DEPARTMENT OF WATER AND SANITATION

NO. 1298 **23 NOVEMBER 2018**

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

PROPOSED CLASSES OF WATER RESOURCE AND RESOURCE QUALITY OBJECTIVES FOR THE BREEDE-GOURITZ WATER MANAGEMENT AREA

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

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

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

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

SCHEDULE

DESCRIPTION OF THE WATER RESOURCE

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

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

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

i. The proposed water resource classes for Breede-Gouritz Water Management Area are listed in Table 1 according to the overall class per integrated unit of analysis (IUA), indicated in Figure 1 for Breede Overberg Area and indicated in Figure 2 for Gouritz Coastal Area.

ii. IUAs are classified in terms of their extent of permissible utilisation and protection as either Class I: indicating high environmental protection and minimal utilisation; Class II indicating moderate protection and moderate utilisation; and Class III indicating sustainable minimal protection and high utilisation.

iii. Table 1 provides the IUA, its water resource class and its respective catchment configuration. The catchment configuration consists of a number of biophysical nodes representing river reaches or resource units (RUs). The ecological category to be maintained for each RU in the IUA is provided.

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

i. Resource Quality Objectives (RQOs) are defined for each prioritised RU for every IUA in terms of water quantity, habitat and biota, and water quality. Prioritised RUs for Breede Overberg Area are indicated in Figure 1 and prioritised RUs for Gouritz Coastal Area are indicated in Figure 2.

ii. Table 2 to Table 17 provide the RQOs for RIVERS in priority RUs.

iii. Table 18 to Table 26 provide the RQOs for ESTUARIES in priority RUs.

iv. Table 27 to Table 40 provide the RQOs for GROUNDWATER in priority RUs.

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

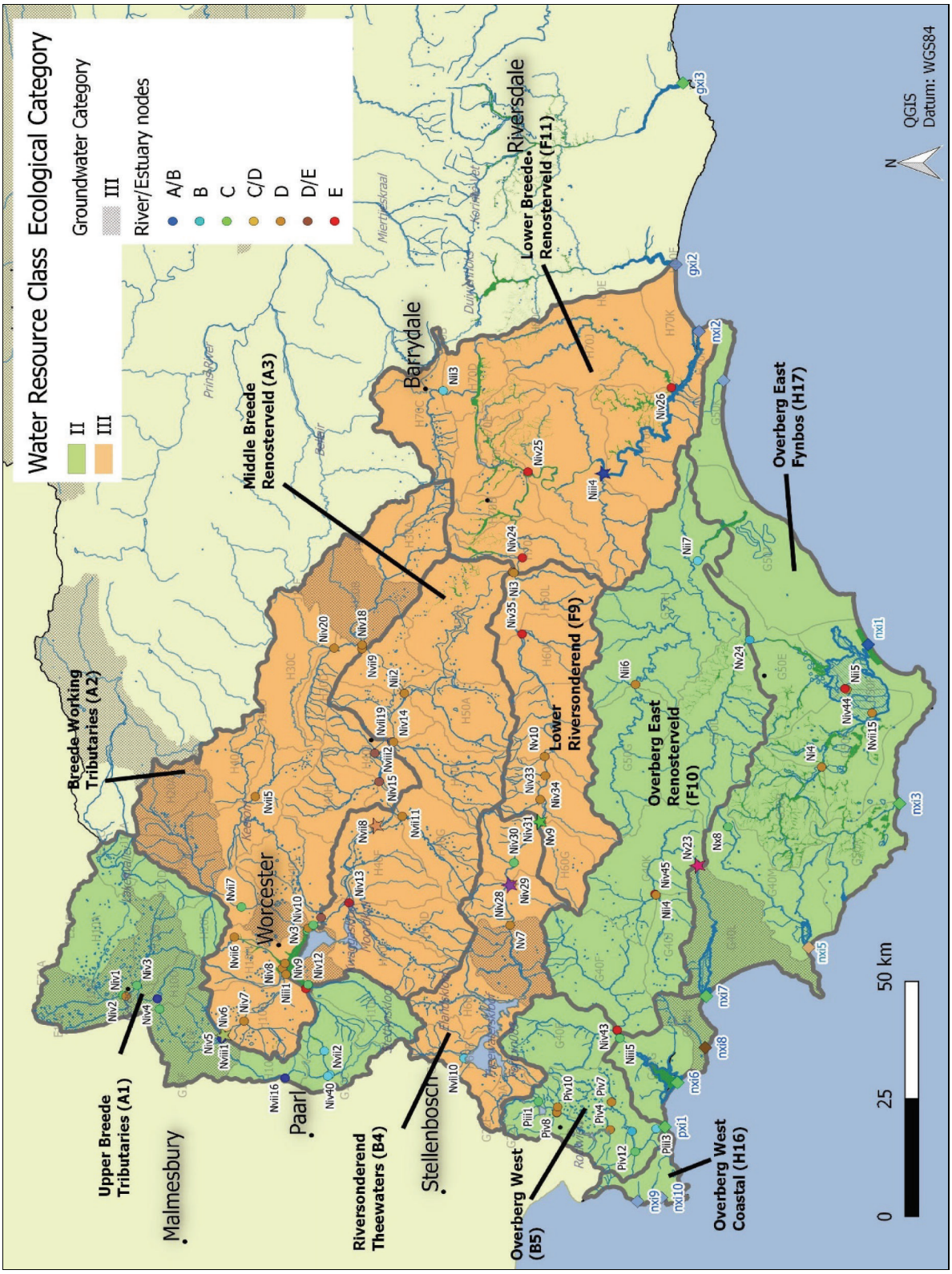

Figure 1: Proposed Water Resource Classes for the Breede Overberg Area

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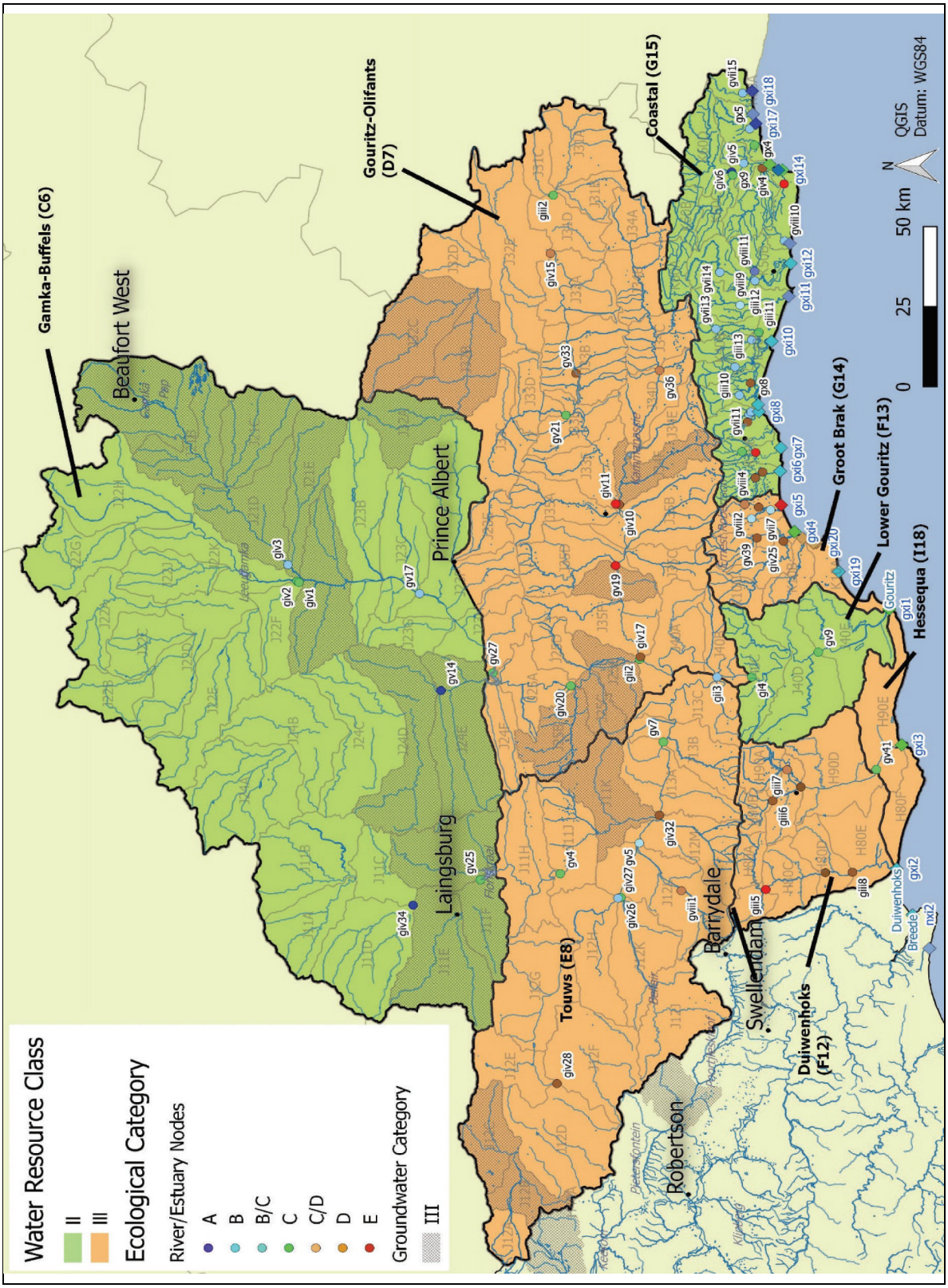

Figure 2: Proposed Water Resource Classes for the Gouritz Coastal Area

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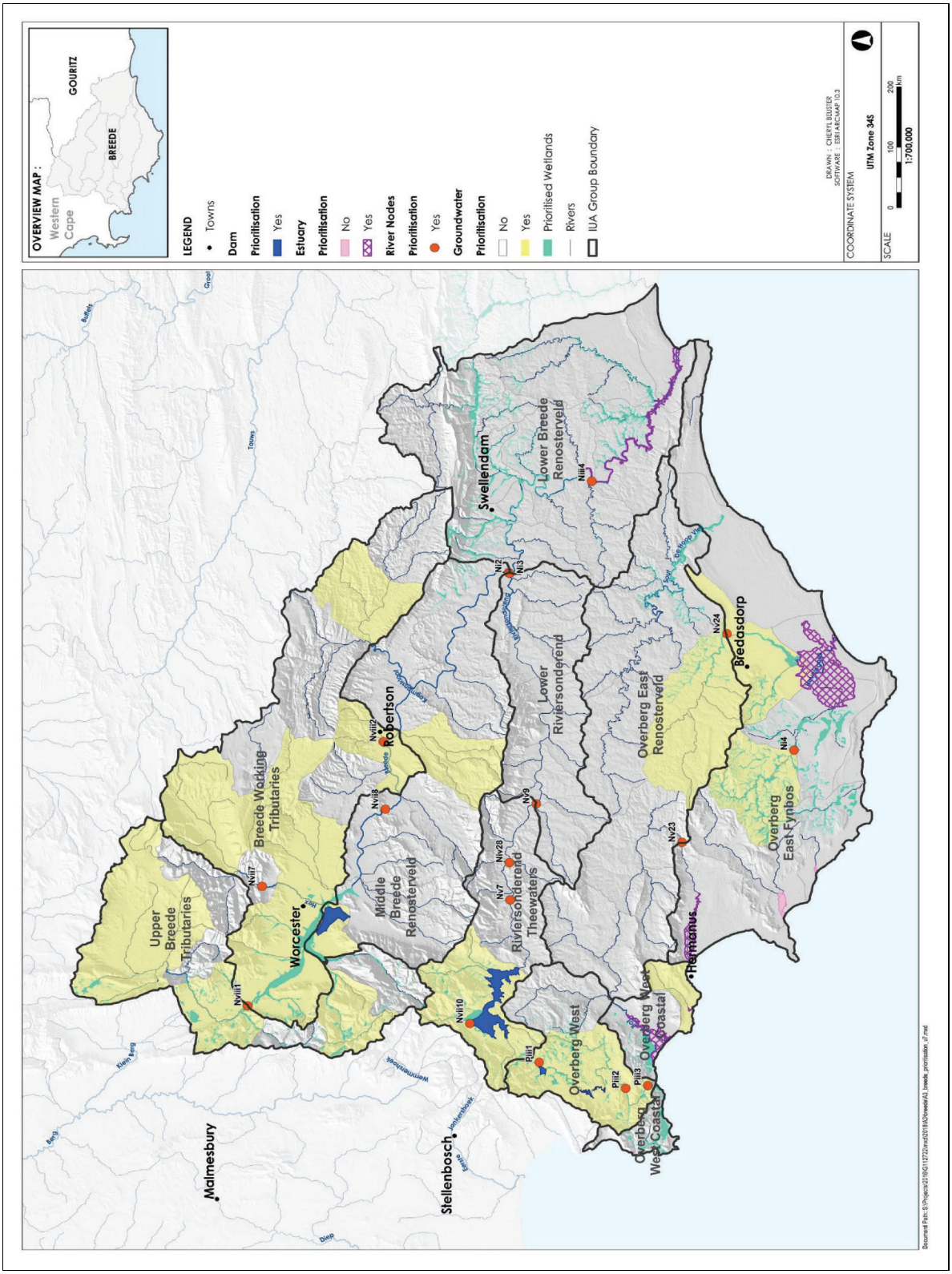

