

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
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178 Francis Baard Street
Private Bag x 313
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0001
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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.

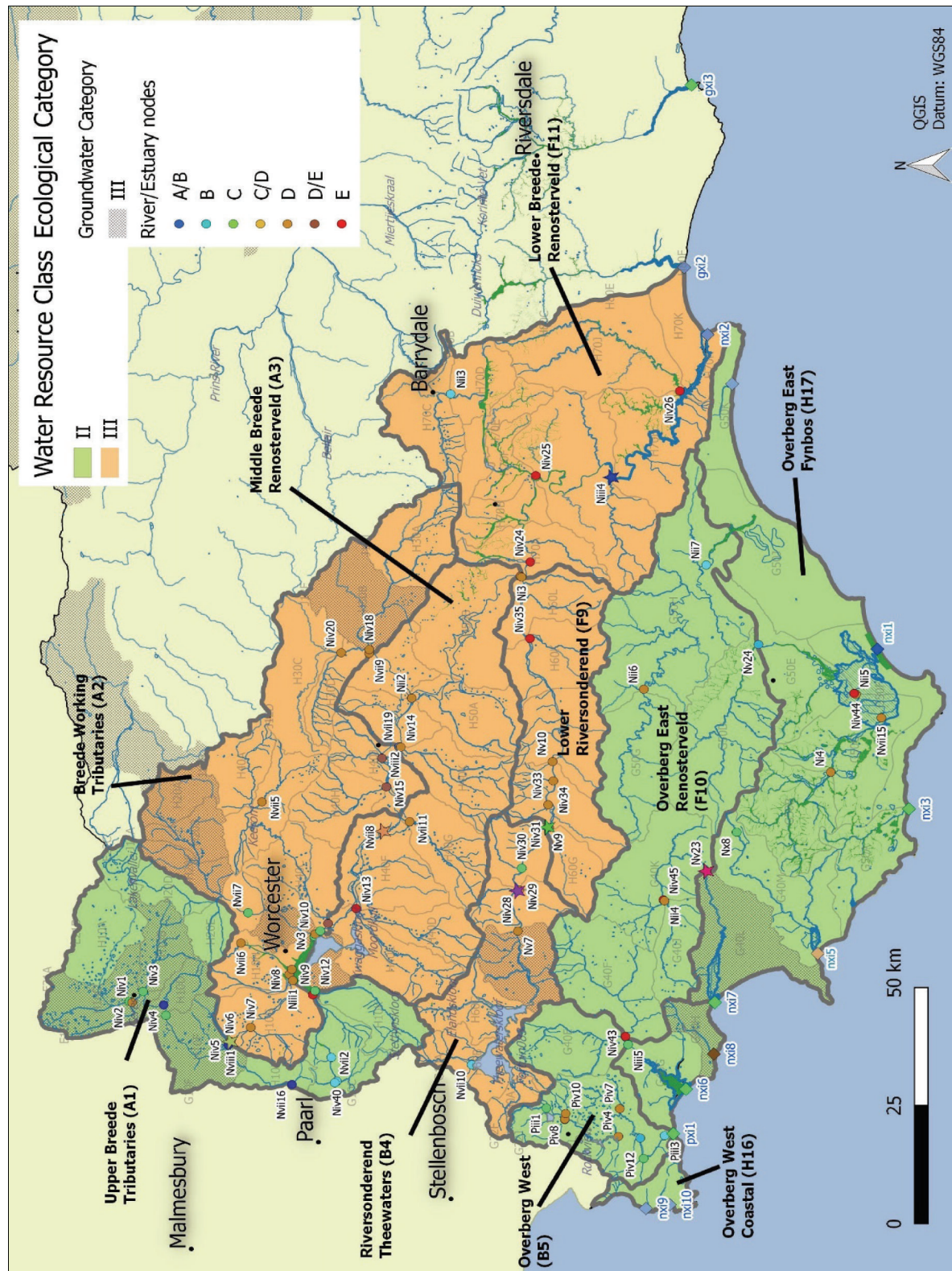


Figure 1: Proposed Water Resource Classes for the Breede Overberg Area

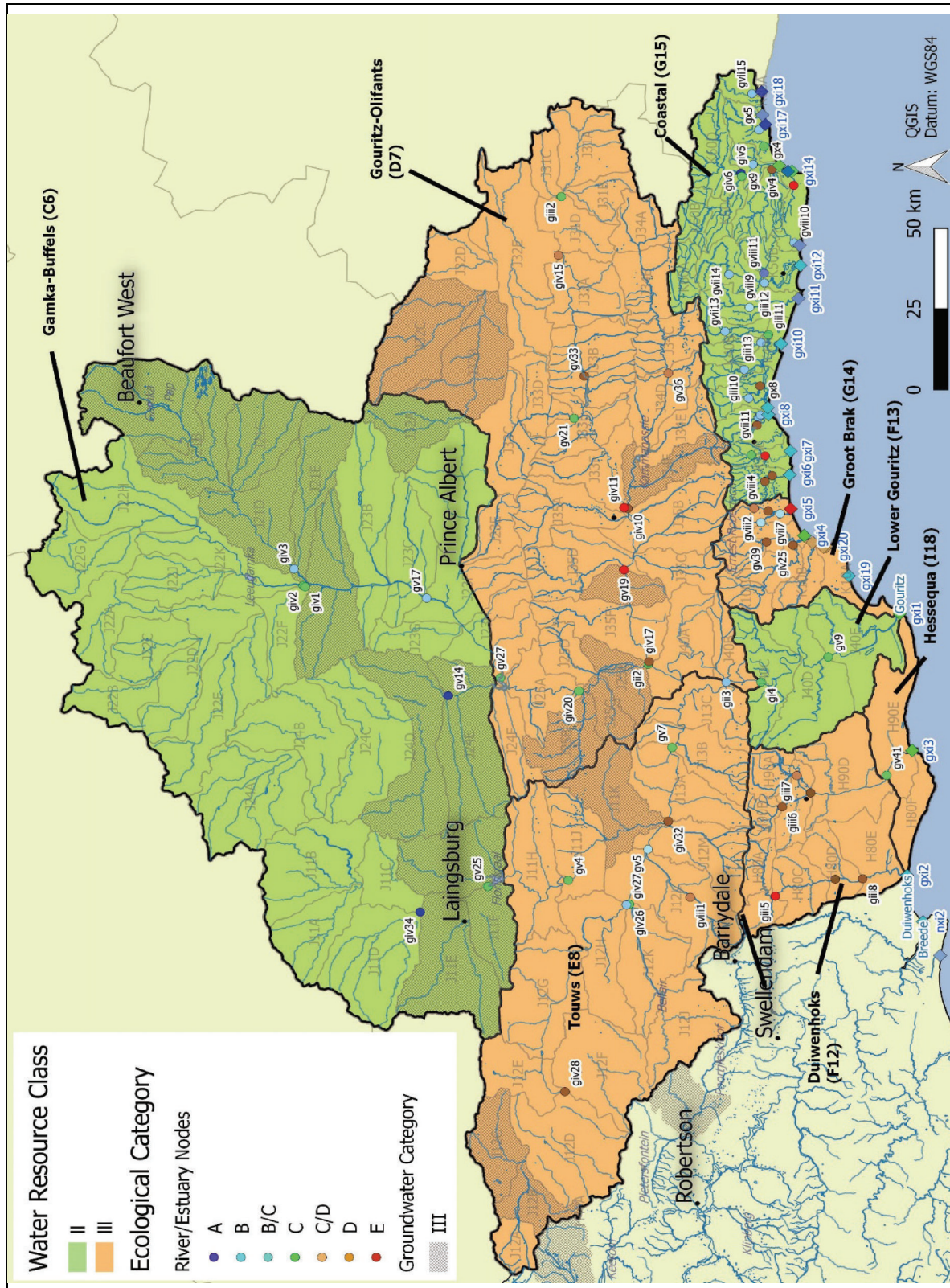


Figure 2: Proposed Water Resource Classes for the Gouritz Coastal Area

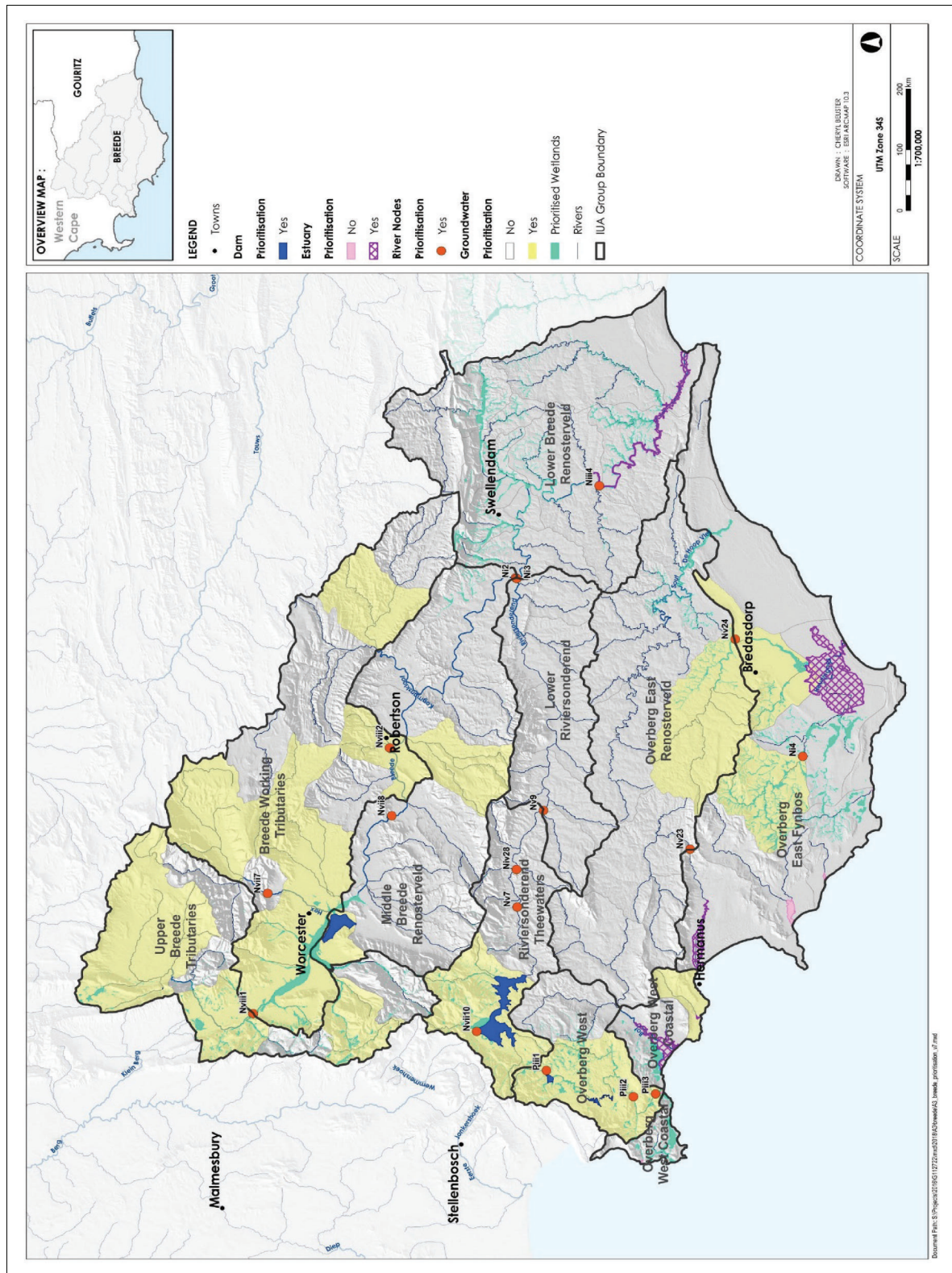


Figure 3: Proposed Priority Resource Units for the Breede Overberg Area

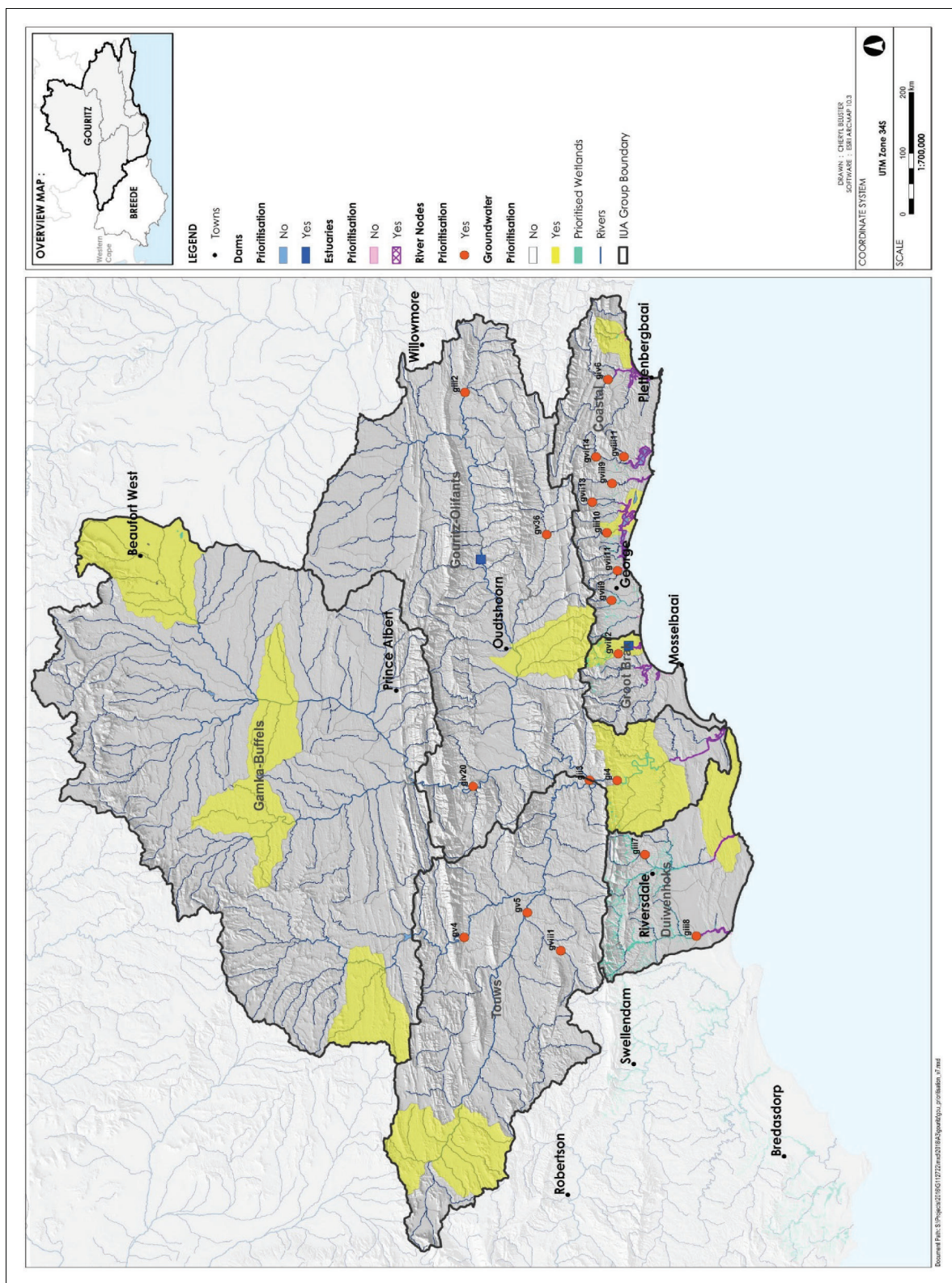


Table 1: Summary of Water Resource Classes per Integrated Unit of Analysis and Ecological Categories

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	nvi4	C	126.90
		H10D		Witels River	Niv4	A	84.30
		H10D		Breede River	Nvi3	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		Keisie 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	Nvi1	D	1099.90
		H30E		Kogmanskloof River	Nii2	D	52.00
		H50A		Breede River	Niii3	D	1153.40
		H50B	A3-R05	Breede River	Ni2	D	1170.10
B4 Upper Riversonderend	III	H60B	B4-R06	Du Toits River	Nvii10	B	43.90
		H60D	B4-R07	Riviersonderend River	Nv7	C	370.20
		H60E	B4-R08	Baviaans River	Niv28	B	7.90
		H60E		Sersants River	Niv29	D	4.50
		H60F		Gobos River	Niv30	C	12.40
		H60F	B4-R09	Riviersonderend River	Nv9	D	413.70
		H60G		Kwartel River	Niv31	D	10.70
F9 Lower Riversonderend	III	H60H		Soetmelksvlei River	Niv33	D	4.00
		H60H		Slang River	Niv34	D	2.10
		H60H		Riviersonderend River	Nv10	D	442.90
		H60J		Riviersonderend River	Nv11	D	463.10
		H60K		Kwassadie River	Niv35	E	5.90
		H60K		Riviersonderend River	Nv12	D	474.50
		H60L	F9-R10	Riviersonderend 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	Plii1	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	Plii2	B/C	206.70
		G40D		Dwars/Louws River	Piv12	C	25.20
		G40D	B5-R13	Palmiet River	Plii3	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	Nlii5	C	74.10
		G40G	H16-E04	Bot Estuary	Nxi6	C	77.67
		G40H	H16-E05	Onrus Estuary	Nxi8	D	2.49
		G40J		Harbees River	Nli4	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	Nli6	D	4.20
		G50H		DeHoopVlei River	Nli7	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	Nli5	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	Nii3	B	19.40
		H70F		Buffeljags River	Niv25	E	119.40
		H70G	F11-R17	Breede River	Niii4	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	giii2	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	gvi11	E	79.90
		J34C	D7-R25	Kammanassie River	gv36	C/D	41.20
		J34F		Kammanassie River	gvi10	D	59.20
		J35A		Grobbelaars River	gvii2	C	16.90
		J35A		Grobbelaars River	gvi9	E	30.70
		J35D		Olifants River	gv19	E	224.50
		J35F		Olifants River	gvi17	D	253.40
		J40A		Gouritz River	gvi16	C	394.90
		J40B	F13-R26	Gouritz River	gi4	C	489.10
F13 Lower Gouritz	II	J40C		Gouritz River	gv28	D	21.40
		J40D		Gouritz River	gv9	C	571.80
		J40E	F13-E12	Gouritz Estuary	Gxi1	C	294.69
		H80B		Duiwenhoks River	giii5	E	62.50
F12 Duiwenhoks	III	H80C		Duiwenhoks River	gv11	D	75.10
		H80D	F12-R27	Duiwenhoks River	giii8	D	83.30
		H80E	F12-E13	Duiwenhoks 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)
G-14 Groot Brak	III	K10D		Brandwag River	g1v25	D	17.90
		K10E		Moordkuil River	gv39	D	15.70
		K10F	G14-E15	Klein-Brak estuary	Gxi4	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
G-15 Coastal	II	K30B		Gwaing River	gviii6	E	13.92
		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	gvii10	B	12.40
		K40B		Hoekraal River	gvii13	B	27.90
		K40C	G15-R33	Karatara River	gvii13	B	11.20
		K40C		Karatara River	gvii11	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	gvii12	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	H10F	A1-R01	Breede River	nviii1	D	Quantity	Low 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					
							High flows		Maintenance flows (million cubic metres)	6.667	1.651	4.007	2.105	1.651	0	0	0	0	0	0	0	0	0	0	0	0
							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)																
								pH range		6.5 ≥ pH ≤ 8.5 (5 th and 95 th percentiles)																
						System variables		Dissolved oxygen	Concentrations of waterborne pathogens should be maintained in an acceptable category for full contact recreation.	DO ≥ 6 milligrams per litre (5 th percentile)																
