ib marine and estuarine breeders (10-20%), IIa obligate estuarine-dependent (10-20%), IIb estuarine associated species (5-15%), IIc marine opportunists (20-80%), III marine vagrants (not more than 5%), IV indigenous fish (1-5%), V <i>catadromous</i> species (1-5%); Category Ia species should contain viable populations of at least 4 species; Category IIa obligate dependents should be well represented by large exploited species; REI species dominated by both <i>Myxus capensis</i> and <i>G. aestuaria</i> Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species
G15 Coastal	II	K70B	G15-E34	Bloukrans Estuary	gx118	A	Birds	Maintain population of original groups of birds present on the estuary; number of birds in any group, other than species that are increasing regionally such as Egyptian geese, should not drop below the baseline median (determined by past data and or initial surveys) number of species and/or birds counted for three consecutive summer or winter counts Maintain composition, richness and abundance of different avifauna groups
G15 Coastal	II	K70B	G15-E34	Bloukrans Estuary	gx118	A	Flow	MMR/MAR (% Nat) DIN not >100 µg/L once-off.
G15 Coastal	II	K70B	G15-E34	Bloukrans Estuary	gx118	A	Nutrients	DIP not >20 µg/L once-off.
G15 Coastal	II	K70B	G15-E34	Bloukrans Estuary	gx118	A	Salinity	Average salinity <10 at the head of the estuary (expected average range 5 - 10 for most of the system)
G15 Coastal	II	K70B	G15-E34	Bloukrans Estuary	gx118	A	System variables	> 10 NTU in low flow >5 mg/L in estuary.
G15 Coastal	II	K70B	G15-E34	Bloukrans Estuary	gx118	A	Pathogens	≤185 Enterococci/100 ml) (90th percentile)

IUA Class	Quaternary Catchment	RU Name	Resource Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
						Escherichia coli	waterborne pathogens should be maintained in an acceptable category for full contact recreation	≤500 E. coli/100 ml (90 th percentile)
						Mouth state	Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary	Estuary mouth permanently open
					Hydrodynamics	Tidal variation		Average tidal amplitude near the mouth during low flows (summer) must not change by >10% from established baseline.
				Habitat				
					Sediment	Sediment characteristics, Channel shape/size	Flood regime is sufficient to maintain natural bathymetry and sediment characteristics	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline
					Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Maintain low/median phytoplankton/benthic microalgae biomass: phytoplankton not to exceed 1 µg/l (median), phytoplankton not to exceed 20 µg/l and/or cell density not to exceed 10 000 cells/ml (once-off); benthic microalgae not to exceed 11 mg/m ² (median); prevent formation of phytoplankton blooms
					Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Establish presence/absence of sand prawn <i>Callinectes kraussi</i> on sand banks in lower estuary, establish presence/absence of the copepod <i>Pseudodiaptomus hessei</i> or estuarine congeneric in the zooplankton of the estuary, populations of these species should not deviate from average baselines (as determined in first three visits) by more 30%
				Biota				
					Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Maintain fish assemblage that includes at least 2 estuarine breeding species (Category I), 3 estuary dependent marine species (Category IIa & IIb) and 1 indigenous catadromous species (Category V); estuarine residents should dominate numerically, but the proportion of estuary dependent marine species (based on abundance) should not fall below 2%.
					Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	Maintain population of original groups of birds present on the estuary; number of birds in any group, other than species that are increasing regionally such as Egyptian geese, should not drop below the baseline median (determined by past data and or initial surveys) number of species and/or birds counted for three consecutive summer or winter counts

Table 27: Resource Quality Objectives for GROUNDWATER in priority Resource Units in the Breede-Gouritz Water Management Area