Figure 3: Proposed Priority Resource Units for the Breede Overberg Area

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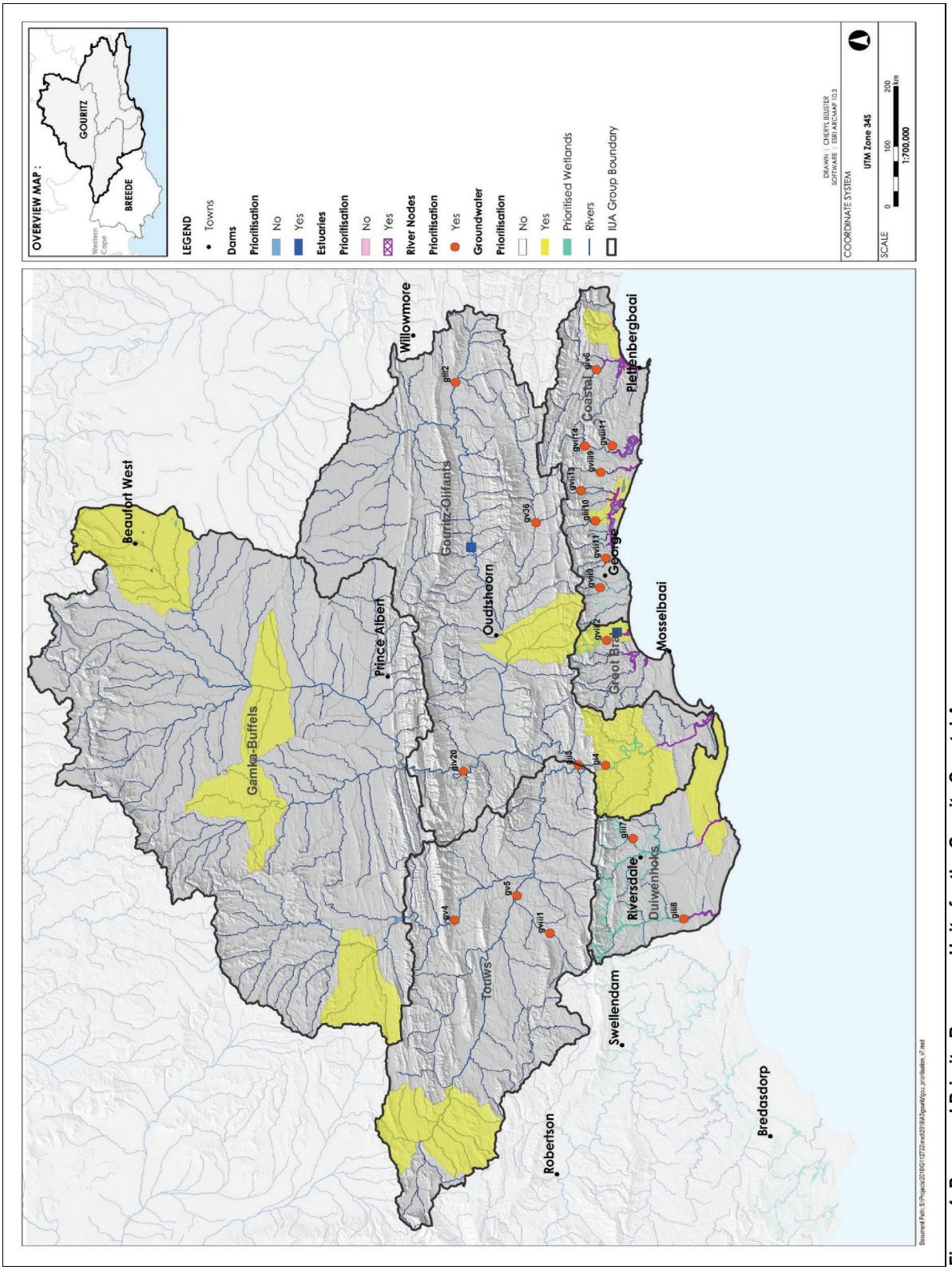

Figure 4: Proposed Priority Resource Units for the Gouritz Coastal Area

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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
A2 Breede Woring tributaries	III	H10G		Slanghoek River	Niv7	D	32.60
		H10G		Breede River	Niii1	D	497.60
		H10J		Smalblaar River	Niv42	E	191.20
		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
F9 Lower Riversonderend	III	H60G		Kwartel River	Niv31	D	10.70
		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	Piii1	C	250.40
		G40C		Witklippieskloof River	Piv10	D	15.10
		G40C		Palmiet River	Piv9	D	78.70
		G40C		Palmiet River	Pvi1	D	100.50
		G40C		Klipdrif River	Piv8	D	13.60
		G40D		Klein-Palmiet River	Piv4	D	13.70
		G40D		Krom/Ribbok River	Piv7	D	27.50
		G40D	B5-R12	Palmiet River	Piii2	B/C	206.70
		G40D		Dwars/Louws River	Piv12	C	25.20
		G40D	B5-R13	Palmiet River	Piii3	B	250.50
		G40D	B5-E01	Palmiet Estuary	Pxi1	C	173.44
H16 Overberg West Coastal	II	G40B	H16-E02	Buffels Estuary	Bxi1	B	8.80
		G40B	H16-E03	Rooiels Estuary	Bxi2	B	9.44
		G40F		Swart River	Niv43	E	42.10
		G40E		Bot River	Niii5	C	74.10
		G40G	H16-E04	Bot Estuary	Nxi6	C	77.67
		G40H	H16-E05	Onrus Estuary	Nxi8	D	2.49
F10 Overberg East Renosterveld	II	G40J		Hartbees River	Nii4	D	18.40
		G40K		Steenbok River	Niv45	E	10.80
		G40K	F10-R14	Klein River	Nv23	C/D	38.38
		G50G		Sout River	Nii6	D	4.20
		G50H		DeHoopVlei River	Nii7	B	27.10
H17 Overberg East Fynbos	II	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
		G50E		Kars River	Nii5	E	21.60
		G50F	H17-E09	Heuningnes Estuary	Nxi1	A/B	30.56
		G50K	H17-E10	Klipdrifsfontein 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	gii3	B	78.10

Integrated Unit of Analysis (IUA)	Water Resource Class for IUA	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Natural MAR (million m^3/a)
D7 Gouritz-Olifants; Lower Gouritz	III	J25A	D7-R23	Gamka River	giv20	C	79.80
		J25D		Nels River	giv18	E	10.90
		J25E		Gamka River	gii2	C	111.80
		J31C	D7-R24	Olifants River	giii2	C	11.80
		J32E		Traka River	giv15	C/D	2.80
		J33B		Olifants River	gv33	D	25.00
		J33D		Meirings River	gv21	C	21.40
		J33F		Olifants River	giv11	E	79.90
		J34C	D7-R25	Kammanassie River	gv36	C/D	41.20
		J34F		Kammanassie River	giv10	D	59.20
		J35A		Grobbelaars River	gvii2	C	16.90
		J35A		Grobbelaars River	giv9	E	30.70
		J35D		Olifants River	gv19	E	224.50
		J35F		Olifants River	giv17	D	253.40
F13 Lower Gouritz	II	J40A		Gouritz River	giv16	C	394.90
		J40B	F13-R26	Gouritz River	gi4	C	489.10
		J40C		Gouritz River	gv28	D	21.40
		J40D		Gouritz River	gv9	C	571.80
		J40E	F13-E12	Gouritz Estuary	Gxi1	C	294.69
F12 Duiwenhoks	III	H80B		Duiwenhoks River	giii5	E	62.50
		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
I18 Hessequa	III	H90B		Korinte River	giii6	D	34.20
		H90A	I18-R28	Goukou River	giii7	C/D	50.90
		H90C		Goukou River	gv10	D	92.90
		H90D		Goukou River	gv41	C	104.90
		H90E	I18-E14	Goukou Estuary	Gxi3	C	89.94

Integrated Unit of Analysis (IUA)	Water Resource Class for IUA	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Natural MAR (million m^3/a)
G14 Groot Brak	III	K10D		Brandwag River	giv25	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
G15 Coastal	II	K30A		Maalgate River	gviii4	D	15.30
		K30A		Maalgate River	gvii8	D	22.84
		K30A	G15-E21	Maalgate Estuary	Gxi6	B	29.81
		K30B	G15-R30	Malgas River	gvii9	C	8.16
		K30B		Gwaing River	gviii6	E	13.92
		K30B	G15-E22	Gwaing Estuary	Gxi7	B	22.64
		K30C		Swart River	gviii7	D	16.10
		K30C	G15-R31	Kaaimans River	gvii11	B	17.53
		K30C		Silver River	gviii8	B	14.90
		K30C	G15-E23	Kaaimans Estuary	Gxi8	B	35.32
		K30D		Touws River	gvii12	B	16.70
		K30D		Klein River	gx8	D	2.50
		K30D	G15-E24	Wilderness Estuary	Gxi9	B	29.01
		K40A	G15-R32	Diep River	giii10	B	12.40
		K40B		Hoekraal River	giii13	B	27.90
		K40C	G15-R33	Karatara River	gvii13	B	11.20
		K40C		Karatara River	giii11	B	33.90
		K40D	G15-E25	Swartvlei Estuary	Gxi10	B	76.19
		K40E	G15-R34	Goukamma River	gviii9	B/C	30.40
		K40E	G15-E26	Goukamma Estuary	Gxi11	B	46.25
		K50A	G15-R35	Knysna River	gvii14	B	26.50
		K50A		Knysna River	giii12	B	46.60

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

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

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
											Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
											Maintenance flows (million cubic metres)												
											Low	6.667	4.007	2.105	1.93	1.268	1.754	2.343	3.544	6.452	7.719	10.526	7.81
											High	1.651	0	1.651	0	0	0	0	0	5.502	0	32.397	13.009
A1 Upper Breede Tributaries	II	H10F	A1-R01	Breede River	nviii1	D	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Breede River in a condition equal to or better than a D category.	≤ 0.075 milligrams per litre (50th percentile)												
							Quality	Nutrients	Phosphate (PO_4-P)	River nutrient levels must be maintained in a mesotrophic or better condition.													
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams per litre (50th percentile)												
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at levels that do not adversely affect aquatic ecosystems	≤ 55 milliSiemens/metre EC (95th percentile)												
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≥ pH ≤ 8.5 (5th and 95th percentiles)												
									Dissolved oxygen		DO ≥ 6 milligrams per litre (5th percentile)												
								Toxins	Ammonia	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.073 milligrams per litre (95th percentile)												
									Atrazine		≤ 0.079 milligrams per litre (95th percentile)												
									Endosulfan		≤ 0.0013 milligrams per litre (95th percentile)												
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95th percentile)												
							Habitat	Geomorphology	GAI score	GAI score should be within D category (42-57%).	D category (42-57%)												
								Riparian vegetation	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												
									Lower zone cover abundance		No exotic species, no terrestrial woody species												
									Upper zone cover abundance		Exotic species < 5%, terrestrial woody species > 50%												
								Biota	Fish	FRAI score	FRAI should be within a D category (42-57%).	D category (42-57%)											
								Invertebrates	MIRAI score	MIRAI score to be within D	D category (42-57%)												

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
A1 Upper Breede Tributaries	II	H10J	A1-R02	Molenaars River	nvii2	B	Quantity	Low flows High flows	Invertebrate diversity	category (42-57%)	SASS score > 70, ASPT > 5.0												
									Number of families		> 15 families at abundances A - C												
									Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Molenaars River in a condition equal to or better than a B category.	Maintenance flows (million cubic metres)	Months	Low	High	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
													3.381	3.434	2.506	0.454	1.584	0	0.869	0.454	0.909	0	1.356	0.454	2.479	1.797	3.588	1.797	4.149	8.005	4.39	3.434	4.002	3.434
								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)												
								System variables	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)												
									Dissolved oxygen		≥ 8 milligrams per litre (5^{th} percentile)												
								Toxins	Ammonia	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.073 milligrams per litre (95^{th} percentile)												
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Ideal category for full contact recreation.	≤ 130 counts/100ml (95^{th} percentile)												
							Habitat	Geomorphology	GAI score	GAI score should be within B category (42-57%).	B category (82-87%)												
								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												
									Lower zone cover abundance		No exotic species, no terrestrial woody species												
							Biota	Fish	FRAI score	FRAI should be within a E category (22-37%).	E category (22-37%)												

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

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
											Months		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
											Maintenance flows (million cubic metres)	High	2.998	2.649	1.888	1.18	1.066	0.943	1.142	1.652	2.26	3.067	3.54	3.333
												Low	0.387	0.395	0	0	0	0	0	1.137	1.098	6.801	2.797	2.803
A2 Breede Working Tributaries	III	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	≤ 0.075 milligrams/litre (50th percentile)													
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.														
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50th percentile)													
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at levels that do not adversely affect aquatic ecosystems	≤ 55 milliSiemens/metre (95th percentile)												
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≥ pH ≤ 8.5 (5th and 95th percentiles)												
									Dissolved oxygen		≥ 8 milligrams per litre (5th percentile)												
								Toxins	Ammonia	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.073 milligrams per litre (95th percentile)												
									Atrazine		≤ 0.079 milligrams per litre (95th percentile)												
									Endosulfan		≤ 0.0013 milligrams per litre (95th percentile)												
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95th percentile)												
							Habitat	Geomorphology	GAI score	GAI score should be within a C/D category (57-62%).	C/D category (57-62%)												
								Riparian vegetation	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												
									Lower zone cover abundance		No exotic species, no terrestrial woody species												
								Fish	FRAI score	FRAI should be within a D category (42-57%).	D category (42-57%)												
							Biota	Invertebrates	MIRAI score	MIRAI score to be within C category (62-77%).	C category (62-77%)												
									Invertebrate diversity		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											
											Months		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
											Maintenance flows (million cubic metres)	High	3.704	0	0	0	0	0	0	16.107	32.902	76.916	31.869	18.949
												Low	14.575	8.743	3.449	4.796	1.461	3.181	4.262	11.161	22.326	36.912	33.451	26.791
A3 Middle Breede Renosterveld	III	H40F	A3-R04	Breede River	nvii8	C/D	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Breede River in a condition equal to or better than a C/D category.	≤ 0.075 milligrams/litre (50th percentile)													
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 1.75 milligrams/litre (50th percentile)													
									Total inorganic nitrogen (TIN)															
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at levels that do not adversely affect aquatic ecosystems	≤ 55 milliSiemens/metre (95th percentile)												
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≥ pH ≤ 8.5 (5th and 95th percentiles)												
									Dissolved oxygen		≥ 6 milligrams litre (5th percentile)												
								Toxins	Ammonia	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.073 milligrams per litre (95th percentile)												
									Atrazine		≤ 0.079 milligrams per litre (95th percentile)												
									Endosulfan		≤ 0.0013 milligrams per litre (95th percentile)												
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95th percentile)												
							Habitat	Geomorphology	GAI score	GAI score should be within C category (52-67%).	C category (62-77%)												
								Riparian vegetation	VEGRAI score	VEGRAI level 3 should be within a C category (52-67%).	C category (62-77%)												
									Marginal zone cover abundance		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%												
							Biota	Fish	FRAI score	FRAI should be within a D category (42-57%).	D category (42-57%)												
								Invertebrates	MIRAI score	MIRAI score to be within D	D category (42-57%)												