								Ammonia		≤ 0.073 milligrams per litre (95 th percentile)																
						Toxins		Atrazine		≤ 0.079 milligrams per litre (95 th percentile)																
								Endosulfan		≤ 0.0013 milligrams per litre (95 th percentile)																
						Pathogens	Escherichia coli	≤ 165 counts/100ml (95 th percentile)																		
								D category (42-57%)																		
						Habitat	Geomorphology	GAI score	VEGRAI level 3 should be within a D category (42-57%).	D category (42-57%)																
							Riparian vegetation	VEGRAI score		D category (42-57%)																
								Marginal zone cover abundance		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 > 50%																	
								FRAI score	D category (42-57%)																	
						Invertebrates	MIRAI score	MIRAI score to be within D category (42-57%).		D category (42-57%)																
										D category (42-57%)																

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
A1 Upper Breede Tributaries	H10J	A1-R02	Molenaars River	nvii2	B	Quantity		Invertebrate diversity	category (42-57%)	SASS score > 70, ASPT > 5.0
								Number of families		> 15 families at abundances A - C
							Low flows High flows	Maintenance low flows	Flows shall be sufficient to maintain the Molenaars River in a condition equal to or better than a B category.	Months
								Maintenance high flows		Sep 3.434 Aug 3.434 Jul 4.149 8.005 Jun 3.588 1.797 May 2.479 1.797 Apr 1.356 0.454 Mar 0.909 Feb 0.869 0.454 Jan 1.022 Dec 1.584 Nov 2.506 0.454 Oct 3.381 3.434 High Low Maintenance flows (million cubic metres)
						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 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)
						Biota	System variables	Dissolved oxygen	Toxicity levels must not pose a threat to aquatic ecosystems.	≥ 8 milligrams per litre (5 th percentile)
								Ammonia		≤ 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 should be within B category (42-57%).	B category (82-87%)
						Habitat	Riparian vegetation	VEGRAI score	VEGRAI level 3 should be within a B category (82-87%)	B category (82-87%)
								Marginal zone cover abundance	No exotic species, no terrestrial woody species	No exotic species, no terrestrial woody species
								Lower zone cover abundance		
							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	H20G	A2-R03	Hex River	nvii7	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	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
										Maintenance flows (million cubic metres)	2.998	0.387	0.395	1.888	1.18	1.066	0.943	1.142	1.652	2.26	3.067	3.333
										Low	2.649	0.387	0.395	1.888	1.18	1.066	0.943	1.142	1.652	2.26	3.067	3.333
						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)												
										Salt concentrations need to be maintained at levels that do not adversely affect aquatic ecosystems												
						Salts	Electrical conductivity (EC)	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	≤ 55 milliSiemens/metre (95 th percentile)												
										6.5 ≥ pH ≤ 8.5 (5 th and 95 th percentiles)												
										≥ 8 milligrams per litre (5 th percentile)												
						System variables	Dissolved oxygen	Ammonia	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)												
						Toxins	Atrazine	Endosulfan	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95 th percentile)												
										C/D category (57-62%)												
										D category (42-57%)												
						Pathogens	Escherichia coli	VEGRAI score	No exotic species, no terrestrial woody species	No exotic species, no terrestrial woody species												
										No exotic species, no terrestrial woody species												
										No exotic species, no terrestrial woody species												
						Geomorphology	GAI score	Marginal zone cover abundance	FRAI should be within a D category (42-57%).	D category (42-57%)												
										D category (42-57%)												
										D category (42-57%)												
						Habitat	Lower zone cover abundance	FRAI score	MIRAI score to be within C category (62-77%).	C category (62-77%)												
										C category (62-77%)												
										SASS score > 100, ASPT > 6.3												
						Biota	Fish	Invertebrate diversity	SASS score > 100, ASPT > 6.3	SASS score > 100, ASPT > 6.3												
										SASS score > 100, ASPT > 6.3												
										SASS score > 100, ASPT > 6.3												