IUA	Class	Quaternary Catchment	RU	Resource Name	Component Sub Component	Indicator/ Measure	RQO Narrative	RQO Numeric
A1 Upper Breede Tributaries	II	H10A, H10B, H10C	BB-1	Groundwater (all)	Quantity	Seasonal abstraction: water level recovers from abstraction impact during wet season, under consideration of climate change and drought cycles. Permanent abstraction: water level decline stabilises under consideration of aquifer response time.	Groundwater use should be sustainable for all users and n/a the environment	
		H10L, H10F, H10G, H10J	BB-3					
		H20A, H20B, H20C, H20F	BB-2					
A3 Breede Working Tributaries	III	H40B	BB-4					
		H20H, H10H, H40C	BB-5					
		H30B	BB-6					
A3 Breede Working Tributaries	III	H40J						
A2 Middle Breede Renosterveld	III	H40K	BB-7					
B4 Riversoenderend Theewaters	III	H60A, H60B, H60C	BR-1					
B5 Overberg West	II	G40C, G40D	BO-1	Groundwater (all)	Quantity	Seasonal abstraction: water level recovers from abstraction impact during wet season, under consideration of climate change and drought cycles. Permanent abstraction: water level decline stabilises under consideration of aquifer response time.	Groundwater use should be sustainable for all users and n/a the environment	
H16 Overberg West Coastal	II	G40H	BO-2					
F10 Overberg East Renosterveld	II	G50B	BO-3					
H17 Overberg East Fynbos	II	G50D, G50E						
E8 Touws	III	J12C, J12D	GGr-1					
		J11E	GGr-3					
C6 Gamka Buffels	II	J24B	GGa-1					
		J21A, J21B, J23A	GGa-2a, 2b and 2c					
		J35B	GO-4					
D7 Gouritz-Olifants	III	J40C, J40D	GGa-1	Groundwater (all)	Quantity	Seasonal abstraction: water level recovers from abstraction impact during wet season, under consideration of climate change and drought cycles. Permanent abstraction: water level decline stabilises under consideration of aquifer response time.	Groundwater use should be sustainable for all users and n/a the environment	
F13 Lower Gouritz	II	H90E	GGa-2					
I18 Hessequa	III	K40D	GC-2					
G15 Coastal	II	G40H	BO-2					
H16 Overberg West Coastal	II	G50B	BO-3					
F10 Overberg East Renosterveld	II	G50D, G50E						
H17 Overberg East Fynbos	II	K40D	GC-2	Groundwater (Coastal Cenozoic Deposits)	Quantity	Groundwater level	Minimum water level in abstraction boreholes within 2.5km from the ocean to avoid saline intrusion	>1 mamsl >0.5 mamsl
G15 Coastal	II	K40D	GC-2					

IUA	Class	Quaternary Catchment	RU	Resource Name	Component Sub Component	Indicator/ Measure	RQO Narrative	RQO Numeric
A3 Breede Working Tributaries	III	H20H, H10H, H40C	BB-5	Groundwater (Coastal Cenozoic Deposits)				
G15 Coastal	II	K40D K70A	GC-2 GC-3					
A3 Breede Working Tributaries	III	H40J						
A2 Middle Breede Renosterveld	III	H40K	BB-7	Groundwater (superficial aquifers)	Quantity	Discharge	Relative water levels between groundwater and surface water (in mamsl)	The natural gradient between groundwater and surface water should be maintained n/a
B4 Riversonderend Theewaters	III	H60A, H60B, H60C	BR-1					
B5 Overberg West	II	G40C, G40D	BO-1					
H16 Overberg West Coastal	II	G40H	BO-2					
F10 Overberg East Renosterveld	II	G50B	BO-3					
H17 Overberg East Fynbos	II	G50D, G50E		Groundwater (all)				
F13 Lower Gouritz	II	J40C, J40D	GG-1					
G15 Coastal	II	K20A	GC-1					
A1 Upper Breede Tributaries	II	H10L, H10F, H10G, H10J	BB-3	Groundwater (all)	Quantity	Discharge	Buffer zones	No groundwater abstraction around wetland and river FEPAs in accordance with the implementation manual for FEPAs. 250m
A3 Breede Working Tributaries	III	H40J						
A2 Middle Breede Renosterveld	III	H40K	BB-7					
B4 Riversonderend Theewaters	III	H60A, H60B, H60C	BR-1					
H16 Overberg West Coastal	II	G40H	BO-2					
F10 Overberg East Renosterveld	II	G50B	BO-3					
H17 Overberg East Fynbos	II	G50D, G50E						
B5 Overberg West	II	G40C, G40D	BO-1					
C6 Gamka Buffels	II	J11E, J21A, J21B, J23A	GG-3 GGa-2a, 2b and 2c					
F13 Lower Gouritz	II	J40C, J40D	GG-1					
	II	K20A	GC-1					