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
A3 Middle Breede Renosterveld	III	H50B	A3-R05	Breede River	ni2	D	Quantity	Low flows High flows	Invertebrate diversity	category (42-57%).	SASS score < 45, ASPT > 4.3												
									Number of families		> 14 families at A - C abundance												
									Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Breede River in a condition equal to or better than a D category.	Maintenance flows (million cubic metres)	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
												Low	13.406	8.861	3.095	2.454	2.911	1.301	3.367	4.395	9.942	13.992	19.944	17.315
												High	0	3.227	0	0	0	0	0	37.538	7.323	36.389	16.731	0
									Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50th percentile)												
								Nutrients	Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50th percentile)												
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at present state levels.	95%tile ≤ 220 milliSiemens/metre EC												
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≥ pH ≤ 8.5 (5th and 95th percentiles)												
									Dissolved oxygen		≥ 6 milligrams litre (5th percentile)												
									Water temperature		No more than 2°C change in natural monthly range (minimum and maximum)												
								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												
											Months		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
											Maintenance flows (million cubic metres)	Low	1.406	1.041	0.658	0.425	0.362	0.376	0.564	1.032	1.491	1.725	1.825	1.663
												High	0.369	0.122	0	0	0	0	0	1.794	2.585	3.218	0.54	1.081
B4 Riversonderend Theewaters	III	H60B	B4-R06	Du Toits River	nvii10	B	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Du Toits River in a condition equal to or better than a B category.	≤ 0.025 milligrams per litre (50th percentile)													
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river in an oligotrophic condition	≤ 0.70 milligrams per litre (50th percentile)												
									Total inorganic nitrogen (TIN)															
								Salts	Electrical conductivity (EC)	Salt concentrations must be maintained in an Ideal category	≤ 30 milliSiemens/metre (95th percentile)												
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≥ pH ≤ 8.5 (5th and 95th percentiles)												
									Dissolved oxygen		≥ 8 milligrams per litre (5th percentile)												
								Toxins	Atrazine	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.079 milligrams per litre (95th percentile)												
									Endosulfan		≤ 0.0013 milligrams per litre (95th percentile)												
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Ideal category for full contact recreation.	≤ 130 counts/100ml (95th percentile)												
B4 Riversonderend Theewaters	III	H60D	B4-R07	Riviersonderend River	nv7	C	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.	≤ 0.075 milligrams/litre (50th percentile)													
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 1.75 milligrams/litre (50th percentile)												
									Total inorganic nitrogen (TIN)															
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at levels that do not adversely affect aquatic ecosystems	≤ 55 milliSiemens/metre (95th percentile)												
								System	pH range	pH, temperature, and	6.5 ≥ pH ≤ 8.5 (5th and 95th 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)
								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)
B4 Riversonderend Theewaters	III	H60E	B4-R08	Baviaans River	niv28	B	Quantity	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.	Maintenance flows (million cubic metres) — Months: Low / High Oct: 0.292 / 0.026 Nov: 0.24 / 0 Dec: 0.109 / 0 Jan: 0.117 / 0 Feb: 0.059 / 0.026 Mar: 0.029 / 0 Apr: 0.049 / 0.026 May: 0.029 / 0.068 Jun: 0.092 / 0.068 Jul: 0.153 / 0.127 Aug: 0.197 / 0.296 Sep: 0.247 / 0.127
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at an oligotrophic condition.	≤ 0.025 milligrams per litre PO_4-P
									Total inorganic nitrogen (TIN)		≤ 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	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	4.5 ≥ pH ≤ 7.0 (5^{th} and 95^{th} percentiles)
									Dissolved oxygen		≥ 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%)
								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
									Lower zone cover abundance		No exotic species, no terrestrial woody species

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
									Upper zone cover abundance		Exotic species < 5%, terrestrial woody species > 20%												
							Biota	Fish	FRAI score	FRAI should be within an A/B category (87-92%).	A/B category (87-92%)												
								Invertebrates	MIRAI score	MIRAI score to be within A/B category (87-92%).	A/B category (87-92%)												
									Invertebrate diversity		SASS score > 160, ASPT > 7.5												
									Number of families		> 15 families at abundances A - C												
B4 Riversonderend Tneewaters	III	H60F	B4-R09	Riviersonderend River	nv9	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.	Maintenance flows (million cubic metres)	Months	Low	High	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
															4.019	3.087	1.053	0.893	0.663	0.606	2.593	3.19	7.717	11.163	12.12	12.038
															0	0.726	0	0.488	0	0	0	3.442	3.334	8.86	22.114	3.334
								Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50th percentile)														
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50th percentile)														
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at levels that do not adversely affect aquatic ecosystems	≤ 55 milliSiemens/metre (95th percentile)														
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	4.5 ≥ pH ≤ 7.5 (5th and 95th percentiles)														
									Dissolved oxygen		≥ 6 milligrams litre (5th percentile)														
								Toxins	Atrazine	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.079 milligrams per litre (95th percentile)														
									Endosulfan		≤ 0.0013 milligrams per litre (95th percentile)														
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95th percentile)														
							Habitat	Geomorphology	GAI score	GAI score should be within D category (42-57%).	D category (42-57%)														
								Riparian vegetation	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														
									Lower zone cover abundance		No exotic species, no terrestrial woody species														

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
							Biota		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%)
								Invertebrates	MIRAI score	MIRAI score to be within C/D category (57-62%).	C/D category (57-62%)
									Invertebrate diversity		SASS score > 40, ASPT score > 4.3
									Number of families		> 25 families at abundance A - C

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

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
											Maintenance flows (million cubic metres)	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
												High	4.699	3.609	1.231	1.044	0.775	0.709	3.032	3.73	9.023	13.054	14.173	14.076
												Low	0	0.849	0	0.571	0	0	0	4.024	3.899	10.36	25.859	3.899
F9 Lower Breede Renosterveld	III	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.														
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50^{th} percentile)												
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50^{th} percentile)												
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at levels that do not adversely affect aquatic ecosystems	95^{th} %tile ≤ 85 milliSiemens/metre EC												
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	$6.5 \geq pH \leq 8.5$ (5^{th} and 95^{th} percentiles)												
									Dissolved oxygen		≥ 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)												

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

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
											Maintenance flows (million cubic metres)		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
											Months	Low	1.438	1.054	0.56	0.267	0.179	0.169	0.266	0.604	1.127	1.523	1.73	1.69
												High	0.413	0.093	0	0	0	0	0	0.723	1.413	2.17	0.435	0.871
B5 Overberg West	II	G40C	B5-R11	Palmiet River	piii1	C	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Palmiet River in a condition equal to or better than a B category.															
								Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river in an oligotrophic condition.	≤ 0.025 milligrams per litre PO_4-P												
									Total inorganic nitrogen (TIN)		≤ 0.70 milligrams per litre TIN												
							Quality	Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at levels that do not adversely affect aquatic ecosystems	≤ 30 milliSiemens/metre (95^{th} percentile)												
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	4.5 ≥ pH ≤ 7.0 (5^{th} and 95^{th} percentiles)												
									Dissolved oxygen		≥ 8 milligrams per litre (5^{th} percentile)												
								Toxins	Atrazine	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.079 milligrams per litre (95^{th} percentile)												
									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.	≤ 130 counts/100ml (95^{th} percentile)												
							Habitat	Geomorphology	GAI score	GAI score should be within D category (42-57%).	B category (82-87%)												
								Riparian vegetation	VEGRAI score	VEGRAI level 3 should be within a B/C category (77-82%).	B/C category (77-82%)												
								Fish	FRAI score	FRAI should be within an E category (22-37%).	E category (22-37%)												
							Biota	Invertebrates	MIRAI score	MIRAI score to be within B/C category (77-82%).	B/C category (77-82%)												
									Invertebrate diversity		SASS score > 110, ASPT > 6.5												
									Number of families		Five families, *Corydalidae, Elmidae, Hydropsychidae, Cordulidae, Chlorocyphidae*												

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
											Maintenance flows (million cubic metres)		Months										
											Low	High	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
B5 Overberg West	II	G40D	B5-R12	Palmiet River	piii2	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.	7.642	1.67	5.516	0.38	2.919	1.374	0.943	0.898	1.512	3.519	6.382	8.317	9.401	8.932
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50th percentile)												
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50th percentile)												
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at levels that do not adversely affect aquatic ecosystems	≤ 55 milliSiemens/metre (95th percentile)												
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≥ pH ≤ 8.5 (5th and 95th percentiles)												
									Dissolved oxygen		≥ 6 milligrams litre (5th percentile)												
								Toxins	Atrazine	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.079 milligrams per litre (95th percentile)												
									Endosulfan		≤ 0.0013 milligrams per litre (95th percentile)												
									Iron (Mn)		≤ 0.1 milligrams per litre (95th percentile)												
									Manganese (Mn)		≤ 0.15 milligrams per litre (95th percentile)												
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95th percentile)												
							Habitat	Geomorphology	GAI score	GAI score should be within B category (82-87%).	B category (82-87%)												
								Riparian vegetation	VEGRAI score	FRAI should be within an E category (23-37%).	B/C category (77-82%)												
								Fish	FRAI score	VEGRAI level 3 should be within a B/C category (77-82%).	E category (22-37%)												
							Biota	Invertebrates	MIRAI score	MIRAI score to be within B/C category (77-82%).	B/C category (77-82%)												
									Invertebrate diversity		SASS score > 110, ASPT > 6.5												
									Number of families		Five families, *Corydalidae, Elmidae, Hydropsychidae, Cordulidae, Chlorocyphidae*												

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
											Maintenance flows (million cubic metres)		Months										
											Low	High	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
B5 Overberg West	II	G40D	B5-R13	Palmiet River	piii3	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.	10.02	0.049	4.71	0.097	2.463	1.907	1.955	0.954	1.118	0.954	1.488	0.954	2.142	0.954	3.016	8.623	11.08	2.385	12.83	8.302	13.49	14.21	12.78	0.049
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.025 milligrams per litre (50th percentile)																							
									Total inorganic nitrogen (TIN)		≤ 0.70 milligrams per litre (50th percentile)																					
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at levels that do not adversely affect aquatic ecosystems	≤ 30 milliSiemens/metre (95th percentile)																					
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	5.0 ≥ pH ≤ 7.5 (5th and 95th percentiles)																					
									Dissolved oxygen		≥ 8 milligrams per litre (5th percentile)																					
								Toxins	Atrazine	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.079 milligrams per litre (95th percentile)																					
									Endosulfan		≤ 0.0013 milligrams per litre (95thpercentile)																					
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 130 counts/100ml (95th percentile)																					
							Habitat	Geomorphology	GAI score	GAI score should be within a 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 D category (42-57%).	A category (92-100%)																					
								Invertebrates	MIRAI score	MIRAI score to be within a B category (82-87%).	B category (82-87%)																					
									Invertebrate diversity		SASS score > 110, ASPT > 7.0																					
									Number of families		9 families, *Ephemerellidae, Leptophlebidae, Heptageniidae, Tricorythidae, Elmidae, Corydalidae, Trichoptera cased caddis 2 or > types, Pyraustidae, 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		
											Months	Maintenance flows (million cubic metres)	
												Low	High
											Oct	0.465	0.398
											Nov	0.358	0.179
											Dec	0.199	0
											Jan	0.091	0
											Feb	0.065	0
											Mar	0.064	0
											Apr	0.126	0
											May	0.196	0.516
											Jun	0.293	0.767
											Jul	0.413	0.502
											Aug	0.603	2.013
											Sep	0.541	0.502
F10 Overberg East Renosterveld	II	G40K	F10-R14	Klein River	nv23	C/D	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Klein River in a condition equal to or better than a C/D category.	≤ 0.075 milligrams/litre (50th percentile)		
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.			
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50th percentile)		
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at present day levels.	≤ 180 milliSiemens/metre (95th percentile)		
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≥ pH ≤ 8.5 (5th and 95th percentiles)		
									Dissolved oxygen		≥ 6 milligrams litre (5th percentile)		
								Toxins	Atrazine	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.079 milligrams per litre (95th percentile)		
									Endosulfan		≤ 0.0013 milligrams per litre (95thpercentile)		
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95th percentile)		
							Habitat	Geomorphology	GAI score	GAI score should be within C category (62-77%).	C category (62-77%)		
								Riparian vegetation	VEGRAI score	VEGRAI level 3 should be within a D category (42-57%).	D category (42-57%)		
							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 C category (62-77%).	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												
											Months		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
H17 Overberg East Fynbos	II	H17	H17-R15	Nuwejaar 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.	Maintenance flows (million cubic metres)	Low	0.055	0.046	0.03	0.022	0.022	0.02	0.03	0.035	0.049	0.056	0.065	0.059
												High	0.115	0.052	0	0	0	0	0	0.129	0.232	0.108	0.393	0.108
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50th percentile)												
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50th percentile)												
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at present day levels.	≤ 170 milliSiemens/metre (95th percentile)												
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≥ pH ≤ 8.5 (5th and 95th percentiles)												
									Dissolved oxygen		≥ 6 milligrams /litre (5th percentile)												
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95th percentile)												
							Habitat	Geomorphology	GAI score	GAI score should be within a D category (42-57%).	D category (42-57%)												
								Riparian vegetation	VEGRAI score	VEGRAI level 3 should be within an E category (22-37%).	E category (22-37%)												
							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 D category (42-57%).	D category (42-57%)												
H17 Overberg East Fynbos	II	G50D	H17-R16	Kars River	nv24	B/C	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Kars River in a condition equal to or better than a B/C category.	Maintenance flows (million cubic metres)	Low	0.322	0.282	0.168	0.121	0.109	0.119	0.191	0.204	0.25	0.255	0.304	0.283
												High	0.301	0.157	0	0	0	0	0	0.268	0.349	0.17	0.651	0.17
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50th percentile)												
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50th percentile)												