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	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	Low High
								Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	Oct	14.575
								Total inorganic nitrogen (TIN)		Nov	8.743
						Quality	Nutrients	Electrical conductivity (EC)	Salt concentrations need to be maintained at levels that do not adversely affect aquatic ecosystems	Dec	3.449
								pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	Jan	4.796
								Dissolved oxygen		Feb	1.461
								Ammonia	Toxicity levels must not pose a threat to aquatic ecosystems.	Mar	3.181
								Atrazine		Apr	4.262
								Endosulfan	Concentrations of waterborne pathogens should be maintained in an acceptable category for full contact recreation.	May	11.161
						Pathogens	Escherichia coli			Jun	22.326
										Jul	36.912
										Aug	33.451
						Geomorphology	GAI score		GAI score should be within C category (52-67%).	Sep	26.791
								VEGRAI score	C category (62-77%)		
								Marginal zone cover abundance	C category (62-77%)		
						Habitat	Riparian vegetation	Lower zone cover abundance	VEGRAI level 3 should be within a C category (52-67%).		
								Upper zone cover abundance	No exotic species, no terrestrial woody species		
									No exotic species, no terrestrial woody species		
						Biota	Fish	FRAI score	Exotic species < 5%, terrestrial woody species > 30%		
								MIRAI score	D category (42-57%)		
						Invertebrates			D category (42-57%)		
									D category (42-57%)		

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	
A3 Middle Breede Renosterveld								Invertebrate diversity	category (42-57%).	SASS score < 45, ASPT > 4.3	
							Number of families				
						Quantity	Low flows High flows	Maintenance low flows	Flows shall be sufficient to maintain the Breede River in a condition equal to or better than a D category.	Months	
					Maintenance high flows			High			
							Low				
							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)			
						D	Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at present state levels.	95%tile ≤ 220 milliSiemens/metre EC	
								pH range			6.5 ≥ pH ≤ 8.5 (5 th and 95 th percentiles)
							Quality	System variables	Dissolved oxygen	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	≥ 6 milligrams litre (5 th percentile)
									Water temperature		
								Toxins	n/a	Toxicity levels must not pose a threat to aquatic ecosystems.	n/a
						Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	95%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	nv110	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	0.122	0.658	0.425	0.362	0.376	0	0.564	1.032	1.794	2.585	3.218	0.54	1.081	
								Low	1.041	0.122	0.658		0.425	0.362	0.376	0	0.564	1.032	1.794	2.585	3.218	0.54	1.081							
								≤ 0.025 milligrams per litre (50 th percentile)												≤ 0.70 milligrams per litre (50 th percentile)										
							Nutrients	Phosphate (PO ₄ -P) Total inorganic nitrogen (TIN)	Nutrient levels must be maintained in the river in an oligotrophic condition	Months	≤ 30 milliSiemens/metre (95 th percentile)																			
								Electrical conductivity (EC)			Salt concentrations must be maintained in an Ideal category	6.5 ≥ pH ≤ 8.5 (5 th and 95 th percentiles)																		
							System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	Months	≥ 8 milligrams per litre (5 th percentile)																			
								Dissolved oxygen	Toxicity levels must not pose a threat to aquatic ecosystems.		≤ 0.079 milligrams per litre (95 th percentile)																			
							Toxins	Atrazine Endosulfan	Concentrations of waterborne pathogens should be maintained in an Ideal category for full contact recreation.	Months	≤ 0.0013 milligrams per litre (95 th percentile)																			
								Pathogens			Escherichia coli	≤ 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	0.426	0.799	0.437	0.593	0.451	0	2.32	3.019	2.983	7.927	19.787	13.51	7.927	
								Low	10.539	0.65	6.134		0.426	0.799	0.437	0.593	0.451	0	2.32	3.019	2.983	7.927	19.787	13.51	7.927					
								≤ 0.075 milligrams/litre (50 th percentile)												≤ 1.75 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.	Months	≤ 55 milliSiemens/metre (95 th percentile)																			
								Electrical conductivity (EC)			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)																		
							Salts	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	Months	≤ 0.079 milligrams per litre (95 th percentile)																			
								System	Toxicity levels must not pose a threat to aquatic ecosystems.		≤ 0.0013 milligrams per litre (95 th percentile)																			

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	
B4 Riversonderend Theewaters	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	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.079 milligrams per litre (95 th percentile)
									Endosulfan		≤ 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.		
							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)								
Habitat	Geomorphology	GAI score	GAI score should be within B category (82-87%).	B category (82-87%)							
			VEGRAI score	B category (82-87%)							
			Marginal zone cover abundance Lower zone cover abundance	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 Riversoenderend Theewaters	H60F	B4-R09	Riversoenderend River	nv9	D	Quality		Upper zone cover abundance	Exotic species < 5%, terrestrial woody species > 20%	Exotic species < 5%, terrestrial woody species > 20%
								FRAI score	FRAI should be within an A/B category (87-92%).	A/B category (87-92%)
								MIRAI score	MIRAI score to be within A/B category (87-92%).	A/B category (87-92%)
								Invertebrate diversity		
								Number of families		
								Maintenance low flows	Flows shall be sufficient to maintain the Riviersoenderend River in a condition equal to or better than a D category.	
								Maintenance high flows		
								Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	
								Total inorganic nitrogen (TIN)		
								Electrical conductivity (EC)	Salt concentrations need to be maintained at levels that do not adversely affect aquatic ecosystems	
								pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	
								Dissolved oxygen		
								Atrazine	Toxicity levels must not pose a threat to aquatic ecosystems.	
								Endosulfan		
								Pathogens	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	
						Habitat	Riparian vegetation	Geomorphology	GAI score should be within D category (42-57%).	D category (42-57%)
								VEGRAI score	VEGRAI level 3 should be within a D category (42-57%).	D category (42-57%)
								Marginal zone cover abundance	No exotic species, no terrestrial woody species	No exotic species, no terrestrial woody species
								Lower zone cover abundance	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
								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 Invertebrate diversity Number of families	MIRAI score to be within C/D category (57-62%).	C/D category (57-62%) SASS score > 40, ASPT score > 4.3 > 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
										Low
										High
										Maintenance flows (million cubic metres)
										Oct
						Quality	Nutrients	Phosphate (PO ₄ -P) Total inorganic nitrogen (TIN)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	Nov
										Dec
										Jan
										Feb
										Mar
						Quality	Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at levels that do not adversely affect aquatic ecosystems	Apr
										May
										Jun
										Jul
										Aug
						Quality	System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	Sep
										14.076
										14.173
										13.054
										9.023
						Quality	Toxins	Dissolved oxygen	Toxicity levels must not pose a threat to aquatic ecosystems.	3.899
										4.024
										3.032
										0.709
										0.775
						Quality	Pathogens	Atrazine Endosulfan Escherichia coli	Acceptable category for full contact recreation.	1.044
										0.571
										1.231
										3.609
										0.849
						Quality	Pathogens	Escherichia coli	Acceptable category for full contact recreation.	4.699
										0
										≤ 0.075 milligrams/litre (50 th percentile)
										≤ 1.75 milligrams/litre (50 th percentile)
										95 th %tile ≤ 85 milliSiemens/metre EC
						Quality	Pathogens	Escherichia coli	Acceptable category for full contact recreation.	95 th %tile ≤ 8.5 (5 th and 95 th percentiles)
										≥ 6 milligrams litre (5 th percentile)
										≤ 0.079 milligrams per litre (95 th percentile)
										≤ 0.0013 milligrams per litre (95 th percentile)
										≤ 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																				
B5 Overberg West	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	1.67	7.642	0.38	2.919	1.374	0	0	0	0.898	1.512	3.519	6.722	9.654	1.88	3.759	8.932			
								High		Low	5.516	0	0	0	0	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.	Total inorganic nitrogen (TIN)	≤ 0.075 milligrams/litre (50 th percentile)												≤ 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)								
						Salts	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)												≥ 6 milligrams litre (5 th percentile)								
										≤ 0.079 milligrams per litre (95 th percentile)												≤ 0.0013 milligrams per litre (95 th percentile)								
						System variables	Toxins	Endosulfan	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.1 milligrams per litre (95 th percentile)												≤ 0.15 milligrams per litre (95 th percentile)								
								Iron (Mn)																						
						Pathogens	Escherichia coli	Manganese (Mn)	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.												≤ 165 counts/100ml (95 th percentile)									
								GAI score should be within B category (82-87%).												B category (82-87%)										
						Habitat	Geomorphology	VEGRAI score	VEGRAI level 3 should be within a B/C category (77-82%).	B/C category (77-82%)												B category (77-82%)								
							Fish	FRAI score		E category (22-37%)												B/C category (77-82%)								
						Biota	Invertebrates	MIRAI score	MIRAI score to be within B/C category (77-82%).	B/C category (77-82%)												SASS score > 110, ASPT > 6.5								
								Invertebrate diversity		Five families, Corydalidae, Elmidae, Hydropsychidae, Cordulidae, Chlorocyphidae																				
														Number of families																

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 Maintenance high flows	Flows shall be sufficient to maintain the Palmiet 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
											flows (million cubic metres)	10.02	0.049	2.463	1.907	0.954	0.954	0.954	1.118	0.954	1.488	0.954	2.142	8.623
								Nutrients	Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at a mesotrophic or better 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 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.	5.0 ≥ pH ≤ 7.5 (5 th and 95 th percentiles)													
							System variables	Dissolved oxygen	Toxicity levels must not pose a threat to aquatic ecosystems.		≥ 8 milligrams per 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)														
								Escherichia coli		≤ 130 counts/100ml (95 th percentile)														
							Pathogens	Geomorphology	GAI score	GAI score should be within a B category (82-87%).	B category (82-87%)													
									VEGRAI score		B category (82-87%)													
							Biota	Fish	FRAI score	FRAI should be within a D category (42-57%).	A category (92-100%)													
									MIRAI score		B category (82-87%)													
								Invertebrate diversity	SASS score > 110, ASPT > 7.0															
									Invertebrates	Number of families	9 families, Ephemerellidae, Leptophlebiidae, Heptageniidae, Tricorythidae, Elmidae, Corydalidae, Trichoptera cased caddis 2 or > types, Psvaustidae, Athericidae													

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 Renosterfeld	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)		0.465	0.398	0.179	0.199	0.091	0.065	0.064	0.126	0.196	0.293	0.413	0.502	2.013
							Nutrients	Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	Low	≤ 0.075 milligrams/litre (50 th percentile)											
								Total inorganic nitrogen (TIN)		High	≤ 1.75 milligrams/litre (50 th percentile)											
						Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at present day levels.	≤ 180 milliSiemens/metre (95 th percentile)													
							pH range		6.5 ≥ pH ≤ 8.5 (5 th and 95 th percentiles)													
						Quality	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	Pathogens	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		≤ 165 counts/100ml (95 th percentile)												
						Habitat	Geomorphology	GAI score	GAI score should be within C category (62-77%).	C category (62-77%)												
								VEGRAI score		D category (42-57%)												
						Biota	Fish	FRAI score	FRAI should be within a E category (22-37%).	E category (22-37%)												
								MIRAI score		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	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	0.03	0.022	0.022	0.02	0.03	0.035	0.129	0.232	0.108	0.393	0.108	
							Nutrients	Phosphate (PO ₄ -P) Total inorganic nitrogen (TIN)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	Low	0.055	0.046	0.03	0.022	0.02	0.03	0.035	0.129	0.232	0.108	0.393	0.108		
										Maintenance flows (million cubic metres)	0.055	0.046	0.03	0.022	0.022	0.02	0.03	0.035	0.129	0.232	0.108	0.393	0.108	
						Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at present day levels.	≤ 170 milliSiemens/metre (95 th percentile)															
									6.5 ≥ pH ≤ 8.5 (5 th and 95 th percentiles)															
						System variables	pH range Dissolved oxygen	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	≥ 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%)														
						Biota	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%)																				
	Invertebrates	MIRAI score	MIRAI score to be within D category (42-57%).	D category (42-57%)																				
H17 Overberg East Fynbos	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	0.157	0.168	0.121	0.109	0.119	0.191	0.204	0.268	0.349	0.255	0.304	0.651	0.17
							Nutrients	Phosphate (PO ₄ -P) Total inorganic nitrogen (TIN)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	Low	0.322	0.157	0.168	0.121	0.109	0.119	0.191	0.204	0.268	0.349	0.255	0.304	0.651	0.17
										Maintenance flows (million cubic metres)	0.322	0.157	0.168	0.121	0.109	0.119	0.191	0.204	0.268	0.349	0.255	0.304	0.651	0.17
									≤ 0.075 milligrams/litre (50 th percentile)															
									≤ 1.75 milligrams/litre (50 th percentile)															
											≤ 170 milliSiemens/metre (95 th percentile)													
											6.5 ≥ pH ≤ 8.5 (5 th and 95 th percentiles)													
											≥ 6 milligrams litre (5 th percentile)													
											≤ 165 counts/100ml (95 th percentile)													
											D category (42-57%)													
					E category (22-37%)																			
					E category (22-37%)																			
					D category (42-57%)																			