IUA	Class	Quaternary Catchment	RU	Resource Name	Component	Sub Component	Indicator/ Measure	RQO Narrative	RQO Numeric
G15 Coastal		K70A	GC-3						
A3 Breede Working Tributaries	III	H20H, H10H, H40C	BB-5	Groundwater (Coastal Cenozoic Deposits)					
G15 Coastal	II	K40D	GC-2						
A1 Upper Breede Tributaries	II	H10L, H10F, H10G, H10J	BB-3					Maintenance low flow requirements: 56.125Mm ³ /a (12.90%MAR) at H1H001; 30.215Mm ³ /a (28.63%MAR) at H1H018	n/a
B4 Riversonderend Theewaters	III	H60A, H60B, H60C	BR-1					Maintenance low flow requirements: 12.567Mm ³ /a (28.63%MAR) at Nvii10	n/a
B5 Overberg West	II	G40C, G40D	BO-1	Groundwater (all)	Quantity	Low flow in river	Maintain (groundwater component of) the low flow requirements in the river Compliance with the low flow requirements in the river (as per riverine RQO)	Maintenance low flow requirements: 12.669Mm ³ /a (31.79%MAR) at Piii1; 54.260Mm ³ /a (26.26%MAR) at G4H030; 77.111Mm ³ /a (30.79%MAR) at G4H007	n/a
F10 Overberg East Renosterveld	II	G50B						Maintenance low flow requirements: 0.490Mm ³ /a (3.93%MAR) at Ni4; 2.067Mm ³ /a (13.40%MAR) at G5H003.	n/a
H17 Overberg East Fynbos	II	G50D, G50E	BO-3						
A1 Upper Breede Tributaries	II	H10A, H10B, H10C H10L, H10F, H10G, H10J	BB-1 BB-3						
A3 Breede Working Tributaries	III	H20A, H20B, H20C, H20F H40B H20H, H10H, H40C H30B	BB-2 BB-4 BB-5 BB-6						
A3 Breede Working Tributaries	III	H40J							
A2 Middle Breede Renosterveld	III	H40K	BB-7	Groundwater (all)	Quality	Pathogens	E-coli	Groundwater should be fit for domestic use after treatment; and groundwater quality shall not show a deteriorating trend from natural background	0 counts / 100ml
B4 Riversonderend Theewaters	III	H60A, H60B, H60C	BR-1						
B5 Overberg West	II	G40C, G40D	BO-1						
H16 Overberg West Coastal	II	G40H	BO-2						
F10 Overberg East Renosterveld	II	G50B	BO-3						

IUA	Class	Quaternary Catchment	RU	Resource Name	Component Sub Component	Indicator/ Measure	RQO Narrative	RQO Numeric
H17 Overberg East Fynbos	II	G50D, G50E						
E8 Touws	III	J12C, J12D	GG-1					
		J11E	GG-3					
C6 Gamka Buffels	II	J24B	GGa-1					
		J21A, J21B, J23A	GGa-2a, 2b and 2c					
D7 Gouritz-Olifants	III	J35B	GO-4					
F13 Lower Gouritz	II	J40C, J40D	GGo-1					
I18 Hessequa	III	H90E	GGo-2					
G15 Coastal	II	K40D	GC-2					
A1 Upper Breede Tributaries	II	H10A, H10B, H10C	BB-1					
		H10L, H10F, H10G, H10J	BB-3					
A3 Breede Working Tributaries	III	H20A, H20B, H20C, H20F	BB-2					
		H40B	BB-4					
		H20H, H10H, H40C	BB-5					
		H30B	BB-6					
A3 Breede Working Tributaries	III	H40J						
A2 Middle Breede Renosterveld	III	H40K	BB-7					
B4 Riversonderend Theewaters	III	H60A, H60B, H60C	BR-1					
B5 Overberg West	II	G40C, G40D	BO-1					
H16 Overberg West Coastal	II	G40H	BO-2					
F10 Overberg East Renosterveld	II	G50B						
H17 Overberg East Fynbos	II	G50D, G50E	BO-3					
E8 Touws	III	J12C, J12D	GG-1					
		J11E	GG-3					
C6 Gamka Buffels	II	J24B	GGa-1					
		J21A, J21B, J23A	GGa-2a, 2b and 2c					
D7 Gouritz-Olifants	III	J35B	GO-4					
F13 Lower Gouritz	II	J40C, J40D	GGo-1					
I18 Hessequa	III	H90E	GGo-2					
G15 Coastal	II	K40D	GC-2					