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 (95th percentile)
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≥ pH ≤ 8.5 (5th and 95th percentiles)
									Dissolved oxygen		≥ 6 milligrams litre (5th percentile)
								Toxins	Ammonia		≤ 0.073 milligrams per litre (95th percentile)
									Atrazine	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.079 milligrams per litre (95th percentile)
									Endosulfan		≤ 0.0013 milligrams per litre (95thpercentile)
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95th 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		
											Maintenance flows (million cubic metres)	Months	
F11 Lower Breede Renosterveld	III	H70G	F11-R17	Breede River	niii4	C	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Breede River in a condition equal to or better than a B/C category.	Low	Oct	42.827
												Nov	28.026
												Dec	9.569
												Jan	7.407
												Feb	8.604
												Mar	3.827
												Apr	10.237
												May	13.818
												Jun	31.627
												Jul	44.934
												Aug	64.391
												Sep	55.658
								Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50th percentile)		
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50th percentile)		
							Quality	Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained in a Tolerable category for Irrigation water supply.	≤ 270 milliSiemens/metre (95th percentile)		
								System	pH range	pH, temperature, and	6.5 ≥ pH ≤ 8.5 (5th and 95th 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 (5th percentile)
									Water temperature		No more thatn2°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 (95th percentile)
									Atrazine		≤ 0.079 milligrams per litre (95th percentile)
									Endosulfan		≤ 0.0013 milligrams per litre (95th percentile)
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95th percentile)
								Geomorphology	GAI score	GAI score should be within B category (82-87%).	B category (82-87%)
							Habitat	Riparian vegetation	VEGRAI score	VEGRAI level 3 should be within a C category (62-77%).	C category (62-77%)
									Marginal zone cover abundance		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%
							Biota	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		
											Months		
											Maintenance flows (million cubic metres)		
											Low	High	
E8 Touws	III	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).	Oct	0.017	0.031
											Nov	0.021	0.031
											Dec	0.019	0
											Jan	0.012	0.031
											Feb	0.009	0
											Mar	0.015	0
											Apr	0.016	0.079
											May	0.017	0
											Jun	0.013	0
											Jul	0.01	0
											Aug	0.012	0
											Sep	0.012	0
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50th percentile)		
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50th percentile)		

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
E8 Touws	III	J12L	E8-R19	Touws River	gv5	B/C	Habitat	Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at present day levels.	≤ 1500 milliSiemens/metre (95th percentile)
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≥ pH ≤ 8.5 (5th and 95th percentiles)
									Dissolved oxygen		≥ 6 milligrams litre (5th percentile)
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95th percentile)
								Geomorphology	GAI score	GAI score should equate to a C/D.	C/D category (57-62%)
								Riparian vegetation	VEGRAI score	VEGRAI level 4 of at ~58% for the riparian zone.	C/D category (57-62%)
									Marginal zone cover abundance		No exotic species, no terrestrial woody species
									Lower zone cover abundance		Exotic species < 5%, terrestrial woody species < 10%
									Upper zone cover abundance		Exotic species < 10%, terrestrial woody species < 15%
							Biota	Fish	FRAI score	FRAI shall yield a C/D (58.3%).	C/D category (57-62%)
								Invertebrates	MIRAI score	MIRAI score to be within D (40-59%) Category	D category (42-57%)
									Invertebrate diversity		SASS score > 90, ASPT score > 4.5
									Number of families		> 15 families at abundances A - C
							Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Touws River an ecological condition that is equal to or better than the ecological condition in summer 2014 (Category C).	Maintenance flows (million cubic metres)
											Months
											Low: Oct 0.125, Nov 0.164, Dec 0.139, Jan 0.124, Feb 0.119, Mar 0.108, Apr 0.163, May 0.178, Jun 0.235, Jul 0.201, Aug 0.195, Sep 0.129
											High: Oct 0.183, Nov 0.354, Dec 0.274, Jan 0.246, Feb 0.407, Mar 0.204, Apr 1.37, May 0.446, Jun 0, Jul 0, Aug 0.433, Sep 0.175
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50th percentile)
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50th percentile)
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at present day levels.	≤ 1500 milliSiemens/metre (95th percentile)
								System	pH range	pH, temperature, and	6.5 ≥ pH ≤ 8.5 (5th and 95th percentiles)

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
E8 Touws	III	J11H	E8-R20	Buffels River	gv4	C	Habitat	variables	Dissolved oxygen	dissolved oxygen are important for the maintenance of ecosystem health.	≥ 6 milligrams litre (5th percentile)
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95th percentile)
								Geomorphology	GAI score	GAI score should equate to a B	B category (82-87%)
								Riparian vegetation	VEGRAI score	VEGRAI level 4 of at least 78% % for the riparian zone.	B/C category (77-82%)
									Marginal zone cover abundance		No exotic species, no terrestrial woody species
									Lower zone cover abundance		Exotic species < 5%, terrestrial woody species < 5%
									Upper zone cover abundance		Exotic species < 5%, terrestrial woody species < 5%
							Biota	Fish	FRAI score	FRAI shall yield a C/D (59%).	C/D category (57-62%)
								Invertebrates	MIRAI score	MIRAI score to be within B/C (78 - 82%) Category	B/C category (77-82%)
									Invertebrate diversity		SASS score > 45, ASPT?>4.0
									Number of families		> 10 families, 5 with SASS score > 5, abundance A-C
							Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Buffels River an ecological condition that is equal to or better than the ecological condition in summer 2014 (Category C).	Maintenance flows (million cubic metres) Months: Low / High: Oct 0.068 / 0.517; Nov 0.075 / 1.588; Dec 0.078 / 0.517; Jan 0.07 / 1.588; Feb 0.057 / 0; Mar 0.083 / 0; Apr 0.097 / 0; May 0.113 / 0; Jun 0.111 / 0; Jul 0.11 / 0; Aug 0.105 / 0; Sep 0.073 / 0
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50th percentile)
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50th percentile)
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at present day levels.	≤ 320 milliSiemens/metre (95th percentile)
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≥ pH ≤ 8.5 (5th and 95th percentiles)
									Dissolved oxygen		≥ 6 milligrams litre (5th percentile)

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
E8 Touws	III	J11J	E8-R21	Groot River	gv6	D	Habitat	Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95th percentile)
								Geomorphology	GAI score	GAI score should equate to a D	D category (42-57%)
								Riparian vegetation	VEGRAI score	VEGRAI level 4 of at ~57% for the riparian zone.	D category (42-57%)
									Marginal zone cover abundance		No exotic species, no terrestrial woody species
									Lower zone cover abundance		Exotic species < 5%, terrestrial woody species < 5%
									Upper zone cover abundance		Exotic species < 10%, terrestrial woody species < 30%
								Fish	FRAI score	FRAI shall yield a B/C (79%).	B/C category (77-82%)
							Biota	Invertebrates	MIRAI score	MIRAI score to be within C Category	C category (62-77%)
									Invertebrate diversity		SASS score > 90, ASPT > 5.0
									Number of families		> 15 families, 7 with SASS score > 6, abundances A - C
							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).	Maintenance flows (million cubic metres)
											Months: Low: Oct: 0.016; Nov: 0.018; Dec: 0.019; Jan: 0.016; Feb: 0.015; Mar: 0.022; Apr: 0.024; May: 0.027; Jun: 0.029; Jul: 0.027; Aug: 0.027; Sep: 0.018
											High: Oct: 0.559; Nov: 1.719; Dec: 0.559; Jan: 1.719; Feb: 0; Mar: 0; Apr: 0; May: 0; Jun: 0; Jul: 0; Aug: 0; Sep: 0
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50th percentile)
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50th percentile)
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at present day levels.	≤ 320 milliSiemens/metre (95th percentile)
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≥ pH ≤ 8.5 (5th and 95th percentiles)
									Dissolved oxygen		≥ 6 milligrams litre (5th percentile)
								Toxins	Atrazine	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.079 milligrams per litre (95th percentile)
									Endosulfan		≤ 0.0013 milligrams per litre (95th percentile)

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
											Months		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
E8 Touws	III	J13C	E8-R22	Groot River	gii3	B	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Groot River an ecological condition that is equal to or better than the ecological condition in summer 2014 (Category D).	Maintenance flows (million cubic metres)	Low	0.583	0.746	0.752	0.732	0.637	0.593	0.852	0.803	0.903	0.791	0.808	0.587
												High	0.603	1.092	1.123	1.121	1.178	0.589	3.765	1.208	0	0	1.118	0.532
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50th percentile)												
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50th percentile)												
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at present day levels.	≤ 620 milliSiemens/metre (95th percentile)												
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≥ pH ≤ 8.5 (5th and 95th percentiles)												
									Dissolved oxygen		≥ 6 milligrams litre (5th 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												
											Months		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
D7 Gouritz-Olifants	III	J25A	D7-R23	Gamka River	giv20	C	Quantity	Low flows High flows	Maintenance low flows Maintenance high 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).	Maintenance flows (million cubic metres)	Low	0.192	0.232	0.262	0.232	0.241	0.487	0.382	0.22	0.16	0.162	0.157	0.167
												High	0.342	0.94	2.707	0.94	0.94	2.707	0.94	0	0	0	0	0.342
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50th percentile)												
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50th percentile)												
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at present day levels.	≤ 90 milliSiemens/metre (95th percentile)												
								System variables	pH	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≥ pH ≤ 8.5 (5th and 95th percentiles)												
									Dissolved oxygen		≥ 6 milligrams litre (5th percentile)												
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95th percentile)												

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
D7 Gourtiz-Olifants	III	J31C	D7-R24	Olifants River	gIII2	C	Habitat	Geomorphology	GAI score	GAI score should equate to a C	C category (62-77%)
								Riparian vegetation	VEGRAI score	VEGRAI level 4 of at least 61% for the riparian zone.	C category (62-77%)
									Marginal zone cover abundance		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 score	FRAI shall yield a C (71.6%).	C category (62-77%)
								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
							Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Olifants River an ecological condition that is equal to or better than the ecological condition in summer 2014 (Category C/D).	Maintenance flows (million cubic metres) Months: Low / High Oct: 0.035 / 0.046 Nov: 0.055 / 0.13 Dec: 0.057 / 0.137 Jan: 0.05 / 0.107 Feb: 0.079 / 0.127 Mar: 0.109 / 0.548 Apr: 0.068 / 0.127 May: 0.053 / 0.097 Jun: 0.036 / 0 Jul: 0.037 / 0 Aug: 0.046 / 0.083 Sep: 0.035 / 0.04
								Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50th percentile)
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50th percentile)
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at present day levels.	≤ 680 milliSiemens/metre (95th percentile)
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≥ pH ≤ 8.5 (5th and 95th percentiles)
									Dissolved oxygen		≥ 6 milligrams litre (5th percentile)
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95th percentile)
							Habitat	Geomorphology	GAI score	GAI score should equate to a C/D	C/D category (57-62%)
								Riparian vegetation	VEGRAI score	VEGRAI level 4 of at ~70% for the riparian zone.	C category (62-77%)
									Marginal zone cover abundance		No exotic species, no terrestrial woody species
									Lower zone cover abundance		No exotic species, no terrestrial woody species

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
D7 Gourtiz-Olifants	III	J34C	D7-R25	Kammanassie River	gv36	C/D			Upper zone cover abundance		No exotic species, no terrestrial woody species
							Biota	Invertebrates	MIRAI score	MIRAI score should equate to a C	C category (62-77%)
							Quantity	Low flows High flows	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).	Maintenance flows (million cubic metres) Months: Low: Oct 0.435, Nov 0.431, 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; High: Oct 0.218, Nov 0.218, Dec 0, Jan 1.091, Feb 0.218, Mar 0, Apr 0, May 0, Jun 0, Jul 1.091, Aug 0, Sep 0
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50th percentile)
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50th percentile)
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained in a D class for aquatic ecosystems.	≤ 85 milliSiemens/metre (95th percentile)
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≥ pH ≤ 8.5 (5th and 95th percentiles)
									Dissolved oxygen		≥ 6 milligrams litre (5th percentile)
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95th percentile)
							Habitat	Riparian vegetation	VEGRAI score	VEGRAI level 4 of at ~58% for the riparian zone.	C/D category (57-62%)
									Marginal zone cover abundance		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 < 20%
								Fish	FRAI score	FRAI shall yield a D (46.9%).	D category (42-57%)
							Biota	Invertebrates	MIRAI score	MIRAI score to be within C/D (58-62%) Category	C/D category (57-62%)
									Invertebrate diversity		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		
											Months		
											Maintenance flows (million cubic metres)	High	Low
F13 Lower Gouritz	II	J40B	F13-R26	Gouritz River	gi4	C	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Gouritz River an ecological condition that is equal to or better than the ecological condition in summer 2014 (Category C).	Oct	4.818	2.752
											Nov	2.398	2.474
											Dec	4.818	2.267
											Jan	2.398	1.804
											Feb	2.398	1.627
											Mar	9.926	2.223
											Apr	9.926	2.134
											May	9.926	2.041
											Jun	0	2.021
											Jul	0	2.137
											Aug	0	2.213
											Sep	0	2.213
								Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50th percentile)		
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50th percentile)		
							Quality	Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at present day levels.	≤ 600 milliSiemens/metre (95th percentile)		
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≥ pH ≤ 8.5 (5th and 95th percentiles)		
									Dissolved oxygen		≥ 6 milligrams litre (5th percentile)		
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95th percentile)		
							Habitat	Geomorphology	GAI score	GAI score should equate to a B	B category (82-87%)		
								Riparian vegetation	VEGRAI score	VEGRAI level 4 of at ~57% for the riparian zone.	B/C category (77-82%)		
									Marginal zone cover abundance		No exotic species, no terrestrial woody species		
									Lower zone cover abundance		No exotic species, no terrestrial woody species		
									Upper zone cover abundance		Exotic species < 15%, terrestrial woody species < 40%		
							Biota	Fish	FRAI score	FRAI shall yield a D (50.1%).	D category (42-57%)		
								Invertebrates	MIRAI score	MIRAI score to be within C (60-79%) Category	C category (62-77%)		
									Invertebrate diversity		SASS score > 90, ASPT > 5.0		
									Number of families		> 19 families, 7 with SASS score > 7, abundance A - C		

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

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
											Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
											Maintenance flows (million cubic metres) High	1.775	1.676	1.151	0.648	0.489	0.781	0.861	0.981	1.014	1.207	1.426	1.522
											Maintenance flows (million cubic metres) Low	0.418	0	0	0	0	0.418	0	0	0.418	0	2.649	0
F12 Duiwenhoks	III	H80D	F12-R27	Duiwenhoks River	giii8	D	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Duiwenhoks River an ecological condition that is equal to or better than the ecological condition in summer 2014.	≤ 0.075 milligrams/litre (50th percentile)													
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 1.75 milligrams/litre (50th percentile)												
									Total inorganic nitrogen (TIN)														
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained in a Tolerable category for irrigation.	≤ 270 milliSiemens/metre (95th percentile)												
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≥ pH ≤ 8.5 (5th and 95th percentiles)												
									Dissolved oxygen		≥ 6 milligrams litre (5th percentile)												
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95th percentile)												
							Habitat	Geomorphology	GAI score	GAI score should equate to a D	D category (42-57%)												
								Riparian vegetation	VEGRAI score	VEGRAI level 4 of at least 61% for the riparian zone.	C/D category (57-62%)												
									Marginal zone cover abundance		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 < 20%												
							Biota	Fish	FRAI score	FRAI shall yield a D in the Duiwenhoks River	D category (42-57%)												
								Invertebrates	MIRAI score	MIRAI (40 - 59%) shall yield a D in the Duiwenhoks River.	D category (42-57%)												
									Invertebrate diversity		SASS score > 60, ASPT score > 5												
									Number of families		> 10 families, abundance A - C, presence of Emlidae, Simulidae, Ancylidae												