IUA Class	Quaternary Catchment	RU	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 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)
						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	Flows shall be sufficient to maintain the Breede River in a condition equal to or better than a B/C category.	Months	High	0	Oct	42.827	28.026	5.055	Nov	0	Dec	9.569	7.407	0	Jan	8.604	0	Feb	3.827	0	Mar	10.237	5.055	Apr	13.818	58.796	May	31.627	11.469	Jun	44.934	56.997	Jul	64.391	26.206	Aug	55.658	0	Sep
								Maintenance flows (million cubic metres)			Low																																				
								≤ 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)																																				
								pH range																																							
								pH temperature and 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
							variables	Dissolved oxygen	dissolved oxygen are important for the maintenance of ecosystem health.	≥ 6 milligrams/litre (5 th percentile)
								Water temperature	No more than 2°C change in natural monthly range (minimum and maximum)	
							Toxins	Ammonia	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.073 milligrams per litre (95 th percentile)
								Atrazine		≤ 0.079 milligrams per litre (95 th percentile)
								Endosulfan		≤ 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	GAI score should be within B category (82-87%).	B category (82-87%)
								VEGRAI score		C category (62-77%)
							Riparian vegetation	Marginal zone cover abundance	VEGRAI level 3 should be within a C category (62-77%).	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 > 30%
							Fish	FRAI score	FRAI should be within a C category (62-77%).	C category (62-77%)
							Invertebrates	MIRAI score	MIRAI score to be within D category (42-57%).	D category (42-57%)
								Invertebrate diversity		SASS score > 40, ASPT score > 4.3
								Number of families		> 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	J12L	E8-R18	Doring River	gviii1	C/D	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).	Months	High	Low	0.017	0.031	Oct	0	0.021	0.019	0.012	0.031	Jan	0	0.009	0	Feb	0	0.015	0.016	0.079	Apr	0	0.017	0.013	0	Jun	0.01	0	Jul	0.012	0	Aug	0.012	0	Sep	0.012
												Maintenance flows (million cubic metres)																																	
												Nutrient levels must be maintained in the river at a																																	
												Phosphate (PO ₄ -P)																																	
												Total inorganic nitrogen (TIN)																																	
												Nutrients																																	
												Quality																																	
												mesotrophic or better condition																																	
												≤ 1.75 milligrams/litre (50 th percentile)																																	
												≤ 0.075 milligrams/litre (50 th percentile)																																	

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																																				
E8 Tows	J12L	E8-R19	Tows River	gv5	B/C	Quantity	Low flows High flows	Maintenance low flows	Flows shall be sufficient to maintain the Tows River an ecological condition that is equal to or better than the ecological condition in summer 2014 (Category C).	Maintenance flows (million cubic metres)	0.125	0.183	Oct	0.164	0.354	Nov	0.139	0.274	Dec	0.124	0.246	Jan	0.119	0.407	Feb	0.108	0.204	Mar	0.163	1.37	Apr	0.178	0.446	May	0.235	0	Jun	0.201	0	Jul	0.195	0.433	Aug	0.129	0.175	Sep
								Maintenance		Low	High	Months																																		
								≤ 0.075 milligrams/litre (50 th percentile)																																						
								≤ 1.75 milligrams/litre (50 th percentile)																																						
						Quality	Nutrients	Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 1500 milliSiemens/metre (95 th percentile)																																				
								Total inorganic nitrogen (TIN)		≤ 1500 milliSiemens/metre (95 th percentile)																																				
						Salts	Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at present day levels.	≤ 1500 milliSiemens/metre (95 th percentile)																																				
								pH range		6.5 ≥ pH ≤ 8.5 (5 th and 95 th percentiles)																																				
						Habitat	Riparian vegetation	System variables	Dissolved oxygen	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	≥ 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)																																
														Geomorphology	GAI score	GAI score should equate to a C/D.	C/D category (57-62%)																													
																	C/D category (57-62%)																													
								Marginal zone cover abundance	Lower zone cover abundance	Upper zone cover abundance	VEGRAI level 4 of at ~58% for the riparian zone.	No exotic species, no terrestrial woody species																																		
												Exotic species < 5%, terrestrial woody species < 10%																																		
Exotic species < 10%, terrestrial woody species < 15%																																														
Fish	FRAI score	FRAI shall yield a C/D (58.3%).	C/D category (57-62%)																																											
			Biota	MIRAI score	Invertebrate diversity			Number of families	D category (42-57%)																																					
									SASS score > 90, ASPT score > 4.5																																					
> 15 families at abundances A - C																																														

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
E8 Towns	J11H	E8-R20	Buffels River	gv4	C	Quantity	variables	Dissolved oxygen	dissolved oxygen are important for the maintenance of ecosystem health.	≥ 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)
							Geomorphology	GAI score	GAI score should equate to a B	B category (82-87%)
								VEGRAI score	B/C category (77-82%)	B/C category (77-82%)
						Habitat	Riparian vegetation	Marginal zone cover abundance	No exotic species, no terrestrial woody species	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%
							Fish	Upper zone cover abundance	Exotic species < 5%, terrestrial woody species < 5%	Exotic species < 5%, terrestrial woody species < 5%
								FRAI score	FRAI shall yield a C/D (59%).	C/D category (57-62%)
						Biota	Invertebrates	MIRAI score	MIRAI score to be within B/C (78 - 82%) Category	B/C category (77-82%)
								Invertebrate diversity		
							Number of families			
						Quality	Low flows High flows	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).	Months Sep 0 Aug 0 Jul 0 Jun 0 May 0 Apr 0 Mar 0 Feb 0 Jan 0 Dec 0 Nov 0 Oct 0 High Low
								Maintenance high flows		0.073 0.105 0.11 0.111 0.113 0.097 0.083 0.057 1.588 0.07 0.078 1.588 0.075 0.068 0.517
							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)
						Quality	Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at present day levels.	≤ 320 milliSiemens/metre (95 th percentile)
								pH range	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)
							System variables	Dissolved oxygen		≥ 6 milligrams litre (5 th percentile)

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																
E8 Towns	J11J	E8-R21	Groot River	gv6	D	Quantity	Low flows High flows	Maintenance 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 High	0.018															
								Maintenance high flows		Maintenance Low	0.027															
										Maintenance cubic metres)	0.018															
						Quality	Nutrients	Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	High	0.018															
								Total inorganic nitrogen (TIN)		Low	0.024															
								Electrical conductivity (EC)			0.015															
						Quality	Salts	pH range	Salt concentrations need to be maintained at present day levels.	High	0.018															
								Dissolved oxygen		Low	0.024															
											0.015															
						Toxins		Atrazine	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	High	0.018															
								Endosulfan		Low	0.024															
											0.015															

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	gli3	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	High	0.603	Oct	0.583	0.746	1.092	Nov	0.752	1.123	Dec	0.732	1.121	Jan	0.637	1.178	Feb	0.593	0.589	Mar	0.852	3.765	Apr	0.803	1.208	May	0.903	0	Jun	0.791	0	Jul	0.808	1.118	Aug	0.532	Sep	0.587
											Low	Maintenance flows (million cubic metres)																																			
						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)																																					
						Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at present day levels.	≤ 620 milliSiemens/metre (95 th percentile)																																						
						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)																																				

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	Maintenance flows (million cubic metres)	Oct	0.342	0.192	0.232	0.94	Nov	0.262	2.707	Dec	0.232	0.94					
								High			Jan	0.241	0.94	Feb	0.487	2.707	Mar	0.382	0.94	Apr	0.22	0.16	0.162	0	0.157	0	0.342
							Nutrients	Phosphate (PO ₄ -P)		Nutrient levels must be maintained in the river at a mesotrophic or better condition.	Low	High	≤ 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. pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	pH	≤ 90 milliSiemens/metre (95 th percentile)																	
							Dissolved oxygen			6.5 ≥ pH ≤ 8.5 (5 th and 95 th percentiles)																	
						System variables	Quality	Dissolved oxygen	pH	≥ 6 milligrams litre (5 th percentile)																	
										Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation																	
						Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation	pH	≤ 165 counts/100ml (95 th percentile)																	
										≤ 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-Olifants	J31C	D7-R24	Olifants River	giii2	C	Quantity	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	Invertebrates	MIRAI score	MIRAI score to be within B/C (78 - 82%) Category	B/C category (77-82%)
								Invertebrate diversity		SASS score > 100, ASPT > 5.5
								Number of families		> 15 families, 5 with SASS score > 5, abundance A - C
						Quality	Low flows High flows	Maintenance low 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).	Months
								Maintenance high flows		Low flows (million cubic metres)
							Nutrients	Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	0.035
								Total inorganic nitrogen (TIN)		0.046
							Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at present day levels.	0.037
								pH range		0.036
					C	Quality	System variables	Dissolved oxygen	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	0.053
								Escherichia coli		0.068
							Pathogens		Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	0.109
										0.127
						Habitat	Geomorphology	GAI score	GAI score should equate to a C/D	0.057
								VEGRAI score		0.055
						Riparian vegetation		Marginal zone cover abundance	VEGRAI level 4 of at ~70% for the riparian zone.	0.035
								Lower zone cover abundance		0.046
										0.079
										0.107
										0.137
										0.13
										0.057
										0.035
										0.046
										0.079

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
D7 Gouritz-Olifants	J34C	D7-R25	Kammanassie River	gv36	C/D	Quality	Pathogens	Upper zone cover abundance	No exotic species, no terrestrial woody species	No exotic species, no terrestrial woody species
								MIRAI score	MIRAI score should equate to a C	C category (62-77%)
								Maintenance low flows Maintenance high 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 High Low flows (million cubic metres) Oct 0.218 Nov 0.218 Dec 0.327 Jan 0.252 Feb 0.179 Mar 0.182 Apr 0.182 May 0.215 Jun 0.239 Jul 0.311 Aug 0.381 Sep 0.353
								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)
								Electrical conductivity (EC)	Salt concentrations need to be maintained in a D class for aquatic ecosystems.	≤ 1.75 milligrams/litre (50 th percentile)
								pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	≤ 85 milliSiemens/metre (95 th percentile)
								Dissolved oxygen		6.5 ≥ pH ≤ 8.5 (5 th and 95 th percentiles)
								Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≥ 6 milligrams litre (5 th percentile)
								VEGRAI score		≤ 165 counts/100ml (95 th percentile)
								Marginal zone cover abundance	C/D category (57-62%)	
	Biota	Fish				Habitat	Riparian vegetation	Lower zone cover abundance	No exotic species, no terrestrial woody species	No exotic species, no terrestrial woody species
								Upper zone cover abundance	Exotic species < 5%, terrestrial woody species < 5%	Exotic species < 5%, terrestrial woody species < 5%
								Upper zone cover abundance	Exotic species < 10%, terrestrial woody species < 20%	Exotic species < 10%, terrestrial woody species < 20%
								FRAI score	FRAI shall yield a D (46.9%).	D category (42-57%)
								MIRAI score	C/D category (57-62%)	C/D category (57-62%)
	Biota	Invertebrates						Invertebrate diversity	MIRAI score to be within C/D (58-62%) Category	SASS score > 90, ASPT > 4.5
								Number of families		> 17 families, 2 or more baetids, abundance A - C