Groundwater should be fit for domestic use after treatment; and groundwater quality shall not show a deteriorating trend from natural background

Total Coliform

Pathogens

Quality

Groundwater (all)

IUA	Class	Quaternary Catchment	RU	Resource Name	Component	Sub Component	Indicator/ Measure	RQO Narrative	RQO Numeric
A1 Upper Breede Tributaries II		H10A, H10B, H10C	BB-1	Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)		<6.8 mg/l
						Salts	EC		<311 mS/m
				Groundwater (Bokkeveld Group)	Quality	Nutrients	NO3 (as N)		<2.4 mg/l
						Salts	EC		<236 mS/m
				Groundwater (Nardouw Group)	Quality	Nutrients	NO3 (as N)		<4.4 mg/l
						Salts	EC		<119 mS/m
				Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)		<9.6 mg/l
						Salts	EC		<73 mS/m
				Groundwater (Table Mountain Group)	Quality	Nutrients	NO3 (as N)		<1.8 mg/l
						Salts	EC		<109 mS/m
A3 Breede Working Tributaries III		H20A, H20B, H20C, H20F	BB-2	Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)		<11.0 mg/l
						Salts	EC		<168 mS/m
				Groundwater (Bokkeveld Group)	Quality	Nutrients	NO3 (as N)		<1.8 mg/l
						Salts	EC		<329 mS/m
				Groundwater (Table Mountain Group)	Quality	Nutrients	NO3 (as N)		<3.7 mg/l
						Salts	EC		<63 mS/m
				Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)	Groundwater should be fit for domestic use after treatment; and groundwater quality shall not show a deteriorating trend from natural background	<3.1 mg/l
						Salts	EC		<591 mS/m
				Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)		<9.8 mg/l
						Salts	EC		<170 mS/m
B4 RIVERSONDEREND THEEWATERS III		H30B	BB-6	Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)		<3.6 mg/l
						Salts	EC		<589 mS/m
				Groundwater (Bokkeveld Group)	Quality	Nutrients	NO3 (as N)		<4.4 mg/l
						Salts	EC		<119 mS/m
				Groundwater (Nardouw Group)	Quality	Nutrients	NO3 (as N)		<10 mg/l
						Salts	EC		<280 mS/m
				Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)		<3.6 mg/l
						Salts	EC		<741 mS/m
				Groundwater (Table Mountain Group)	Quality	Nutrients	NO3 (as N)		<3.8 mg/l
						Salts	EC		<117 mS/m
B4 RIVERSONDEREND THEEWATERS III		H40J, H40K	BB-7	Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)		<10 mg/l
						Salts	EC		<280 mS/m
				Groundwater (Bokkeveld Group)	Quality	Nutrients	NO3 (as N)		<3.6 mg/l
						Salts	EC		<741 mS/m
				Groundwater (Table Mountain Group)	Quality	Nutrients	NO3 (as N)		<3.8 mg/l
						Salts	EC		<117 mS/m
				Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)		<10 mg/l
						Salts	EC		<280 mS/m
				Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)		<3.6 mg/l
						Salts	EC		<741 mS/m
B4 RIVERSONDEREND THEEWATERS III		H60A, H60B, H60C	BR-1	Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)		<10 mg/l
						Salts	EC		<280 mS/m
				Groundwater (Bokkeveld Group)	Quality	Nutrients	NO3 (as N)		<3.6 mg/l
						Salts	EC		<741 mS/m
				Groundwater (Table Mountain Group)	Quality	Nutrients	NO3 (as N)		<3.8 mg/l
						Salts	EC		<117 mS/m
				Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)		<10 mg/l
						Salts	EC		<280 mS/m
				Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)		<3.6 mg/l
						Salts	EC		<741 mS/m