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

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric											
											Months	Maintenance flows (million cubic metres)	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
												Low	0.794	0.764	0.171	0	0.139	0.688	0.688	0.653	0.598	0.567	0.691	0.654
												High	1.734	1.734	0	1.025	0.381	0	0	0	0	0	0	1.025
I18 Hessequa	III	H90C	I18-R28	Goukou River	giii7	C/D	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Duiwenhoks River an ecological condition that is equal to or better than the ecological condition in summer 2014 (Category C/D).		≤ 0.075 milligrams/litre (50th percentile)												
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.		≤ 1.75 milligrams/litre (50th percentile)												
									Total inorganic nitrogen (TIN)															
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained an Acceptable category for ecosystem health.		≤ 130 milliSiemens/metre (95th percentile)												
								System variables	pH	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.		6.5 ≥ pH ≤ 8.5 (5th and 95th percentiles)												
									Dissolved oxygen			≥ 6 milligrams litre (5th percentile)												
								Toxins	Atrazine	Toxicity levels must not pose a threat to aquatic ecosystems.		≤ 0.079 milligrams per litre (95thpercentile)												
									Endosulfan			≤ 0.0013 milligrams per litre (95thpercentile)												
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.		≤ 165 counts/100ml (95th percentile)												
							Habitat	Geomorphology	GAI score	GAI score should equate to a D		D category (42-57%)												
								Riparian vegetation	VEGRAI score	VEGRAI level 4 of at least 71% for the riparian zone.		C category (62-77%)												
									Marginal zone cover abundance			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%												
								Fish	FRAI score	FRAI shall yield a D (50.8%).		D category (42-57%)												
								Invertebrates	MIRAI score	MIRAI score to be within the D EC (40 - 59%) Category		D category (42-57%)												
									Invertebrate diversity			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												
											Maintenance flows (million cubic metres)	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
G14 Groot Brak	III	K20A	G14-R29	Groot Brak River	gviii2	B/C	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Groot Brak River in an ecological condition that is equal to or better than Category B/C.	Low	0.112	0.299	0.287	0.199	0.141	0.134	0.257	0.068	0.087	0.112	0.134	0.151
											High	1.171	0.073	0.147	0	0.147	0.533	0	0	0	0	0	0
								Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at an oligotrophic condition.	≤ 0.025 milligrams per litre (50th percentile)												
									Total inorganic nitrogen (TIN)		≤ 0.70 milligrams per litre (50th percentile)												
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained in a B class for aquatic ecosystem health.	≤ 55 milliSiemens/metre (95th percentile)												
							Quality	System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≥ pH ≤ 8.5 (5th and 95th percentiles)												
									Dissolved oxygen		≥ 8 milligrams litre (5th percentile)												
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation in the downstream Wolwedans Dam.	≤ 165 counts/100ml (95th percentile)												
							Habitat	Geomorphology	GAI score	GAI score should equate to a B	B category (82-87%)												
									Sediment particle size		D16 = 1mm, D50 = 32mm, 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												
									Lower zone cover abundance		Exotic species <5%, terrestrial woody species < 15%												
									Upper zone cover abundance		Exotic species < 30%, terrestrial woody species > 40%												
							Biota	Fish	FRAI score	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												
											Months	Maintenance flows (million cubic metres)											
												High	Low	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
G15 Coastal	II	K30B	G15-R30	Malgas River	gvii9	C	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Malgas in an ecological condition that is equal to or better than Category C.		0.296	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)	1.218	1.044	0.219	0.219	0.219	0.812	0	0	0	0	0	0
									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)												
								System variables	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)												
									Dissolved oxygen		≥ 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)												
									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)												
							Habitat	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												
								Riparian vegetation	VEGRAI score	VEGRAI level 4 of Category D	D category (42-57%)												
									Marginal zone cover abundance		No exotic species, no terrestrial woody species												
									Lower zone cover abundance		Exotic species < 5%, terrestrial woody species < 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%)												
								Invertebrates	MIRAI score	MIRAI score to be within A	A category (92-100%)												
									Invertebrate diversity		SASS score > 160, ASPT > 8												

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
											Maintenance flows (million cubic metres)		Months										
											Low	High	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
G15 Coastal	II	K30C	G15-R31	Kaaimans River	gvii11	B	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Kaaimans River in an ecological condition that is equal to or better than Category B.	0.592 0.538	0.249 1.052	0.538 0.775	0.445 0	0.335 1.828	0.445 0.249	0.538 0	0.483 0	0.359 0	0.371 0	0.371 0	0.359 0	0.359 0
							Quality	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 (50^{th} percentile) ≤0.70 milligrams per litre (50^{th} percentile)												
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained in an Ideal category for aquatic ecosystems.	≤ 30 milliSiemens/metre (95^{th} percentile)												
								System variables	pH range Dissolved oxygen	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	4.5 ≥ pH ≤ 7.5 (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 Sediment particle size	GAI score should equate to a B/C	B/C category (77-82%) D16 = 2mm, D50 = 16 mm, D84 = 64 mm												
								Riparian vegetation	VEGRAI score Marginal zone cover abundance Lower zone cover abundance Upper zone cover abundance	VEGRAI level 4 of Category A.	A category (92-100%) No exotic species, no terrestrial woody species Exotic species < 5%, terrestrial woody species < 15% Exotic species < 5%, terrestrial woody species < 5%												
							Biota	Fish	FRAI score	FRAI shall yield a B.	B category (82-87%)												
								Invertebrates	MIRAI score Invertebrate diversity	MIRAI score to be within A Category.	A category (92-100%) SASS score > 160, ASPT > 8												

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric													
										Maintenance flows (million cubic metres)		Months											
										Low	High	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
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.	0.331	0.412	0.344	0.107	0	0.237	0.18	0.021	0.173	0	0.206	0.412	0.199	0.107	0.201	0	0.176	0	0.173	0	0.213	0	0.252
						Quantity	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at an oligotrophic condition.	≤ 0.025 milligrams per litre (50^{th} percentile)																						
								Total inorganic nitrogen (TIN)		≤ 0.70 milligrams per litre (50^{th} percentile)																					
							Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained in an Ideal category for aquatic ecosystems.	≤ 30 milliSiemens/metre (95^{th} percentile)																					
						Quality	System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	5 ≥ pH ≤ 7 (5^{th} and 95^{th} percentiles)																					
								Dissolved oxygen		≥ 8 milligrams per litre (5^{th} percentile)																					
							Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95^{th} percentile)																					
						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																					
							Riparian vegetation	VEGRAI score	VEGRAI level 4 of Category A/B.	A/B category (87-92%)																					
								Marginal zone cover abundance		No exotic species, no terrestrial woody species																					
								Lower zone cover abundance		Exotic species < 20%, terrestrial woody species < 5%																					
								Upper zone cover abundance		Exotic species < 5%, terrestrial woody species < 5%																					
							Fish	FRAI score	FRAI shall yield a B.	B category (82-87%)																					
							Invertebrates	MIRAI score	MIRAI score to be within B Category (80-90%).	B category (82-87%)																					
								Invertebrate diversity		SASS score > 190, ASPT > 7																					

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
											Months		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
G15 Coastal	II	K40C	G15-R33	Karatara River	gvii13	B	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows shall be sufficient to maintain the Karatara River in an ecological condition that is equal to or better than Category A/B.	Maintenance flows (million cubic metres)	Low	0.188	0.192	0.169	0.149	0.144	0.169	0.16	0.153	0.129	0.12	0.149	0.17
												High	0.471	0.283	0	0	0	0.283	0.029	0	0	0	0	0
								Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at an oligotrophic condition.	≤ 0.025 milligrams per litre (50^{th} percentile)												
									Total inorganic nitrogen (TIN)		≤ 0.70 milligrams per litre (50^{th} percentile)												
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained in an Ideal category for aquatic ecosystems.	≤ 30 milliSiemens/metre (95^{th} percentile)												
							Quality	System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	4.0 ≥ pH ≤ 7.0 (5^{th} and 95^{th} percentiles)												
									Dissolved oxygen		≥ 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 equate to a A.	A category (92-100%)												
									Sediment particle size		D16 = 30mm, D50 = 80 mm, D84 = 200 mm												
								Riparian vegetation	VEGRAI score	VEGRAI level 4 of Category A/B.	A/B category (87-92%)												
									Marginal zone cover abundance		No exotic species, no terrestrial woody species												
									Lower zone cover abundance		Exotic species < 10%, terrestrial woody species < 5%												
									Upper zone cover abundance		Exotic species < 10%, terrestrial woody species < 5%												
							Biota	Fish	FRAI score	FRAI shall yield a B.	B category (82-87%)												
								Invertebrates	MIRAI score	MIRAI score to be within A.	A category (92-100%)												
									Invertebrate diversity		SASS score > 120, ASPT > 7												

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
											Months	Maintenance flows (million cubic metres)		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
												Low	High												
G15 Coastal	II	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.				0.645	1.124	0.825	0.642	0.552	0.764	0.947	0.401	0.387	0.431	0.554	0.536
								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)			0.445	0.821	0.821	0.445	0.445	0.445	0.445	0	0	0	0	0
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50^{th} percentile)														
							Quality	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)														
									Dissolved oxygen		≥ 6 milligrams litre (5^{th} percentile)														
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95^{th} percentile)														
							Habitat	Geomorphology	GAI score	GAI score should equate to a 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														
									Lower zone cover abundance		Exotic species < 5%, terrestrial woody species < 15%														
									Upper zone cover abundance		Exotic species < 5%, terrestrial woody species < 5%														
							Biota	Fish	FRAI score	FRAI shall yield a C.	C category (62-77%)														
								Invertebrates	MIRAI score	MIRAI score to be within A.	A category (92-100%)														
									Invertebrate diversity		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												
											Maintenance flows (million cubic metres)	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
G15 Coastal	II	K50A	G15-R35	Knysna River	gvii14	B	Quantity	Low flows	Maintenance low flows	Flows shall be sufficient to maintain the Knysna River in an ecological condition that is equal to or better than Category B.		Low	0.686	0.664	0.546	0.437	0.411	0.441	0.441	0.476	0.447	0.474	0.579	0.644
								High flows	Maintenance high flows			High	0.478	0.837	0	0	0.239	0.239	0.478	0	0	0	0	0
								Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at an oligotrophic condition.	≤ 0.025 milligrams per litre (50th percentile)													
									Total inorganic nitrogen (TIN)		≤ 0.70 milligrams per litre (50th percentile)													
							Quality	Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained in an Ideal category for aquatic ecosystem health.	≤ 30 milliSiemens/metre (95th percentile)													
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	4.5 ≥ pH ≤ 7.0 (5th and 95th percentiles)													
									Dissolved oxygen		≥ 8 milligrams per litre (5th percentile)													
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Ideal category for full contact recreation.	≤ 130 counts/100ml (95th percentile)													
							Habitat	Geomorphology	GAI score	GAI score should equate to a A/B.	A/B category (87-92%)													
									Sediment particle size		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													
									Lower zone cover abundance		Exotic species < 20%, terrestrial woody species < 5%													
									Upper zone cover abundance		Exotic species < 40%, terrestrial woody species < 5%													
								Fish	FRAI score	FRAI shall yield a B.	B category (82-87%)													
							Biota	Invertebrates	MIRAI score	MIRAI score to be within B Category.	B category (82-87%)													
									Invertebrate diversity		SASS score > 150, ASPT > 6.7													

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric													
										Maintenance flows (million cubic metres)		Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
												Low	1.44	1.328	1.019	0.778	0.692	0.76	0.781	0.898	0.875	0.954	1.202	1.377
												High	0.342	1.197	0	0	0	0.684	0.342	0	0	0	0	0	0.067
G15 Coastal						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.	≤ 0.025 milligrams per litre (50th percentile)															
							Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at an oligotrophic condition.															
								Total inorganic nitrogen (TIN)		≤ 0.70 milligrams per litre (50th percentile)														
							Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained in an Ideal category for aquatic ecosystem health.	≤ 30 milliSiemens/metre (95th percentile)														
						Quality	System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	4.0 ≥ pH ≤ 7.0 (5th and 95th percentiles)														
								Dissolved oxygen		≥ 8 milligrams per litre (5th percentile)														
							Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Ideal category for full contact recreation.	≤ 130 counts/100ml (95th percentile)														
						Habitat	Geomorphology	GAI score	GAI score should equate to a A/B.	A/B category (87-92%)														
								Sediment particle size		D16 = 10mm, D50 = 50 mm, D84 = 200 mm														
							Riparian vegetation	VEGRAI score	VEGRAI level 4 of Category A/B.	A/B category (87-92%)														
								Marginal zone cover abundance		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 < 5%														
						Biota	Fish	FRAI score	FRAI shall yield a B.	B category (82-87%)														
							Invertebrates	MIRAI score	MIRAI score to be within B	B category (82-87%)														
								Invertebrate diversity		SASS score > 120, ASPT > 7.5														

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric											
											Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
											Maintenance flows (million cubic metres) High	1.697	1.448	1.157	0.788	0.508	0.627	0.669	0.833	0.875	1.123	1.395	1.448
											Maintenance flows (million cubic metres) Low	0.758	0	0.758	0	0	0	0	0.758	0	0	0.758	3.389
G15 Coastal	II	K60C	G15-R37	Keurbooms River	giv6	C	Quantity	Low flows High flows	Maintenance low flows Maintenance high 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).													
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at an oligotrophic condition.	≤ 0.025 milligrams per litre (50^{th} percentile)												
									Total inorganic nitrogen (TIN)		≤ 0.70 milligrams per litre (50^{th} percentile)												
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained in an Ideal category for aquatic ecosystem health.	≤ 30 milliSiemens/metre (95^{th} percentile)												
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	5.5 ≥ pH ≤ 8.0 (5^{th} and 95^{th} percentiles)												
									Dissolved oxygen		≥ 8 milligrams per litre (5^{th} percentile)												
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Ideal category for full contact recreation.	≤ 130 counts/100ml (95^{th} percentile)												
							Habitat	Geomorphology	GAI score	GAI score should equate to a B.	B category (82-87%)												
								Riparian vegetation	VEGRAI score	VEGRAI level 4 of at ~58% for the riparian zone.	B/C category (77-82%)												
									Marginal zone cover abundance		No exotic species, no terrestrial woody species												
									Lower zone cover abundance		Exotic species < 5%, terrestrial woody species < 15%												
									Upper zone cover abundance		Exotic species < 30%, terrestrial woody species < 20%												
								Fish	FRAI score	FRAI shall yield a B	B category (82-87%)												
							Biota	Invertebrates	MIRAI score	MIRAI score to be within B	B category (82-87%)												
									Invertebrate diversity		SASS score > 180, ASPT > 6.5												
									Number of families		> 15 families, 2 with SASS scores > 12, abundance A - C												