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	Maintenance low 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).	Maintenance flows (million cubic metres)	High	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep		
							High flows	Maintenance high flows			Low														
						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)																		
							Electrical conductivity (EC)																		
							pH range																		
					Quality	System variables	Dissolved oxygen	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	Salt concentrations need to be maintained at present day levels.	≤ 600 milliSiemens/metre (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	Riparian vegetation	GAI score	GAI score should equate to a B	B category (82-87%)															
								VEGRAI score																	
								Marginal zone cover abundance																	
								Lower zone cover abundance																	
					Biota	Fish	Invertebrates	Upper zone cover abundance																	
								FRAI score	FRAI shall yield a D (50.1%).																
								MIRAI score	C category (62-77%)																
								Invertebrate diversity	MIRAI score to be within C (60-79%) Category																
								Number of families	> 19 families, 7 with SASS score > 7, abundance A - C																

[illegible]

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	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		
								Maintenance flows (million cubic metres)		Low	High	0.794	1.734	0.764	1.734	0.171	0	1.025	0.139	0.381	0.688	0.688	0.653	0.598
						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)												≤ 1.75 milligrams/litre (50 th percentile)		
								Total inorganic nitrogen (TIN)																
								Electrical conductivity (EC)	Salt concentrations need to be maintained an Acceptable category for ecosystem health.	≤ 130 milliSiemens/metre (95 th percentile)														
								pH	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	Dissolved oxygen		≥ 6 milligrams litre (5 th percentile)														
								Atrazine		≤ 0.079 milligrams per litre (95 th percentile)														
								Endosulfan	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.0013 milligrams per litre (95 th percentile)														
										≤ 165 counts/100ml (95 th percentile)														
						Pathogens	Escherichia coli		Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.															
						Habitat	Riparian vegetation	Geomorphology	GAI score	GAI score should equate to a D	D category (42-57%)													
								VEGRAI score		C category (62-77%)														
									Marginal zone cover abundance	VEGRAI level 4 of at least 71% for the riparian zone.	No exotic species, no terrestrial woody species													
									Lower zone cover abundance		Exotic species < 5%, terrestrial woody species < 5%													
									Upper zone cover abundance		Exotic species < 10%, terrestrial woody species < 10%													
					Biota	Fish	Invertebrates	FRAI score	FRAI shall yield a D (50.8%).	D category (42-57%)														
								MIRAI score		D category (42-57%)														
								Invertebrate diversity	MIRAI score to be within the D EC (40 - 59%) Category	SASS score > 90, ASPT score > 5.8														
								Number of families		> 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	gviil2	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.	Maintenance flows (million cubic metres)	High	0	Sep	0	Aug	0	Jul	0	Jun	0	May	0	Apr	0.257	0	Mar	0.533	0.134	0.257	0	Feb	0.147	0.141	0.147	0.199	0	Jan	0.199	0	Dec	0.287	0.147	0.299	0.073	Nov	0.299	0.073	Oct	0.112	1.171	0.112	Low	0.151
								≤ 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 in a B class for aquatic ecosystem health.	≤ 55 milliSiemens/metre (95 th percentile)																																									
						Quality	System variables	pH range	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation in the downstream Wolwedans Dam.	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	Pathogens	Escherichia coli	GAI score	Sediment particle size	GAI score should equate to a B	B category (82-87%)																																									
													D16 = 1mm, D50 = 32mm, D84 = 128 mm																																								
							Riparian vegetation	VEGRAI score	No exotic species, no terrestrial woody species	B category (82-87%)																																											
								Marginal zone cover abundance		Exotic species <5%, terrestrial woody species < 15%																																											
						Biota	Fish	FRAI score	Lower zone cover abundance	Upper zone cover abundance	VEGRAI level 4 of Category B.	Exotic species < 30%, terrestrial woody species > 40%																																									
													FRAI shall yield a B (82-87%).	B category (82-87%)																																							
													Invertebrates	MIRAI score	MIRAI score to be within A (92-100%).	A category (92-100%)																																					
						Invertebrate diversity	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	Maintenance low 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		
							High flows	Maintenance high flows			0.296	1.218	1.044	0.219	0.042	0.219	0.077	0.812	0.123	0.211	0.204	0.169	0.211	0.204
											Maintenance flows (million cubic metres)	Low	0.081	0.042	0.042	0.077	0.085	0.123	0.211	0.204	0.169	0.211	0.204	
						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 in B class for aquatic ecosystems.	≤ 55 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.	≥ 6 milligrams litre (5 th percentile)														
							Toxins	Ammonia		Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.073 milligrams per litre (95 th percentile)													
								Atrazine			≤ 0.079 milligrams per litre (95 th percentile)													
							Pathogens	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			≤ 165 counts/100ml (95 th percentile)													
							Geomorphology	GAI score		GAI score should equate to a B/C	B/C category (77-82%)													
								Sediment particle size			D16 = 2mm, D50 = 4 mm, D84 = 32mm													
							Habitat	VEGRAI score			D category (42-57%)													
								Marginal zone cover abundance		VEGRAI level 4 of Category D	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 > 50%													
						Biota	Fish	FRAI score	FRAI shall yield a C/D (57-62%).	C/D category (57-62%)	C/D category (57-62%)													
								MIRAI score			A category (92-100%)													
							Invertebrates	Invertebrate diversity	MIRAI score to be within A		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	Flows shall be sufficient to maintain the Kaaimans River in an ecological condition that is equal to or better than Category B.	Maintenance flows (million cubic metres)	High	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
								Maintenance high flows			Low	0.592	0.538	0.445	0.371	0.335	0.445	0.538	0.483	0.359	0.371	0.371	0.359
						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)															
								Electrical conductivity (EC)															
						Quality	Salts		Salt concentrations need to be maintained in an Ideal category for aquatic ecosystems.	≤ 30 milliSiemens/metre (95 th percentile)													
								pH range															
								Dissolved oxygen															
						Habitat	Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Ideal category for full contact recreation.	≤ 130 counts/100ml (95 th percentile)													
								GAI score															
								Sediment particle size															
Biota	Invertebrates	Fish	Riparian vegetation	VEGRAI score	VEGRAI level 4 of Category A.	B/C category (77-82%)																	
				Marginal zone cover abundance																			
				Lower zone cover abundance																			
				Upper zone cover abundance																			
				FRAI score																			
G15 Coastal	K30C	G15-R31	Kaaimans River	gvii11	B	Biota	Invertebrates	MIRAI score	FRAI shall yield a B.	B category (82-87%)													
								Invertebrate diversity															
G15 Coastal	K30C	G15-R31	Kaaimans River	gvii11	B	Biota	Invertebrates		MIRAI score to be within A Category.	A category (92-100%)													
G15 Coastal	K30C	G15-R31	Kaaimans River	gvii11	B	Biota	Invertebrates		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 Maintenance high 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	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
								Maintenance flows (million cubic metres)			Low	0.331	0.412	0	0.021	0.173	0.206	0.199	0.201	0.176	0.173	0.213	0.252
						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)													
						Quality	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		5 ≥ pH ≤ 7 (5 th and 95 th percentiles)													
						Quality	System variables	Dissolved oxygen	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≥ 8 milligrams per litre (5 th percentile)													
								Escherichia coli		≤ 165 counts/100ml (95 th percentile)													
						Habitat	Geomorphology	GAI score	GAI score should equate to a B.	B category (82-87%)													
								Sediment particle size		D16 = 10mm, D50 = 100 mm, D84 = 300 mm													
								VEGRAI score		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%													
						Biota	Fish	Upper zone cover abundance	VEGRAI level 4 of Category A/B.	Exotic species < 5%, terrestrial woody species < 5%													
								FRAI score		B category (82-87%)													
								MIRAI score		B category (82-87%)													
						Biota	Invertebrates	Invertebrate diversity	FRAI shall yield a B. MIRAI score to be within B Category (80-90%).	SASS score > 190, ASPT > 7													

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
G15 Coastal	K40C	G15-R33	Karataru River	gvii13	B	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Karataru 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
											High	0.471	0.283	0.169	0.149	0.144	0.283	0.16	0.153	0.129	0.12	0.149
						Quality	Nutrients	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)												
								Electrical conductivity (EC)		≤ 0.70 milligrams per litre (50 th percentile)												
								pH range		Salt concentrations need to be maintained in an Ideal category for aquatic ecosystems.												
						Quality	System variables	Dissolved oxygen		pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.												
								Escherichia coli		Concentrations of waterborne pathogens should be maintained in an Ideal category for full contact recreation.												
						Habitat	Geomorphology		GAI score	GAI score should equate to a A.	≤ 130 counts/100ml (95 th percentile)											
									Sediment particle size		A category (92-100%) 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%											
									FRAI score		B category (82-87%)											
							Invertebrates		MIRAI score		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	gviii9	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	0.645	0.445	0.821	0.445	0.445	0.764	0.445	0.947	0.401	0.387	0.431	0.554	0.536			
								Low			1.124	0.821	0.642	0.562	0.562	0.562	0.562	0.562	0.562	0.562	0.562	0.562	0.562	0.562	0.562	0.562	0.562
							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 in an Acceptable category for aquatic ecosystems.	≤ 55 milliSiemens/metre (95 th percentile)																
									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	Dissolved oxygen	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.		≥ 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 B.	B category (82-87%)																
							Sediment particle size		D16 = 2mm, D50 = 24 mm, D84 = 128 mm																		
							Riparian vegetation	VEGRAI score	VEGRAI level 4 of Category B.	B category (82-87%)																	
								Marginal zone cover abundance		No exotic species, no terrestrial woody species	No exotic species, no terrestrial woody species																
						Biota	Fish	Invertebrates	Lower zone cover abundance	FRAI shall yield a C.	Exotic species < 5%, terrestrial woody species < 15%																
									Upper zone cover abundance		Exotic species < 5%, terrestrial woody species < 5%																
									FRAI score		C category (62-77%)																
									MIRAI score		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					
											High	0.686	0.478	0.837	0	0.437	0.239	0.441	0.239	0.441	0.478	0.476	0.447	0.474	0.579	0.644	
							Quality	Nutrients	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)																
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained in an Ideal category for aquatic ecosystem health.	≤ 0.70 milligrams per litre (50 th percentile)																
									System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	≤ 30 milliSiemens/metre (95 th percentile)															
						Pathogens	Dissolved oxygen	Concentrations of waterborne pathogens should be maintained in an Ideal category for full contact recreation.		4.5 ≥ pH ≤ 7.0 (5 th and 95 th percentiles)																	
								Escherichia coli		≥ 8 milligrams per litre (5 th percentile)																	
						Habitat		Geomorphology	GAI score	GAI score should equate to a A/B.	≤ 130 counts/100ml (95 th percentile)																
							Sediment particle size		A/B category (87-92%) D16 = 30mm, D50 = 120 mm, D84 = 300 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	A/B category (82-87%)																
						Biota		Fish	Invertebrates	Lower zone cover abundance	FRAI shall yield a B.	Exotic species < 20%, terrestrial woody species < 5%															
										Upper zone cover abundance		Exotic species < 40%, terrestrial woody species < 5%															
										FRAI score		B category (82-87%)															
										MIRAI score		B category (82-87%)															
																SASS score > 150, ASPT > 6.7											