IUA	Class	Quaternary Catchment	RU	Resource Name	Component	Sub Component	Indicator/ Measure	RQO Narrative	RQO Numeric
				Groundwater (Table Mountain Group)		Salts	EC		<70 mS/m
B5 Overberg West	II	G40A, G40C, G40D	BO-1	Groundwater (Bokkeveld Group)	Quality	Nutrients	NO3 (as N)		<3.6 mg/l
						Salts	EC		<589 mS/m
				Groundwater (Table Mountain Group)	Quality	Nutrients	NO3 (as N)		<3.8 mg/l
						Salts	EC		<117 mS/m
H16 Overberg West Coastal	II	G40H	BO-2	Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)		<9.8 mg/l
						Salts	EC		<280 mS/m
				Groundwater (Bokkeveld Group)	Quality	Nutrients	NO3 (as N)		<3.6 mg/l
						Salts	EC		<589 mS/m
F10 Overberg East Renosterveld	II	G50B	BO-3	Groundwater (Table Mountain Group)	Quality	Nutrients	NO3 (as N)		<3.8 mg/l
						Salts	EC		<117 mS/m
				Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)		<10 mg/l
						Salts	EC		<280 mS/m
F10 Overberg East Renosterveld	II	G50B	BO-3	Groundwater (Bokkeveld Group)	Quality	Nutrients	NO3 (as N)		<3.6 mg/l
						Salts	EC		<741 mS/m
F10 Overberg East Renosterveld	II	G50B	BO-3	Groundwater (Table Mountain Group)	Quality	Nutrients	NO3 (as N)		<3.8 mg/l
						Salts	EC		<117 mS/m
F10 Overberg East Renosterveld	II	G50B	BO-3	Groundwater (Table Mountain Group)	Quality	Nutrients	NO3 (as N)		<11.7 mg/l
						Salts	EC		<600 mg/l
F10 Overberg East Renosterveld	II	G50B	BO-3	Groundwater (Table Mountain Group)	Quality	Nutrients	NO3 (as N)		<231 mS/m
						Salts	EC		<12.0 mg/l
C6 Gamka Buffels	II	J11E	GGa-1	Groundwater (all)	Quality	Nutrients	NO3 (as N)		<237 mg/l
						Salts	EC		<226 mS/m
				Groundwater (Beaufort Group)	Quality	Nutrients	NO3 (as N)		<15.8 mg/l
						Salts	EC		<525 mg/l
E8 Touws	III	J12C, J12D	GGa-2a, 2b and 2c	Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)		<310 mS/m
						Salts	EC		<15.9 mg/l
				Groundwater (Beaufort Group, Karoo Supergroup)	Quality	Nutrients	NO3 (as N)		<634 mg/l
						Salts	EC		<367 mS/m
E8 Touws	III	J12C, J12D	GGa-1	Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)		<9.8 mg/l
						Salts	EC		<170 mS/m
				Groundwater (Witteberg Group)	Quality	Nutrients	NO3 (as N)		<11.0 mg/l
						Salts	EC		<420 mS/m

IUA	Class	Quaternary Catchment	RU	Resource Name	Component	Sub Component	Indicator/ Measure	RQO Narrative	RQO Numeric
				Groundwater (Bokkeveld Group)	Quality	Nutrients Salts	NO ₃ (as N) EC		<3.6 mg/l <589 mS/m
D7 Gouritz-Olifants	III	J35B	GO-4	Groundwater (Bokkeveld Group)	Quality	Nutrients Salts	NO ₃ (as N) EC		<11.0 mg/l <589 mS/m
				Groundwater (Table Mountain Group)	Quality	Nutrients Salts	NO ₃ (as N) EC		<11.0 mg/l <170 mS/m
F13 Lower Gouritz	II	J40C, J40D	GGo-1	Groundwater (Coastal Cenozoic Deposits)	Quality	Nutrients Salts	NO ₃ (as N) EC		<3.3 mg/l <170 mS/m
I18 Hessequa	III	H90E	GGo-2a and 2b	Groundwater (Coastal Cenozoic Deposits)	Quality	Nutrients Salts	NO ₃ (as N) EC		<4.5 mg/l <316 mS/m
G15 Coastal	II	K40D	GC-2	Groundwater (Coastal Cenozoic Deposits)	Quality	Nutrients Salts	NO ₃ (as N) EC		<11.0 mg/l <170 mS/m