Table 18: Resource Quality Objectives for ESTUARIES in priority Resource Units in the Integrated Unit of Analysis B5 Overberg West

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
											Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual
											MMR/MAR (% Nat)	76.6	49.2	39.1	48.2	43.6	43.0	41.1	46.4	57.3	74.4	86.6	90.5	70.1
B5 Overberg West	II	G40D	B5-E01	Palmiet Estuary	pxi1	C	Quantity	Flow	MMR/MAR (% Nat)	Maintain a flow regime to create the required habitat for birds, fish, macrophytes, microalgae and water quality.	River inflow: Average DIN concentration >100 µg/l (dry season) or >500 µg/l (wet season)														
							Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	Estuary: Average DIN concentrations in freshwater section >100 µg/l (dry season) (marine waters may have higher concentrations linked to upwelling) and >500 µg/l (wet season)													
									DIP		River inflow: Average DIP concentration >10 µg/l (dry season) and >50 µg/l (wet season)													
											Estuary: Average DIP concentrations >10 µg/l (dry season) (marine waters may have higher concentrations linked to upwelling) and >50 µg/l (wet season).													
								Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Salinity must not drop below 10 for longer than three months in a year													
								System variables	Temperature	System variables not to exceed TPCs for biota	River inflow: Summer temperature <20 °C													
									pH		<8													
									Dissolved oxygen		>4 mg/													
									Secchi depth		>2 m													
								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	Estuary mouth permanently open													
									Tidal variation		Average tidal amplitude near the mouth during low flows (summer) must not change by >10% from established baseline.													
								Sediments	Sediment characteristics, Channel shape/size	Flood regime 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 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 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}
								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 (*Grandidierella* sp.and *Corophium triaenonyx*) living on the sediment surface in the middle and upper estuarine reaches respectively; in the zooplankton, the density of *Pseudodiaptomus hessei* 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		
											Months	Oct	84.4
												Nov	69.5
												Dec	28.7
												Jan	11.2
												Feb	8.9
												Mar	13.4
												Apr	35.3
												May	64.3
												Jun	87.8
												Jul	91.2
												Aug	91.7
												Sep	89.8
												Annual	81.9
H16 Overberg West Coastal													
	II												
		G40B											
			H16-E02										
				Buffels Estuary									
					bxi1	B							
							Quantity	Flow	MMR/MAR (% Nat)	Maintain at least present-day base flows	MMR/MAR (% Nat)	<100µg/ℓ	
							Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	<10 µg/ℓ		
									DIP				
								System variables	Dissolved oxygen	System variables not to exceed TPCs for biota	>6 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)		
							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	<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 *(Potamogeton pectinatus)* should be present during low flow 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	Estuary should have viable populations of *Callianassa kraussi* in sandy zones and *Upogebia africana* in muddy zones.
								Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	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%.
H16 Overberg West Coastal	II	G40B	H16-E03	Rooiels Estuary	bxi2	B	Quantity	Flow	MMR/MAR (% Nat)	Maintain at least present-day base flows	Months / MMR/MAR (% Nat): Oct 99.0; Nov 98.9; Dec 98.4; Jan 98.0; Feb 98.3; Mar 98.0; Apr 98.1; May 98.3; Jun 98.5; Jul 98.6; Aug 98.6; Sep 98.8; Annual 98.6
							Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	<100µg/ℓ
									DIP		<10 µg/ℓ
								System variables	Dissolved oxygen	System variables not to exceed TPCs for biota	>6 mg/l
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation	≤ 130 counts/100ml (95th percentile)
							Habitat	Hydrodynamics	Mouth state	Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary	Closed mouth state should not increase by >10% from established baseline
								Sediments	Sediment characteristics, Channel shape/size	Flood regime is sufficient to maintain natural bathymetry and sediment characteristics	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
H16 Overberg West Coastal	II	G40G	H16-E04	Bot Estuary	9ixn	C	Biota	Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	<20 µg l^{-1}
								Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Area occupied by different macrophyte groups should no change by >20 % change in the area covered by habitats, submerged macrophytes such as pondweed *(Potamogeton pectinatus)* 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 *Callianassa kraussi* in sandy zones and *Upogebia africana* in muddy zones.
								Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Maintain fish assemblage that includes at least 2 estuarine breeding species (Category I), 3 estuary dependent marine species (Category IIa & IIb) and 1 indigenous catadromous species (Category V). Estuarine residents should dominate numerically, but the proportion of estuary dependent marine species (based on abundance) should not fall below 2%.
							Quantity	Flow	MMR/MAR (% Nat)	Maintain a flow regime to create the required habitat for birds, fish, macrophytes, microalgae and water quality	Months / MMR/MAR (% Nat): Oct 80.2; Nov 75.7; Dec 63.9; Jan 58.2; Feb 60.3; Mar 63.7; Apr 75.5; May 80.9; Jun 83.8; Jul 85.8; Aug 87.7; Sep 85.0; Annual 81.8
							Quality	Nutrients	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) (90th percentile)
									Escherichia coli		≤500 E. coli/100 ml (90th 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 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
								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 *Pseudodiaptomus hessei* should range between 100 and 5000 m^3 in the summer in the mid-estuary region; Benthic macrofauna: density of sandprawn *Callianassa kraussi* burrow openings should exceed 75 per m^2 in the highest density areas in the lower estuary, burrow density in the lower estuary should not drop below 50 counts per m^2 in the highest density areas, all size classes of sand prawn should be present in the population
								Fish	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Fish community composition, abundance and richness	Juvenile estuary dependant marine fish should not be absent from the estuary for more than two years in a row; % contribution by juvenile estuary dependant marine fish to assemblage by number should not drop to <60% of residents; Alien species abundance should remain below 5 % of biomass in main body of estuary; % contribution of adult & sub-adult estuary-dependent fish to assemblage by number should not drop below 15%
								Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	Number of non-passerine waterbird species recorded in counts should not decrease by more than 10% over a five-year period; overall numbers of waders, wading birds or gulls & terns, or numbers of any of the species in these groups should not decrease relative to the baseline average by more than 10% over a five-year period, after correcting for regional/global population changes; total summer numbers of waterfowl should not exceed 15 000 for more than 4 years.
H16 Overberg West Coastal	II	G40H	H16-E05	Onrus Estuary	8ixn	D	Quantity	Flow	MMR/MAR (% Nat)	Maintain a flow regime to create the required habitat for birds, fish, macrophytes, microalgae and water quality	Months / MMR/MAR (% Nat): Oct 55.6; Nov 54.2; Dec 53.8; Jan 52.9; Feb 51.2; Mar 50.2; Apr 49.7; May 49.0; Jun 50.0; Jul 49.8; Aug 51.7; Sep 54.8; Annual 51.8
							Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	Entire estuary and river inflow: DIN <300µg/ℓ
									DIP		Entire estuary and river inflow: DIP < 25 µg/ℓ
								Salinity	Salinity	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
							Habitat	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) (90th percentile)
									Escherichia coli		≤500 E. coli/100 ml (90th percentile)
								Hydrodynamics	Mouth state	Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary	Closed mouth state should not increase by >10% from established baseline
								Sediments	Sediment characteristics, Channel shape/size	Flood regime is sufficient to maintain natural bathymetry and sediment characteristics	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline
							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	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
								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 *Azolla*.; 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	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 *Callianassa kraussi* in sandy zones and *Upogebia africana* in muddy zones. Breeding in both species ceases at salinities lower than 17 ppt during prolonged mouth phase. In *U. africana* 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. *Pseudodiaptomus* 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	II	G40L	H17-E06	Klein Estuary	nxl7	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	MMR/MAR (% Nat)	
											Oct	84.2	
											Nov	83.1	
											Dec	85.5	
											Jan	73.7	
											Feb	69.4	
											Mar	78.8	
											Apr	78.0	
											May	83.9	
											Jun	82.3	
											Jul	86.9	
											Aug	89.7	
											Sep	90.3	
											Annual	85.6	
								Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	Entire estuary and river inflow: DIN <300µg/ℓ		
									DIP		Entire estuary and river inflow: DIP <25 µg/ℓ		
							Quality	Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	5 < Salinity <40		
								System variables	Dissolved oxygen	System variables not to exceed TPCs for biota	Entire estuary and river inflow: DO >5mg/ℓ, turbidity < 5 NTU		
									Turbidity		Turbidity <5 NTU		
								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 (90th 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	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 epipelic diatoms should be found during the closed phase
								Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Maintain the present area (2014) covered by the macrophyte habitats: open surface water area: 741.6 ha; sand and mud banks: 79 ha; submerged macrophytes: 92 ha; salt marsh: 170 ha; reeds and sedges: 127 ha; floodplain: 280 ha (mostly intact) and 110 ha (disturbed); maintain the distribution of plant community types i.e. submerged macrophyte, *Ruppia cirrhosa* beds during closed mouth brackish conditions, salt marsh, *Salicornia meyeriana* marsh during open mouth conditions, *Phragmites australis* 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 *Callianassa kraussi* in sandy zones and *U. Africana* in muddy zones. Breeding in both species ceases at salinities lower than 17 ppt during prolonged mouth phase. In *U. africana* and export of larvae into marine and postlarvae back to estuary ceases; abundance of *C. kraussi* and *U. africana* 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. *Pseudodiaptomus sp.)* from the zooplankton community; abundance of indicator marine species (e.g. *Pseudodiaptomus 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		
											Months	MMR/MAR (% Nat)	
											Oct	58.8	
											Nov	58.8	
											Dec	58.8	
											Jan	58.8	
											Feb	58.8	
											Mar	58.8	
											Apr	58.8	
											May	58.8	
											Jun	58.8	
											Jul	58.8	
											Aug	58.8	
											Sep	58.8	
											Annual	58.8	
H17 Overberg East Fynbos													
	II												
		G40M											
			H17-E07										
				Uilkraal 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	Entire estuary and river inflow: DIN <300µg/ℓ		
							Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	Entire estuary and river inflow: DIP <25 µg/ℓ		
									DIP				
								Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	10 < Salinity <40		
								System variables	Dissolved oxygen	System variables not to exceed TPCs for biota	Entire estuary and river inflow: DO > 6 mg/ℓ		
									Turbidity		Turbidity < 5 NTU		
								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)		
							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	Phytoplankton biomass, measured as water column chlorophyll-a should not exceed 10 ug l^{-1}; maintain high subtidal benthic microalgal biomass during the closed mouth phase and high intertidal benthic microalgal biomass during the open 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	Maintain the distribution of plant community types i.e. submerged macrophyte, *Ruppia cirrhosa* beds during closed mouth brackish conditions, salt marsh, *Salicornia meyeriana* marsh during open mouth conditions, *Phragmites australis* stands in the middle / upper reaches and salt marsh grasses indicative of brackish conditions.		
								Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	The estuary should have viable populations of *Callianassa kraussi* in sandy zones and U. Africana in muddy zones		
								Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Retain the following fish assemblages in the estuary (based on abundance): estuarine species (30-40%), estuarine associated marine species (60-70%) and indigenous freshwater species (<1%). All numerically dominant species are represented by 0+ juveniles		
								Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	The estuary should contain a rich avifaunal community that includes representatives of all the original groups, significant numbers of migratory waders and terns, as well as a healthy breeding population of resident waders; the estuary should support thousands of birds in summer and hundreds in winter		
H17 Overberg East Fynbos	II	G50A	H17-E08	Ratel Estuary	nxi3	C	Quantity	Flow	MMR/MAR (% Nat)	Maintain at least present-day base flows		Months	MMR/MAR (% Nat)
												Oct	90.0
												Nov	90.0
												Dec	90.1
												Jan	90.3
												Feb	90.2
												Mar	90.2
												Apr	90.0
												May	90.0
												Jun	90.0
												Jul	90.0
												Aug	90.0
												Sep	90.0
												Annual	90.0
							Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	Entire estuary and river inflow: DIN <300µg/ℓ		
									DIP		Entire estuary and river inflow: DIP <25 µg/ℓ		
								Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	10 < Salinity <40		
								System variables	Dissolved oxygen	System variables not to exceed TPCs for biota	Entire estuary and river inflow: DO > 6 mg/ℓ		
									Turbidity		Turbidity < 5 NTU		
								Pathogens	Enterococci	Concentrations of	≤185 Enterococci/100 ml) (90th 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 (90th 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)
								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 (*Potamogeton pectinatus*) 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 *Callianassa kraussi* in sandy zones and *Upogebia africana* in muddy zones
								Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	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	
											Months	MMR/MAR (% Nat)
H17 Overberg East Fynbos	II	G50F	H17-E09	Heuningnes Estuary	nxi1	A/B	Quantity	Flow	MMR/MAR (% Nat)	Flood and breaching regimes to maintain the sediment distribution patterns and aquatic habitat (instream physical habitat) so as not to exceed TPCs for biota	Oct	79.6
											Nov	77.5
											Dec	73.1
											Jan	71.5
											Feb	72.5
											Mar	76.2
											Apr	79.1
											May	79.2
											Jun	79.0
											Jul	78.4
											Aug	78.7
											Sep	78.2
											Annual	78.2
								Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	Entire estuary and river inflow: DIN <300µg/ℓ	
									DIP		Entire estuary and river inflow: DIP <25 µg/ℓ	
							Quality	Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	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	
								System variables	Dissolved oxygen	System variables not to exceed TPCs for biota	Entire estuary and river inflow: DO >5 mg/ℓ	
									pH		8< 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	
								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	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 *C. kraussi* and *U. Africana* 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. *Pseudodiaptomus sp.)* from the zooplankton community, abundance of indicator marine species (e.g. *Pseudodiaptomus 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								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
	II	G50K	H17-E10	Klipdrifsfontein Estuary	bxi3	A	Quantity	Flow	MMR/MAR (% Nat)	Maintain at least present-day base flows	Months / MMR/MAR (% Nat): Oct 62.5; Nov 68.0; Dec 63.3; Jan 58.4; Feb 58.3; Mar 65.7; Apr 68.6; May 64.4; Jun 60.2; Jul 61.2; Aug 66.8; Sep 64.3; Annual 64.8
							Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	Entire estuary and river inflow: DIN <300µg/ℓ
									DIP		Entire estuary and river inflow: DIP <25 µg/ℓ
								Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	10 < Salinity <40
								System variables	Dissolved oxygen	System variables not to exceed TPCs for biota	Entire estuary and river inflow: DO > 6 mg/ℓ
									Turbidity		Turbidity < 5 NTU
								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
								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
							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)
								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 (*Potamogeton pectinatus*) 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 *Callianassa kraussi* in sandy zones and *Upogebia africana* in muddy zones
								Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	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	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
F11 Lower Breede Renosterveld	II	H70K	F11-E11	Breede Estuary	nxi2	B	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
											MMR/MAR (% Nat)	57.6	50.1	34.0	33.0	34.6	41.7	59.7	56.6	61.2	47.6	51.3	27.3	47.2
							Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	Entire estuary and river inflow: DIN <300µg/ℓ													
									DIP		Entire estuary and river inflow: DIP <25 µg/ℓ													
								Salinity	Salinity	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	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
							Habitat	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		Estuary mouth permanently open
									Tidal variation	Maintain connectivity with marine environment	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
							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	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/$m^{2;\ s}$ite specific chlorophyll a concentration not to exceed 20 µg/ℓ and cell density not to exceed 10 000 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: 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. *Eucalyptus*, prickly pear, *Tamarix*) cover not to exceed 5% of total floodplain area