UA 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	gviii11	A/B	Quantity	Low flows High flows	Maintenance low flows Maintenance high 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	Oct	1.197	1.328	1.019	0.778	0.692	0.76	0.684	0.781	0.342	0.898	0.875	0.964	1.202	0.067
								High			1.44	1.328	1.019	0.778	0.692	0.76	0.684	0.781	0.342	0.898	0.875	0.964	1.202	0.067	
							Nutrients	Phosphate (PO ₄ -P)	Nutrient levels must be maintained in the river at an oligotrophic condition.	Maintenance flows (million cubic metres)	Low	≤ 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.	Maintenance flows (million cubic metres)	High	≤ 30 milliSiemens/metre (95 th percentile)													
											Low	4.0 ≥ pH ≤ 7.0 (5 th and 95 th percentiles)													
						Quality	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	Maintenance flows (million cubic metres)	High	≥ 8 milligrams per litre (5 th percentile)														
										Low	≤ 130 counts/100ml (95 th percentile)														
						Habitat	Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Ideal category for full contact recreation.	Maintenance flows (million cubic metres)	High	A/B category (87-92%)													
											Low	D16 = 10mm, D50 = 50 mm, D84 = 200 mm													
											High	A/B category (87-92%)													
											Low	No exotic species. no terrestrial woody species													
High	Exotic species < 10%, terrestrial woody species < 5%																								
Low	Exotic species < 10%, terrestrial woody species < 5%																								
Biota	Fish	FRAI score	FRAI shall yield a B.	Maintenance flows (million cubic metres)	High	B category (82-87%)																			
					Low	B category (82-87%)																			
Biota	Invertebrates	MIRAI score	MIRAI score to be within B	Maintenance flows (million cubic metres)	High	SASS score > 120, ASPT > 7.5																			
					Low																				

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	g1v6	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	1.448	0.758	0.788	0.508	0.627	0.669	0.758	0.833	0.875	1.123
							Nutrients	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	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.	5.5 ≥ pH ≤ 8.0 (5 th and 95 th percentiles)									
							Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Ideal category for full contact recreation.		≥ 8 milligrams per litre (5 th percentile)											
										Geomorphology	GAI score	GAI score should equate to a B.	≤ 130 counts/100ml (95 th percentile)									
						Habitat	Riparian vegetation	VEGRAI score	VEGRAI level 4 of at ~58% for the riparian zone.				B category (82-87%)									
										Lower zone cover abundance	B/C category (77-82%)											
											Upper zone cover abundance	No exotic species, no terrestrial woody species										
										Biota		Fish	FRAI score	FRAI shall yield a B	Exotic species < 5%, terrestrial woody species < 15%							
						Invertebrates	MIRAI score	Exotic species < 30%, terrestrial woody species < 20%														
Number of families	B category (82-87%)																					
	SASS score > 180, ASPT > 6.5																					
> 15 families, 2 with SASS scores > 12, abundance A - C																						

IUA Class	Quaternary Catchment	RU	Resource 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 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	Oct	69.5	Nov	28.7	Dec	11.2	Jan	8.9	Feb	13.4	Mar	35.3	Apr	64.3	May	87.8	Jun	91.2	Jul	91.7	Aug	89.8	Sep	81.9	Annual
								DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	<100µg/l																										
						Quality	Nutrients	DIP	System variables not to exceed TPCs for biota	<10 µg/l																										
								Dissolved oxygen	System variables not to exceed TPCs for biota	>6 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)																										
								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)																										
						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 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	<20 µg l-1																									
											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																							

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UA Class	Quaternary Catchment	Resource Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric														
H16 Overberg West Coastal	G40G	Bot Estuary	nx16	C	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 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%.													
						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
					88.2		75.7			63.9	58.2	60.3	63.7	75.5	80.9	83.8	85.8	87.7	85.0	81.8		
					Nutrients	Quality	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	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)													
									DIP	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)												

IUA Class	Quaternary Catchment	RU	Resource 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	RU	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	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 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%
						Fish	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/incr ease of alien species	Fish community composition, abundance and richness	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.
						Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	
						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) Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Annual 51.8
						Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	Entire estuary and river inflow: DIN <300µg/l
						Quality	DIP		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

IUA Class	Quaternary Catchment	RU	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
							Turbidity		Turbidity <5 NTU
						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	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	RU Name	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	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	nx17	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	83.1	85.5	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																											
										Nutrients	DIN	Entire estuary and river inflow: DIP <25 µg/l																										
											DIP	Entire estuary and river inflow: DIP <25 µg/l																										
					Quality	Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Salinity	5 < Salinity <40	Entire estuary and river inflow: DO >5mg/l, turbidity < 5 NTU																											
											Turbidity <5 NTU																											
											≤185 Enterococci/100 ml) (90 th percentile)																											

IUA Class	Quaternary Catchment	RU	Resource 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)
								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 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
								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
								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 Catchment	RU	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	Ulirkraal Estuary	nxi5	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	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	Annual																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
										MMR/MAR (% Nat)	Nov	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	
H17 Overberg East Fynbos	G50A	H17-E08	Ratel Estuary	nxi3	C	Quantity	Flow	MMR/MAR (% Nat)	Maintain at least present-day base flows	Months MMR/MAR (% Nat) Entire estuary and river inflow: DIN <300µg/l	
							Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae		
								DIP			
								Salinity	Salinity		Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae
						Quality	System variables	Dissolved oxygen	System variables not to exceed TPCs for biota	Entire estuary and river inflow: DO > 6 mg/l	
							Pathogens	Turbidity	Turbidity	Turbidity < 5 NTU	
								Enterococci	Concentrations of	≤185 Enterococci/100 ml) (90 th percentile)	

IUA Class	Quaternary Catchment	RU	Resource 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)
						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
						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 the distribution of different phytoplankton groups and low biomass (< 20 µg l ⁻¹)
									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
									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%.

UA Class	Quaternary Catchment	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																		
H17 Overberg East Fynbos	G50F	Heunings 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					
									Annual	Sep	Aug	Jul	Jun	May	Apr	Mar	Feb	Jan	Dec	Nov	Oct						
						Nutrients	DIN	DIP	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	MMR/MAR (% Nat)	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	Entire estuary and river inflow: DIN <300µg/l														
													Entire estuary and river inflow: DIP <25 µg/l														
					Quality	Salinity	Dissolved oxygen	pH	System variables	Enterococci	Escherichia coli	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	System variables not to exceed TPCs for biota	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													
						Habitat	Hydrodynamics	Mouth state	Sediment characteristics, Channel shape/size	Biomass and community composition of phytoplankton and benthic microalgae	Pathogens	Enterococci	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 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		Microalgae	Sediments	Channel shape/size	Biomass and community composition of phytoplankton and benthic microalgae	Pathogens	Escherichia coli	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	System variables not to exceed TPCs for biota	Phytoplankton biomass, measured as water column chlorophyll-a should not exceed 10 µg l ⁻¹ in both the estuary and Soetendalsvlei (Zone D); maintain diversity of phytoplankton groups i.e. diatoms abundant during marine phase.												

IUA Class	Quaternary Catchment	RU	Resource 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	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	Klipdrifstrontein 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	Months MMR/MAR (% Nat) Annual
							Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	Entire estuary and river inflow: DIN <300µg/l
								DIP		
							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	
								Turbidity	Turbidity	System variables not to exceed TPCs for biota
							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	Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary	≤500 E. coli/100 ml (90 th percentile)
							Hydrodynamics	Mouth state	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	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	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%.

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 U	Resource Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																										
F11 Lower Breede Renosterveld	H7OK	F11-E11	Breede Estuary	nx12	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
									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																										
									Salinity	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 U	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
					Habitat		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 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				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	Resource Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																
F13 Lower Gouritz	J40E	Gouritz 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		
					Quality	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															
									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														
						Quality	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, salinity <40 in saltmarsh sediments													
					System variables				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)											
					Habitat	Hydrodynamics	Mouth state	Tidal variation		Maintain connectivity with marine environment	Estuary mouth permanently open													
									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														

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
						Biota	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	RU	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 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 Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric														
F12 Duiwenhoks	H80E	Duiwenhoks Estuary	gxi2	Quantity	Flow	MMR/MAR (% Nat)	Maintain flow regime as per TEC	Months	92.2	92.0	87.7	84.0	84.7	90.7	92.9	93.5	93.8	94.4	93.5	91.9		
								MMR/MAR (% Nat)														
				Quality	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	RU Name	Resource 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 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
							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	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.

IUA Class	Quaternary Catchment	RU	Resource 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

Table 24: Resource Quality Objectives for ESTUARIES in priority Resource Units in the Integrated Unit of Analysis I18 Hessequa

IUA Class	Quaternary Catchment	R U	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
I18 Hessequa	H90E	I18-E14	Goukou Estuary	C	C	Quantity	Flow	MMR/MAR (% Nat)	Maintain flow regime as per recommended ecological flow Ensure the persistence of freshwater seepage sites in the lower and middle reaches of the estuary. River inflow should not drop Maintain water levels in fountains (determine trough baseline study)	Months	Oct	81.7																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									

IUA Class	Quaternary Catchment	R U	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 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 <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 ; site specific chlorophyll <i>a</i> concentration not to exceed 20 µg/l and cell density not to exceed 10000 cells/l.
						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
					Biota	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 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 estuarine associated species (5-15%), IId 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	Resource Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																										
G14 Groot-Brak	K10F	Klein-Brak Estuary	gxi4	Quantity	Flow	MMR/MAR (% Nat)	Maintain a flow regime to create the required habitat for birds, fish, macrophytes, microalgae and water quality	Months	77.4	Oct	77.4	Nov	77.4	Dec	75.1	Jan	71.7	Feb	70.2	Mar	75.8	Apr	77.9	May	78.5	Jun	78.0	Jul	78.1	Aug	79.5	Sep	77.0	Annual
								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																										
				Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae																											

IUA Class	Quaternary Catchment	RU	Resource 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	exceed TPCs for biota	TSS <5 mg/ l (low flow)
							pH		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) (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	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	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 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 (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	RU	Resource Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																		
G14 Groot-Brak	K20A	G14-E16	Groot-Brak Estuary	gxi5	E	Quantity	Flow	MMR/MAR (% Nat)	Maintain a flow regime to create the required habitat for birds, fish, macrophytes, microalgae and water quality.	Months	Oct	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			
										Annual	Sep																
							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, 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																
											River inflow: PO4-P not to exceed 20 µg/l over 2 consecutive months; Estuary (except during upwelling or floods): average PO4-P not to exceed 20 µg/l during survey, no single measurement to exceed 50 µg/l																
						Quality	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																
											Entire estuary and river inflow: DO >5 mg/l																
							System variables		Dissolved oxygen pH	System variables not to exceed TPCs for biota	6 < pH > 8.5 in estuary																
											≤185 Enterococci/100 ml) (90 th percentile)																
						Pathogens			Enterococci	Concentrations of 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																
											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 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. 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.
					Biota				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.
						Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	
						Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Density of mudprawns should exceed 100 – 150 burrow counts per m ² in the highest density areas; in the zooplankton, the density of <i>Pseudodiaptomus hessei</i> should exceed levels of about 5000-10000 m ³ 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.