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

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

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
												Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual
F13 Lower Gouritz	II	J40E	F13-E12	Gouritz Estuary	gxi1	C	Quantity	Flow	MMR/MAR (% Nat)	Maintain flow regime as per recommended ecological flow	Months													
											MMR/MAR (% Nat)	53.2	59.8	53.5	46.4	53.3	59.7	61.8	66.7	62.2	62.8	74.1	57.8	59.7
							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													
								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	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)													
							Habitat	Hydrodynamics	Mouth state	Maintain connectivity with marine environment	Estuary mouth permanently open													
									Tidal variation		Average tidal amplitude near the mouth during low flows (summer) must not change by >10% from established baseline.													
								Sediments	Sediment characteristics, Channel shape/size	Flood regime to maintain natural bathymetry and the sediment characteristics	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline													

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
						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	Median phytoplankton chlorophyll a (minimum 5 sites) should not exceed 3.5 µg/ℓ; prevent formation of localised phytoplankton blooms; site specific *chlorophyll a concentration exceeds 20 µg/ℓ and cell density exceeds 10 000 cells/ mℓ ;* Median intertidal benthic chlorophyll a (minimum 5 sites) exceeds 42 mg/m^2
							Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Maintain the present area (2013) covered by the macrophyte habitats: surface water area: 298.04 ha, sand and mud banks : 81.02 ha, reeds and sedges 6.72 ha, floodplain (supratidal salt marsh): 137.77 ha; Maintain the integrity of the remaining supratidal salt marsh; maintain the reed and sedge stands in the upper reaches of the estuary; rehabilitate 20% of the floodplain habitat by removing any agricultural berms and invasive plants; maintain the integrity of the riparian zone; change in the area covered by salt marsh, reeds and sedges not to exceed 20% from baseline; invasive plants (e.g. Eucalyptus, prickly pear, Tamarix) cover not to exceed 5% of total floodplain area
							Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Maintain rich populations of the mudprawn *Upogebia africana* 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	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric		
F12 Duiwenhoks	III	H80E	F12-E13	Duiwenhoks Estuary	gxi2	B	Quantity	Flow	MMR/MAR (% Nat)	Maintain flow regime as per TEC	Months	MMR/MAR (% Nat)
											Oct	92.2
											Nov	92.0
											Dec	87.7
											Jan	84.0
											Feb	84.7
											Mar	90.7
											Apr	92.9
											May	93.5
											Jun	93.5
											Jul	93.8
											Aug	94.4
											Sep	93.5
											Annual	91.9
							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	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
								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	Estuary mouth permanently open
									Tidal variation		Average tidal amplitude near the mouth does not change more than 30% from present during low flows (summer).
								Sediment	Sediment characteristics, Channel shape/size	Flood regime is sufficient to maintain natural bathymetry and sediment characteristics	Channel shape/size, sediment grain size and organic matter must not change by >10% from established baseline
							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	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 *Upogebia africana* 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	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	
I18 Hessequa	III	H90E	I18-E14	Goukou Estuary	gxi3	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	MMR/MAR (% Nat)
											Oct	81.7
											Nov	81.4
											Dec	72.8
											Jan	70.0
											Feb	71.2
											Mar	81.9
											Apr	85.0
											May	85.0
											Jun	84.1
											Jul	84.5
											Aug	85.7
											Sep	83.8
											Annual	81.4
								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	
								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	Dissolved oxygen	System variables not to exceed TPCs for biota	Entire estuary and river inflow: DO >5 mg/ℓ	
									pH		6.0 < pH > 8.0 (black water system)	
								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	Estuary mouth permanently open	

IUA	Class	Quaternary Catchment	RU	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
							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	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$^{2;\ s}$ite specific chlorophyll a 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
								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 *Upogebia africana* 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 25: Resource Quality Objectives for ESTUARIES in priority Resource Units in the Integrated Unit of Analysis G14 Groot-Brak

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
G14 Groot-Brak	III	K10F	G14-E15	Klein-Brak Estuary	gxi4	C	Quantity	Flow	MMR/MAR (% Nat)	Maintain a flow regime to create the required habitat for birds, fish, macrophytes, microalgae and water quality	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual
											MMR/MAR (% Nat)	77.4	77.4	75.1	71.7	70.2	75.8	77.9	78.5	78.0	78.1	79.5	78.8	77.0
							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	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		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 (90th percentile)
									Escherichia coli		≤500 E. coli/100 ml (90th 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
							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 the spread of reeds into open water; prevent an increase in nutrients and macroalgal blooms; prevent the spread of invasive trees (e.g. *Acacia* spp.) in the riparian zone

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	Maintain rich populations of the mudprawn *Upogebia africana* 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												
											Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual
											MMR/MAR (% Nat)	62.2	67.3	55.3	48.2	43.4	55.7	49.2	54.9	38.3	43.7	63.4	63.8	56.2
G14 Groot-Brak	III	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.	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	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												
									DIP														
								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												
									pH		6 < pH > 8.5 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)												
							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												

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
							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 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 to 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; Epipelic diatoms indicative of brackish conditions should be found during the closed phase.
								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 as for present (2013): Submerged macrophyte, *Ruppia cirrhosa* beds: ~5 ha, *Zostera capensis* present during open mouth conditions, intertidal salt marsh: ~13 ha, supratidal and floodplain salt marsh: ~26.6 ha), Reed (*Phragmites australis)* 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 *Triglochin* spp. and *Cotula coronopifolia*; prevent hypersaline sediment and groundwater conditions in the salt marsh. Sediment electrical conductivity should be approximately 30 mS and similar to groundwater values.
								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 m2 in the highest density areas; in the zooplankton, the density of Pseudodiaptomus hessei should exceed levels of about 5000-10000 m3 in the upper estuary in spring. Salinity variation in the estuary is highly variable and the mouth remains closed for extended periods - this may also lead to the temporary absence of some invertebrate species that might be expected to occur here.

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 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. *G. aestuaria*, & *Hyporamphus capensis*); 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).
G14 Groot-Brak	III	K10A	G14-E17	Blinde Estuary	gxi19	B	Quantity	Flow	MMR/MAR (% Nat)	Maintain flow regime as close to present as possible (small system needs most flows)	Months / MMR/MAR (% Nat): Oct 69.6; Nov 69.9; Dec 67.8; Jan 65.6; Feb 64.8; Mar 68.7; Apr 69.3; May 70.1; Jun 69.0; Jul 69.9; Aug 70.7; Sep 70.3; Annual 69.2
							Quality	Nutrients	DIN	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	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	<20 (expected range 5-15)
								System variables	Dissolved oxygen	System variables not to exceed TPCs for biota	>5 mg/l
									Turbidity		Turbidity not to exceed 10 NTU in low flow season
								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
						Biota	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. *Acacia* 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 *Callichirus kraussi* on sand banks in lower estuary; establish presence/absence of the copepod *Pseudodiaptomus hessei* or estuarine congeneric in the zooplankton of the estuary; 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												
											Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual
G14 Groot-Brak	III	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)	MMR/MAR (% Nat)	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3
							Quality	Nutrients	DIN	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	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		≤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												
							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. *Acacia* spp.) in the riparian zone												

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	Establish presence/absence of sand prawn *Callichirus kraussi* on sand banks in lower estuary; establish presence/absence of the copepod *Pseudodiaptomus hessei* or estuarine congeneric in the zooplankton of the estuary; 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
											Months / MMR/MAR (% Nat): 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 72.3
G14 Groot-Brak	III	K10A	G14-E19	Gericke Estuary	gxi21	D	Quantity	Flow	MMR/MAR (% Nat)	Maintain flow regime as close to present as possible (small system needs most flows)	
							Quality	Nutrients	DIN	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	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		≤500 E. coli/100 ml (90^{th} 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	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. *Acacia* 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 *Callichirus kraussi* on sand banks in lower estuary; establish presence/absence of the copepod *Pseudodiaptomus hessei* or estuarine congeneric in the zooplankton of the estuary; 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	III	K10B	G14-E20	Hartenbos Estuary	gxi22	D	Habitat	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
											Months: Oct 59.7 / Nov 64.0 / Dec 68.7 / Jan 71.1 / Feb 67.4 / Mar 60.3 / Apr 64.2 / May 64.7 / Jun 65.9 / Jul 60.8 / Aug 66.1 / Sep 66.9 / Annual 65.0
								Flow	MMR/MAR (% Nat)	Maintain at least present-day base flows	MMR/MAR (% Nat): Entire estuary and river inflow: DIN <200µg/ℓ
							Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	Entire estuary and river inflow: DIP <50 µg/ℓ
									DIP		
								Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Average salinity along the estuary should not drop more than 5 below baseline average
								System variables	Turbidity	System variables not to exceed TPCs for biota	Turbidity <20 NTU in low flow season
									Sechii depth		Sechii 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) (90th percentile)
									Escherichia coli		≤500 E. coli/100 ml (90th 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

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
							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 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. *Acacia* 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 Callichirus kraussi on sand banks in lower estuary, establish presence/absence of the copepod *Pseudodiaptomus hessei* or estuarine congeneric in the zooplankton of the estuary, 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	Fish assemblage should comprise the 5 estuarine association categories in similar proportions (diversity and abundance) to that under the reference (see 2015 EWR report); numerically assemblage should comprise: Ia estuarine residents (50-80% of total abundance), Ib marine and estuarine breeders (10-20%), IIa obligate estuarine-dependent (10-20%), IIb estuarine associated species (5-15%), IIc marine opportunists (20-80%), III marine vagrants (not more than 5%), IV indigenous fish (1-5%), V catadromous species (1-5%); Category Ia species should contain viable populations of at least 4 species ; Category IIa obligate dependents should be well represented by large exploited species
								Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	Maintain population of original groups of birds present on the estuary; number of birds in any group, other than species that are increasing regionally such as Egyptian geese, should not drop below the baseline median (determined by past data and or initial surveys) number of species and/or birds counted for three consecutive summer or winter counts

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

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
											Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual
											MMR/MAR (% Nat)	80.3	79.1	74.5	73.4	71.3	80.5	82.1	82.7	85.9	84.3	83.7	81.9	79.3
G15 Coastal	II	K30A	G15-E21	Maalgate Estuary	gxi6	B	Quantity	Flow	MMR/MAR (% Nat)	Maintain flow regime (small system needs most flows)	Entire estuary and river inflow: DIN <100µg/ℓ												
							Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	Entire estuary and river inflow: DIP <20 µg/ℓ												
									DIP														
								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												
								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)												
							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												

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 distribution of macrophyte habitats; prevent the spread of reeds into open water; prevent an increase in nutrients and macroalgal blooms; prevent the spread of invasive trees (e.g. *Acacia* spp.) in the riparian zone		
								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 Callichirus kraussi on sand banks in lower estuary, establish presence/absence of the copepod *Pseudodiaptomus hessei* or estuarine congeneric in the zooplankton of the estuary, 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	II	K30B	G15-E22	Gwaing Estuary	gxi7	B	Quantity	Flow	MMR/MAR (% Nat)	Maintain flow regime (small system needs most flows)	Months	Oct	84.9
												Nov	84.3
												Dec	82.8
												Jan	83.0
												Feb	81.6
												Mar	84.8
												Apr	86.3
												May	87.0
												Jun	89.1
												Jul	87.8
												Aug	86.8
												Sep	86.1
												Annual	85.0
											MMR/MAR (% Nat)	Entire estuary and river inflow: DIN <100µg/ℓ	
								Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	Entire estuary and river inflow: DIP <20 µg/ℓ		
									DIP				
							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		

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
							Habitat	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)
								Hydrodynamics	Mouth state	Maintain connectivity with marine environment	Closed mouth state should not increase 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
							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 the spread of reeds into open water; prevent an increase in nutrients and macroalgal blooms; prevent the spread of invasive trees (e.g. *Acacia* spp.) in the riparian zone
								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 Callichirus kraussi on sand banks in lower estuary, establish presence/absence of the copepod *Pseudodiaptomus hessei* or estuarine congeneric in the zooplankton of the estuary, populations of these species should not deviate from average baselines (as determined in first three visits) by more 30%
								Fish	Fish community composition, abundance and richness	Maintain composition, richness and abundance of different groups of fish, prevent colonisation/increase of alien species	Maintain fish assemblage that includes at least 2 estuarine breeding species (Category I), 3 estuary dependent marine species (Category IIa & IIb) and 1 indigenous catadromous species (Category V); estuarine residents should dominate numerically, but the proportion of estuary dependent marine species (based on abundance) should not fall below 2%.