UA Class	Quaternary Catchment	Resource RU Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric														
G14 Groot-Brak	K10A	G14-E17	Blinde Estuary	B	Quality	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 five estuarine association categories in similar proportions (diversity and abundance) to that under the reference. Numerically, assemblage should comprise: Estuarine species (40-60%), Estuarine associated marine species (30-50%), Indigenous freshwater fish (1-5%); Category Ia species should contain viable populations of at least two species (e.g. <i>G. aestuaria</i> , & <i>Hyporamphus capensis</i>); Category IIa obligate dependents should be well represented by at least two large exploited species													
							Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	Retain species richness, abundance and density of bird counts of resident and migrant waders, gulls, terns, wading birds and waterfowl within 15 % of present state (2006).												
							Flow	MMR/MAR (% Nat)	Maintain flow regime as close to present as possible (small system needs most flows)	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
											MMR/MAR (% Nat)	69.6	69.9	67.8	65.6	64.8	68.7	69.3	70.1	69.0	69.9	70.7
														Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	DIN not to exceed 100 µg/l (average)							
														DIP	DIP not to exceed 20 µg/l (average)							
														Salinity	<20 (expected range 5-15)							
														System variables	>5 mg/l							
							Turbidity	Turbidity not to exceed 10 NTU in low flow season														
							Enterococci	≤185 Enterococci/100 ml) (90 th percentile)														
							Pathogens	≤500 E. coli/100 ml (90 th percentile)														
							Habitat	Closed mouth state should not increase by >10% from established baseline														

IUA Class	Quaternary Catchment	RU	Resource Name	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>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

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric													
G14 Groot-Brak	K10A	G14-E18	Tweekuilen Estuary	gxi20	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	72.3 Annual
								MMR/MAR (% Nat)		MMR/MAR (% Nat)	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
						Quality	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	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	Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary	≤500 E. coli/100 ml (90 th percentile)													
					Habitat	Hydrodynamics	Mouth state	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 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												
						Sediment	Sediment	Sediment characteristics, Channel shape/size	Biomass and community composition of phytoplankton and benthic microalgae community	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				Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass														
					Biota	Macrophytes	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																							

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IUA Class	Quaternary Catchment	RU	Resource 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
					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
						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 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	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric											
G14 Groot-Brak	K10B	G14-E20	Hartenbos Estuary	gxi22	D	Quality	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	Months	MMR/MAR (% Nat)	Annual								
									DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	59.7	64.0	68.7	71.1	67.4	60.3	64.2	64.7	65.9	60.8	66.1
							Nutrients	DIP	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Entire estuary and river inflow: DIP <50 µg/l											
								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										
							System variables		Turbidity	System variables not to exceed TPCs for biota	Turbidity <20 NTU in low flow season										
								Secchi depth	Secchi depth should >0.5 m in the fresher part of the estuary												
								Dissolved oxygen	>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 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	Resource 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 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	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

UA 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	82.7	May	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 distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Salinity	Average salinity >10																								
								System variables	Turbidity	System variables not to exceed TPCs for biota	<10 NTU in low flow season																									
									Dissolved oxygen		>5 mg/l																									
									Enterococci		≤185 Enterococci/100 ml) (90 th percentile)																									
						Pathogens	Hydrodynamics	Mouth state	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)																									
											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	Microalgae	Sediment	Sediment characteristics, Channel shape/size	Flood regime is sufficient to maintain natural bathymetry and sediment characteristics	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline																								
												Biomass and community composition of phytoplankton and benthic microalgae community	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																							

UA 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	gx17	Quantity	Flow	MMR/MAR (% Nat)	Maintain flow regime (small system needs most flows)	<table><tr><td>Months</td><td>MMR/MAR (% Nat)</td></tr><tr><td>Annual</td><td>85.0</td></tr><tr><td>Sep</td><td>86.1</td></tr><tr><td>Aug</td><td>86.8</td></tr><tr><td>Jul</td><td>87.8</td></tr><tr><td>Jun</td><td>89.1</td></tr><tr><td>May</td><td>87.0</td></tr><tr><td>Apr</td><td>86.3</td></tr><tr><td>Mar</td><td>84.8</td></tr><tr><td>Feb</td><td>81.6</td></tr><tr><td>Jan</td><td>83.0</td></tr><tr><td>Dec</td><td>82.8</td></tr><tr><td>Nov</td><td>84.3</td></tr><tr><td>Oct</td><td>84.9</td></tr></table>	Months	MMR/MAR (% Nat)	Annual	85.0	Sep	86.1	Aug	86.8	Jul	87.8	Jun	89.1	May	87.0	Apr	86.3	Mar	84.8	Feb	81.6	Jan	83.0	Dec	82.8	Nov	84.3	Oct	84.9
						Months	MMR/MAR (% Nat)																														
						Annual	85.0																														
						Sep	86.1																														
						Aug	86.8																														
					Jul	87.8																															
					Jun	89.1																															
					May	87.0																															
					Apr	86.3																															
					Mar	84.8																															
Feb	81.6																																				
Jan	83.0																																				
Dec	82.8																																				
Nov	84.3																																				
Oct	84.9																																				
Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	Entire estuary and river inflow: DIN <100µg/l																																		
	DIP		Entire estuary and river inflow: DIP <20 µg/l																																		
	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Average salinity >10																																		
System variables	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae																																			
	Turbidity	System variables not to exceed TPCs for biota	<10 NTU in low flow season																																		
									>5 mg/l																												

IUA Class	Quaternary Catchment	RU	Resource Name	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)
							Escherichia coli		≤500 E. coli/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 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>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%
						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%.

UA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																										
G15 Coastal						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)	<table><tr><td>Months</td><td>MMR/MAR (%)</td></tr><tr><td>Oct</td><td>70.9</td></tr><tr><td>Nov</td><td>74.7</td></tr><tr><td>Dec</td><td>70.7</td></tr><tr><td>Jan</td><td>70.4</td></tr><tr><td>Feb</td><td>72.8</td></tr><tr><td>Mar</td><td>72.3</td></tr><tr><td>Apr</td><td>73.7</td></tr><tr><td>May</td><td>69.5</td></tr><tr><td>Jun</td><td>67.3</td></tr><tr><td>Jul</td><td>74.1</td></tr><tr><td>Aug</td><td>73.8</td></tr><tr><td>Annual</td><td>72.5</td></tr></table>	Months	MMR/MAR (%)	Oct	70.9	Nov	74.7	Dec	70.7	Jan	70.4	Feb	72.8	Mar	72.3	Apr	73.7	May	69.5	Jun	67.3	Jul	74.1	Aug	73.8	Annual	72.5
	Months	MMR/MAR (%)																																	
	Oct	70.9																																	
	Nov	74.7																																	
	Dec	70.7																																	
	Jan	70.4																																	
	Feb	72.8																																	
	Mar	72.3																																	
	Apr	73.7																																	
	May	69.5																																	
	Jun	67.3																																	
	Jul	74.1																																	
	Aug	73.8																																	
	Annual	72.5																																	
					Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	Entire estuary and river inflow: DIN <100µg/l																											
						DIP		Entire estuary and river inflow: DIP <20 µg/l																											
				Quality	Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Average salinity > 10																											
					System variables	Turbidity	System variables not to exceed TPCs for biota	<10 NTU in low flow season																											
						Dissolved oxygen		>5 mg/l																											
		K30C	Kaalimans Estuary	gx18	B	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																											
				Habitat	Hydrodynamics		Tidal variation	Average tidal amplitude near the mouth during low flows (summer) must not change by >10% from established baseline.																											
					Sediment	Sediment characteristics, Channel shape/size characteristics	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	Resource Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
					Biota	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/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
						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%
						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
G15 Coastal	K30D	G15-Wildern	Wildern Estuary (Touw)	gx19	B	Flow	MMR/MAR (% Nat)	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)											
						Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	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											
							DIP		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											
					Quality	Salinity	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											
								Turbidity		Average <5 NTU (low flow) throughout										
						System variables	Dissolved oxygen	System variables not to exceed TPCs for biota	>5 mg/l throughout											
								pH		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	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)											
					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											

IUA Class	Quaternary Catchment	RU	Resource Name	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>Grandidierella lignorum</i> throughout the lakes and estuary
					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 (<i>G. aestuaria</i> , <i>Hyporhamphus capensis</i> , <i>Omobranchius 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>

UA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric										
G15 Coastal	K40D	G15-E25	Swartvlei Estuary	gx10	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										
									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)	Oct	Nov	Dec	Jan	Feb	Mar	Apr
						Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	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										
										DIP	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								
							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)									
						Quality	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)																		

IUA Class	Quaternary Catchment	RU	Resource 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
					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
						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>Callichirus kraussi</i> on sand banks in lower Touw Estuary; maintain rich populations of the benthic amphipod <i>Grandierella lignorum</i> throughout the lakes and estuary

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
G15 Coastal	K40E	G15-E26	Goukamma Estuary	gx111	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 <i>catadromous</i> species (1-5%); Category Ia species should contain viable populations of at least 4 species (<i>G. aestuaria</i> , <i>Hyporhamphus capensis</i> , <i>Omobranchius 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	K40E	G15-E26	Goukamma Estuary	gx111	B	Flow	MMR/MAR (% Nat)	Maintain flow regime	Months MMR/MAR (% Nat) Annual
						Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Annual
							DIP	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	87.5 88.8 88.8 87.5 85.7 85.5 87.1 86.9 87.2 86.5 88.5 88.3 87.5
							Salinity	Salinity	DIP not > 20 µg/L once-off.
						System	Turbidity	Turbidity	DIP not > 20 µg/L once-off.

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
						variables	Dissolved oxygen	exceed TPCs for biota	>5 mg/L in estuary.
							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
					Habitat	Hydrodynamics	Tidal variation		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	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	Resource Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric		
G15 Coastal	K50B	G15-E27	Knysna Estuary	gx12	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 ; Category IIa obligate dependents should be well represented by large exploited species		
										Birds	Avifauna community composition, abundance and richness
						Flow	Quantity	MMR/MAR (% Nat)	Maintain flow regime as close to natural as possible		
										Nutrients	DIN
						Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	DIP not > 20 µg/L once-off.		
										System variables	Turbidity Dissolved oxygen
						Pathogens	Enterococci	Concentrations of	≤185 Enterococci/100 ml) (90 th percentile)		

IUA Class	Quaternary Catchment	RU	Resource Name	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
							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 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
					Biota				
						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	RU	Resource Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																												
G15 Coastal	K60G	G15-E28	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%), 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; 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)	<table><tr><th>Months</th><th>93.5</th><th>93.4</th><th>90.7</th><th>87.1</th><th>85.5</th><th>89.8</th><th>92.1</th><th>94.0</th><th>93.0</th><th>92.8</th><th>94.3</th><th>94.3</th><th>92.5</th></tr><tr><th>Annual</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></table>	Months	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	Annual	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual
										Months	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														
						Annual	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual																		
						Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	DIN not >100 µg/L once-off.																												
										DIP	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	10 < Salinity <40																												
System variables	Turbidity	System variables not to exceed TPCs for biota	>10 NTU in low flow																																		
				Pathogens	Enterococci					Concentrations of	≤185 Enterococci/100 ml) (90 th percentile)																										

IUA Class	Quaternary Catchment	RU	Resource 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)
							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
							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
							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
					Biota		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%
							Invertebrates		

UA Class	Quaternary Catchment	RU	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; 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	G15-E29	Piesang Estuary	gxi14	Quantity	Flow	MMR/MAR (% Nat)	Maintain at least present-day base flows	Months MMR/MAR (% Nat) 71.4 Oct 77.2 Nov 69.5 Dec 68.8 Jan 63.6 Feb 69.2 Mar 70.9 Apr 81.5 May 68.1 Jun 66.8 Jul 74.7 Aug 86.1 Sep 73.8 Annual
							DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	DIN not >100 µg/L once-off.
							DIP	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	DIP not > 20 µg/L once-off.
					Quality	Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	5 < Salinity <40
						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	Resource 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)
					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%

IUA Class	Quaternary Catchment	RU	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	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	G15-E30	Keurbooms Estuary	gx115	Quantity	Flow	MMR/MAR (% Nat)	Maintain flow regime as close to natural as possible	Months MMR/MAR (% Nat)
						DIN	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	Oct 90.6
					Quality	Nutrients	DIP	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Nov 90.5
						Salinity	Salinity	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	Dec 88.8
						System variables	Turbidity	System variables not to exceed TPCs for biota	Jan 83.0
						Pathogens	Enterococci	Concentrations of	Feb 85.5
									Mar 89.3
									Apr 92.0
									May 92.3
									Jun 91.8
									Jul 92.8
									Aug 91.8
									Sep 90.0
									Annual 90.0

IUA Class	Quaternary Catchment	RU	Resource 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)
							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
							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 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 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	Resource Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
G15 Coastal	K70A	G15-E31	Matijes Estuary	gx116	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%), 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
					Quantity	Flow	MMR/MAR (% Nat)	Maintain flow regime (small system needs most flows)	Months MMR/MAR (% Nat) 73.9 73.8 73.9 73.9 67.9 68.4 65.8 66.8 71.6 74.1 70.5 Annual
						Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	DIN not >100 µg/L once-off.
					Quality	Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	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	Resource 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)
							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	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	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 an increase in nutrient input leading to macroalgal blooms, control the spread of invasive plants 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>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%
							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%.

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric																	
G15 Coastal	K70A	G15-E32	Sout (Oos) Estuary	gx17	A	Quality	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 flow regime (small system needs most flows)	MMR/MAR (%) Nat	Months	Oct	86.7	86.8	86.0	83.2	81.7	83.1	84.2	86.1	85.6	84.6	85.8	86.8	85.6
									Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	DIN not >100 µg/L once-off.														
										DIP	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	DIP not >20 µg/L once-off.														
								Habitat	Sediment	Sediment characteristics, Channel shape/size	Mouth state	Hydrodynamics	Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary	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	Mouth must remain permanently open										

UA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric					
G15 Coastal	K70A	G15-E33	Groot (Wes) Estuary	gx123	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					
						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>Callinichirus kraussi</i> on sand banks in lower estuary, establish presence/absence of the copepod <i>Pseudodiaptomus hessei</i> or estuarine congeners 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	MMR/MAR (% Nat)	Maintain flow regime (small system needs most flows)	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.					
							DIP							

IUA Class	Quaternary Catchment	RU	Resource 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	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		>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)
						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	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 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	Resource Name	Biophysical Node Name	TEC Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
G15 Coastal	K70B	G15-E34	Bloukrans Estuary	gx118	A	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 <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>
						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	98.7 Oct 99.0 Nov 98.0 Dec 96.7 Jan 96.8 Feb 97.1 Mar 97.2 Apr 98.1 May 97.6 Jun 97.7 Jul 98.2 Aug 98.9 Sep 98.0 Annual
					Quality	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	Concentrations of	≤185 Enterococci/100 ml) (90 th percentile)

IUA Class	Quaternary Catchment	RU	Resource 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)
							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.
						Habitat	Sediment characteristics, Channel shape/size		Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline
							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/median phytoplankton/benthic microalgae biomass: phytoplankton not to exceed 1 µg/l (median), phytoplankton not to exceed 20 µg/l (once-off); benthic microalgae not to exceed 11 mg/m ² (median); prevent formation of phytoplankton blooms
							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%
						Biota	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%.
							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 H10L, H10F, H10G, H10J H20A, H20B, H20C, H20F	BB-1 BB-3 BB-2	Groundwater (all)	Quantity	Abstraction	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 the environment	n/a
A3 Breede Working Tributaries	III	H40B H20H, H10H, H40C H30B	BB-4 BB-5 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	BO-3						
H17 Overberg East Fynbos	II	G50D, G50E							
E8 Touws	III	J12C, J12D J11E	GGr-1 GGr-3						
C6 Gamka Buffels	II	J24B J21A, J21B, J23A	GGa-1 GGa-2a, 2b and 2c	Groundwater (all)	Quantity	Groundwater level	Groundwater level in abstraction boreholes within 2.5km from the ocean to avoid saline intrusion	>1 mamsl	>0.5 mamsl
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						
H16 Overberg West Coastal	II	G40H	BO-2						
F10 Overberg East Renosterveld	II	G50B	BO-3						
H17 Overberg East Fynbos	II	G50D, G50E							
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	Groundwater (all)					
F10 Overberg East Renosterveld	II	G50B							
H17 Overberg East Fynbos	II	G50D, G50E	BO-3						
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						
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	Groundwater (all)	Quantity	Discharge	Buffer zones	No groundwater abstraction around wetland and river FEPAs in accordance with the implementation manual for FEPAs.	250m
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	BB-2 BB-4						
A3 Breede Working Tributaries	III	H20H, H10H, H40C H30B	BB-5 BB-6						
A2 Middle Breede Renosterveld	III	H40J 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						

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H17 Overberg East Fynbos	II	G50D, G50E							
E8 Touws	III	J12C, J12D	GG-1						
		J11E	GG-3						
		J24B	GGa-1						
C6 Gamka Buffels	II	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						
		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 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							
E8 Touws	III	J12C, J12D	GG-1						
		J11E	GG-3						
		J24B	GGa-1						
C6 Gamka Buffels	II	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 (all)	Quality	Pathogens	Total Coliform	Groundwater should be fit for domestic use after treatment; and groundwater quality shall not show a deteriorating trend from natural background	<10 counts / 100ml

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A1 Upper Breede Tributaries	II	H10A, H10B, H10C	BB-1	Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO ₃ (as N)	Groundwater should be fit for domestic use after treatment: and groundwater quality shall not show a deteriorating trend from natural background	<6.8 mg/l
						Salts	EC		<311 mS/m
				Groundwater (Bokkeveld Group)	Quality	Nutrients	NO ₃ (as N)		<2.4 mg/l
						Salts	EC		<236 mS/m
				Groundwater (Nardouw Group)	Quality	Nutrients	NO ₃ (as N)		<4.4 mg/l
		H10F, H10G, H10J, H10L	BB-3			Salts	EC		<119 mS/m
				Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO ₃ (as N)		<9.6 mg/l
						Salts	EC		<73 mS/m
				Groundwater (Table Mountain Group)	Quality	Nutrients	NO ₃ (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	NO ₃ (as N)		<11.0 mg/l
						Salts	EC		<168 mS/m
				Groundwater (Bokkeveld Group)	Quality	Nutrients	NO ₃ (as N)		<1.8 mg/l
						Salts	EC		<329 mS/m
				Groundwater (Table Mountain Group)	Quality	Nutrients	NO ₃ (as N)		<3.7 mg/l
		H10H, H20H, H40C	BB-5			Salts	EC		<63 mS/m
				Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO ₃ (as N)		<3.1 mg/l
						Salts	EC		<591 mS/m
				Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO ₃ (as N)		<9.8 mg/l
						Salts	EC		<170 mS/m
B4 Riversonderend Theewaters	III	H30B	BB-6	Groundwater (Bokkeveld Group)	Quality	Nutrients	NO ₃ (as N)		<3.6 mg/l
						Salts	EC		<589 mS/m
				Groundwater (Nardouw Group)	Quality	Nutrients	NO ₃ (as N)		<4.4 mg/l
						Salts	EC		<119 mS/m
				Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO ₃ (as N)		<10 mg/l
		H40J, H40K	BB-7			Salts	EC		<280 mS/m
				Groundwater (Bokkeveld Group)	Quality	Nutrients	NO ₃ (as N)		<3.6 mg/l
						Salts	EC		<741 mS/m
				Groundwater (Table Mountain Group)	Quality	Nutrients	NO ₃ (as N)		<3.8 mg/l
						Salts	EC		<117 mS/m
B4 Riversonderend Theewaters	III	H60A, H60B, H60C	BR-1	Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO ₃ (as N)		<10 mg/l
						Salts	EC		<280 mS/m
				Groundwater (Bokkeveld Group)	Quality	Nutrients	NO ₃ (as N)		<3.6 mg/l
						Salts	EC		<741 mS/m
				Groundwater (Bokkeveld Group)	Quality	Nutrients	NO ₃ (as N)		<3.8 mg/l

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
				Groundwater (Bokkeveld Group)	Quality	Nutrients	NO3 (as N)		<3.6 mg/l
B5 Overberg West	II	G40A, G40C, G40D	BO-1	Groundwater (Table Mountain Group)	Quality	Nutrients	NO3 (as N)		<589 mS/m
				Groundwater (Cenozoic coastal deposits)	Quality	Salts	EC		<3.8 mg/l
				Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)		<117 mS/m
H16 Overberg West Coastal	II	G40H	BO-2	Groundwater (Bokkeveld Group)	Quality	Salts	EC		<9.8 mg/l
				Groundwater (Bokkeveld Group)	Quality	Nutrients	NO3 (as N)		<280 mS/m
				Groundwater (Table Mountain Group)	Quality	Salts	EC		<3.6 mg/l
				Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)		<589 mS/m
F10 Overberg East Renosterveld	II	G50B	BO-3	Groundwater (Bokkeveld Group)	Quality	Salts	EC		<3.8 mg/l
H17 Overberg East Fynbos	II	G50D, G50E	BO-3	Groundwater (Bokkeveld Group)	Quality	Nutrients	NO3 (as N)		<117 mS/m
F10 Overberg East Renosterveld	II	G50B	BO-3	Groundwater (Table Mountain Group)	Quality	Salts	EC		<10 mg/l
H17 Overberg East Fynbos	II	G50D, G50E	BO-3	Groundwater (Table Mountain Group)	Quality	Nutrients	NO3 (as N)		<280 mS/m
				Groundwater (all)	Quality	Salts	EC		<3.6 mg/l
		J11E	GGr-3	Groundwater (all)	Quality	Nutrients	NO3 (as N)		<11.7 mg/l
				Groundwater (Beaufort Group)	Quality	Salts	SO4		<600 mg/l
				Groundwater (Beaufort Group)	Quality	Salts	EC		<231 mS/m
		J24B	GGa-1	Groundwater (Beaufort Group)	Quality	Nutrients	NO3 (as N)		<12.0 mg/l
				Groundwater (Cenozoic coastal deposits)	Quality	Salts	SO4		<237 mg/l
				Groundwater (Cenozoic coastal deposits)	Quality	Salts	EC		<226 mS/m
C6 Gamka Buffels	II	J21A, J21B, J21D, J23A	GGa-2a, 2b and 2c	Groundwater (Beaufort Group, Karoo Supergroup)	Quality	Nutrients	NO3 (as N)		<15.8 mg/l
				Groundwater (Cenozoic coastal deposits)	Quality	Salts	SO4		<525 mg/l
				Groundwater (Cenozoic coastal deposits)	Quality	Salts	EC		<310 mS/m
				Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)		<15.9 mg/l
				Groundwater (Cenozoic coastal deposits)	Quality	Salts	SO4		<634 mg/l
				Groundwater (Cenozoic coastal deposits)	Quality	Salts	EC		<367 mS/m
				Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)		<9.8 mg/l
E8 Touws	III	J12C, J12D	GGr-1	Groundwater (Witteberg Group)	Quality	Salts	EC		<170 mS/m
				Groundwater (Witteberg Group)	Quality	Nutrients	NO3 (as N)		<11.0 mg/l
				Groundwater (Witteberg Group)	Quality	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	NO3 (as N)		<3.6 mg/l
						Salts	EC		<589 mS/m
				Groundwater (Bokkeveld Group)	Quality	Nutrients	NO3 (as N)		<11.0 mg/l
						Salts	EC		<589 mS/m
D7 Gouritz-Olifants	III	J35B	GO-4	Groundwater (Table Mountain Group)	Quality	Nutrients	NO3 (as N)		<11.0 mg/l
						Salts	EC		<170 mS/m
F13 Lower Gouritz	II	J40C, J40D	GGO-1	Groundwater (Coastal Cenozoic Deposits)	Quality	Nutrients	NO3 (as N)		<3.3 mg/l
						Salts	EC		<170 mS/m
I18 Hessequa	III	H90E	GGO-2a and 2b	Groundwater (Coastal Cenozoic Deposits)	Quality	Nutrients	NO3 (as N)		<4.5 mg/l
						Salts	EC		<316 mS/m
G15 Coastal	II	K40D	GC-2	Groundwater (Coastal Cenozoic Deposits)	Quality	Nutrients	NO3 (as N)		<11.0 mg/l
						Salts	EC		<170 mS/m