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
							Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	Maintain population of original groups of birds present on the estuary; number of birds in any group, other than species that are increasing regionally such as Egyptian geese, should not drop below the baseline median (determined by past data and or initial surveys) number of species and/or birds counted for three consecutive summer or winter counts
G15 Coastal	K30C	G15-E23	Kaaimans Estuary	gxi8	B	Quantity	Flow	MMR/MAR (% Nat)	Maintain flow regime (small system needs most flows)	Months / MMR/MAR (% Nat): Oct 70.9; Nov 74.5; Dec 74.7; Jan 70.7; Feb 70.4; Mar 72.8; Apr 72.3; May 73.7; Jun 69.5; Jul 67.3; Aug 74.1; Sep 73.8; Annual 72.5
						Quality	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	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
							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)
						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	Estuary mouth permanently open
								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

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
G15 Coastal	II	K30D	G15-[illegible]	Wildern ess Estuary (Touw)	6jxg	B	Quantity	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	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual
								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. *Acacia* 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 Callichirus kraussi on sand banks in lower estuary, establish presence/absence of the copepod *Pseudodiaptomus hessei* or estuarine congeneric in the zooplankton of the estuary, 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 a flow regime to maintain water quality and the required habitat for birds, fish, macrophyes													

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric										
										and macrophytes. Abstraction should not result in flow differing more than 5% from the present day (2017) keeping in mind the percentage nMAR to be maintained in the system (88.6%) to keep it in its ecological category.	MMR/MAR (% Nat)	89.7	90.9	87.2	84.5	83.5	85.5	86.9	90.8	88.7	88.1	93.1	92.8	88.6
								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, PO_4-P not to exceed 10 µg/ℓ over two consecutive months; Estuary: average PO_4-P <10 µg/ℓ, no single sample >50 µg/ℓ ; Lakes: average PO_4-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											
								System variables	Turbidity	System variables 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 (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) (90th percentile)										
									Escherichia coli		≤500 E. coli/100 ml (90th 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
							Biota	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 Callichirus kraussi on sand banks in lower Touw Estuary; maintain rich populations of the benthic amphipod *Grandidierella lignorum* throughout the lakes and estuary
								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 (*G. aestuaria*, *Hyporamphus capensis*, *Omobranchus woodii*); Category IIa obligate dependents should be well represented by large exploited species (*A.japonicus*, *L. litthognathus*, *P. commersonii*, *Lichia amia*); REI species dominated by both *Myxus capensis* and *G. aestuaria*

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric		
							Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	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		
G15 Coastal	K40D	G15-E25	Swartvlei Estuary	gxi10	B	Quantity	Flow	MMR/MAR (% Nat)	Maintain a flow regime to create the required habitat for birds, fish, macrophytes, microalgae and water quality	Months	MMR/MAR (% Nat)	
										Oct	89.5	
										Nov	87.6	
										Dec	80.9	
										Jan	78.7	
										Feb	81.3	
										Mar	86.8	
										Apr	86.8	
										May	88.5	
										Jun	85.9	
										Jul	88.4	
										Aug	90.9	
										Sep	90.2	
										Annual	86.6	
						Quality	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)		
							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/m2 (median); prevent formation of phytoplankton blooms
								Macrophytes	Extent, distribution and richness of macrophytes	No further loss to extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	No further loss to the present area (2014) covered by the macrophyte habitats; no further loss to the distribution of sensitive macrophyte habitats (e.g. salt marsh, submerged macrophytes); control/eliminate invasive plants; prevent the spread of reeds into open water that results in loss of sandbank areas and has a negative impact on biota and hydrological processes
								Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Maintain presence of sand prawn *Callichirus kraussi* on sand banks in lower Touw Estuary; maintain rich populations of the benthic amphipod *Grandidierella lignorum* throughout the lakes and estuary

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 (*G. aestuaria, Hyporamphus capensis, Omobranchus woodii*); Category IIa obligate dependents should be well represented by large exploited species (*A.japonicus, L. lithognathus, P. commersonii, Lichia amia*); REI species dominated by both *Myxus capensis* and *G. aestuaria*
								Birds	Avifauna community composition, abundance and richness	Maintain composition, richness and abundance of different avifauna groups	The estuarine lake system should contain a diverse avifaunal community that includes representatives of all the original groups, and that sustains the populations for which the system has acquired RAMSAR status; numbers of waterbirds on the entire system, other than those that have or are increasing regionally such as Egyptian Goose, should not drop below 40 species or below 1500 birds for three consecutive counts
G15 Coastal	II	K40E	G15-E26	Goukamma Estuary	gxi11	B	Quantity	Flow	MMR/MAR (% Nat)	Maintain flow regime	Months / MMR/MAR (% Nat): Oct 87.5; Nov 88.8; Dec 87.5; Jan 85.7; Feb 85.5; Mar 87.1; Apr 86.9; May 88.2; Jun 87.2; Jul 86.5; Aug 88.5; Sep 88.3; Annual 87.5
							Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	DIN not >100 µg/L once-off.
									DIP		DIP not > 20 µg/L once-off.
								Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	
								System	Turbidity	System variables not to	Turbidity >10 NTU in low flow

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
						Habitat	variables	Dissolved oxygen	exceed TPCs for biota	>5 mg/L in estuary.
							Pathogens	Enterococci	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation	≤185 Enterococci/100 ml) (90th percentile)
								Escherichia coli		≤500 E. coli/100 ml (90th 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	Estuary mouth permanently open
								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
						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 median phytoplankton/benthic microalgae biomass: phytoplankton not > 1.0 µg/L (median)., benthic microalgae not > 11 mg/m^2 (median); Phytoplankton not > 20 µg/L and/or cell density not >10 000 cells/ml (once-off); Prevent formation of phytoplankton blooms
							Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Maintain distribution of macrophyte habitats; prevent the spread of invasive trees (e.g. *Acacia* 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 Callichirus kraussi on sand banks in lower estuary, establish presence/absence of the copepod *Pseudodiaptomus hessei* or estuarine congeneric in the zooplankton of the estuary, 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	K50B	G15-E27	Knysna Estuary	gxi12	B	Quantity	Flow	MMR/MAR (% Nat)	Maintain flow regime as close to natural as possible	Months	MMR/MAR (% Nat)
										Oct	87.5
										Nov	87.6
										Dec	82.7
										Jan	83.9
										Feb	86.1
										Mar	82.5
										Apr	84.7
										May	87.1
										Jun	87.5
										Jul	86.8
										Aug	88.3
										Sep	90.5
										Annual	86.8
						Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	DIN not >100 µg/L once-off.	
								DIP		DIP not > 20 µg/L once-off.	
							Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae		
							System variables	Turbidity	System variables not to exceed TPCs for biota	Turbidity >10 NTU in low flow	
								Dissolved oxygen		>5 mg/L in estuary.	
							Pathogens	Enterococci	Concentrations of	≤185 Enterococci/100 ml) (90th 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	Estuary mouth permanently open
									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
							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
								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 *Upogebia africana* 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; REI species dominated by both *Myxus capensis* and *G. aestuaria*		
							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		
G15 Coastal	K60G	G15-E28	Noetsie Estuary	gxi13	B	Quantity	Flow	MMR/MAR (% Nat)	Maintain flow regime (small system needs most flows)	Months	MMR/MAR (% Nat)	
										Oct	93.5	92.5
										Nov	93.4	94.3
										Dec	90.7	94.3
										Jan	87.1	92.8
										Feb	85.5	93.0
										Mar	89.8	94.0
										Apr	92.1	92.1
										May	94.0	94.0
										Jun	93.0	93.4
										Jul	92.8	92.1
										Aug	94.3	90.7
										Sep	94.3	87.1
										Annual	92.5	85.5
						Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	DIN not >100 µg/L once-off.		
								DIP		DIP not > 20 µg/L once-off.		
							Salinity	Salinity	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		
								Dissolved oxygen		>5 mg/L in estuary.		
							Pathogens	Enterococci	Concentrations of	≤185 Enterococci/100 ml) (90th 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 (90th 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
							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 median phytoplankton/benthic microalgae biomass: phytoplankton not > 1.0 µg/L (median)., benthic microalgae not > 11 mg/m^2 (median); Phytoplankton not > 20 µg/L and/or cell density not >10 000 cells/ml (once-off); Prevent formation of phytoplankton blooms
								Macrophytes	Extent, distribution and richness of macrophytes	Maintain extent, distribution and richness of macrophyte groups, limit colonisation/spread of the EFZ by alien species	Maintain distribution of macrophyte habitats; prevent an increase in nutrient input leading to macroalgal blooms; control the spread of invasive plants in the riparian zone
								Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Establish presence/absence of sand prawn Callichirus kraussi on sand banks in lower estuary, establish presence/absence of the copepod *Pseudodiaptomus hessei* or estuarine congeneric in the zooplankton of the estuary, 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; REI species dominated by both *Myxus capensis* and *G. aestuaria*		
								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	II	K60G	G15-E29	Piesang Estuary	gxi14	C	Quantity	Flow	MMR/MAR (% Nat)	Maintain at least present-day base flows	Months	MMR/MAR (% Nat)	
											Oct	71.4	
											Nov	77.2	
											Dec	69.5	
											Jan	68.8	
											Feb	63.6	
											Mar	69.2	
											Apr	70.9	
											May	81.5	
											Jun	68.1	
											Jul	66.8	
											Aug	74.7	
											Sep	86.1	
											Annual	73.8	
							Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	DIN not >100 µg/L once-off.		
									DIP		DIP not > 20 µg/L once-off.		
								Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	5 < Salinity <40		
								System variables	Turbidity	System variables not to exceed TPCs for biota	>10 NTU in low flow		
									Dissolved oxygen		>5 mg/L in estuary.		
								Pathogens	Enterococci	Concentrations of	≤185 Enterococci/100 ml) (90th 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 (90th 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
							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 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. *Acacia* 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 Callichirus kraussi on sand banks in lower estuary, establish presence/absence of the copepod *Pseudodiaptomus hessei* or estuarine congeneric in the zooplankton of the estuary, 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							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
II	K60G	G15-E30	Keurbooms Estuary	gxi15	A	Quantity	Flow	MMR/MAR (% Nat)	Maintain flow regime as close to natural as possible	MMR/MAR (% Nat)

Months	MMR/MAR (% Nat)
Oct	90.6
Nov	90.5
Dec	88.8
Jan	85.3
Feb	83.0
Mar	85.5
Apr	89.3
May	92.0
Jun	92.3
Jul	91.8
Aug	92.8
Sep	91.8
Annual	90.0

						Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	DIN not >100 µg/L once-off.
								DIP		DIP not >20 µg/L once-off.
							Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Average salinity >10 at the top of the estuary in the Keurbooms and/or Bitou Arm, average salinity >20 along the length of the system
							System variables	Turbidity	System variables not to exceed TPCs for biota	>10 NTU in low flow
								Dissolved oxygen		>5 mg/L in estuary.
							Pathogens	Enterococci	Concentrations of	≤185 Enterococci/100 ml) (90th 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 (90th 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	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
							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 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 *H. capensis*); 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	
							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	K70A	G15-E31	Matjies Estuary	gxi16	C	Quantity	Flow	MMR/MAR (% Nat)	Maintain flow regime (small system needs most flows)	Months	MMR/MAR (% Nat)
										Oct	73.9
										Nov	73.8
										Dec	69.1
										Jan	68.0
										Feb	65.0
										Mar	67.9
										Apr	67.9
										May	68.4
										Jun	65.8
										Jul	66.8
										Aug	71.6
										Sep	74.1
										Annual	70.5
						Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	DIN not >100 µg/L once-off.	
								DIP		DIP not >20 µg/L once-off.	
							Salinity	Salinity	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	System variables not to exceed TPCs for biota	>10 NTU in low flow	
								Dissolved oxygen		>5 mg/L in estuary.	
							Pathogens	Enterococci	Concentrations of	≤185 Enterococci/100 ml) (90th 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 (90th 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
							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 Callichirus kraussi on sand banks in lower estuary, establish presence/absence of the copepod *Pseudodiaptomus hessei* or estuarine congeneric in the zooplankton of the estuary, 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													
G15 Coastal	K70A	G15-E32	Sout (Oos) Estuary	gxi17	A	Habitat	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	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual
										MMR/MAR (% Nat)	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		DIP not >20 µg/L once-off.													
							Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Average salinity <10 at the head of the estuary (expected average range 5 - 10 for most of the system)													
							System variables	Turbidity	System variables not to exceed TPCs for biota	>10 NTU in low flow													
								Dissolved oxygen		>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	Mouth must remain permanently open													
							Sediment	Sediment characteristics, Channel shape/size	Flood regime is sufficient to maintain natural bathymetry and sediment characteristics	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline													

IUA Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
						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 *Callichirus kraussi* on sand banks in lower estuary, establish presence/absence of the copepod *Pseudodiaptomus hessei* or estuarine congeneric in the zooplankton of the estuary, 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	K70A	G15-E33	Groot (Wes) Estuary	gxi23	B	Quantity	Flow	MMR/MAR (% Nat)	Maintain flow regime (small system needs most flows)	Months / MMR/MAR (% Nat): Oct 87.9; Nov 88.0; Dec 87.2; Jan 84.3; Feb 82.7; Mar 84.1; Apr 85.3; May 87.3; Jun 86.7; Jul 85.7; Aug 86.9; Sep 87.9; Annual 86.7
						Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	DIN not >100 µg/L once-off.
								DIP		DIP not >20 µg/L once-off.

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) (90th percentile)
									Escherichia coli		≤500 E. coli/100 ml (90th 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
							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 *Callichirus kraussi* on sand banks in lower estuary, establish presence/absence of the copepod *Pseudodiaptomus hessei* or estuarine congeneric in the zooplankton of the estuary, 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								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 *Myxus capensis* and *G. aestuaria*		
								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		
	II	K70B	G15-E34	Bloukrans Estuary	gxi18	A	Quantity	Flow	MMR/MAR (% Nat)	Maintain flow regime (small system needs most flows)	Months	MMR/MAR (% Nat)	
											Oct	98.7	
											Nov	99.0	
											Dec	98.3	
											Jan	96.7	
											Feb	96.8	
											Mar	97.1	
											Apr	97.2	
											May	98.1	
											Jun	97.6	
											Jul	97.7	
											Aug	98.2	
											Sep	98.9	
											Annual	98.0	
								Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	DIN not >100 µg/L once-off.		
									DIP		DIP not >20 µg/L once-off.		
							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	System variables not to exceed TPCs for biota	>10 NTU in low flow		
									Dissolved oxygen		>5 mg/L in estuary.		
								Pathogens	Enterococci	Concentrations of	≤185 Enterococci/100 ml) (90th 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	Estuary mouth permanently open
									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
							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 1 µg/ℓ (median), phytoplankton not to exceed 20 µg/ℓ and/or cell density not to exceed 10 000 cells/ml (once-off); benthic microalgae not to exceed 11 mg/m^2 (median); prevent formation of phytoplankton blooms
								Invertebrates	Macrofauna community composition, abundance and richness	Maintain composition, richness and abundance of different groups of benthic macrofauna and zooplankton	Establish presence/absence of sand prawn Callichirus kraussi on sand banks in lower estuary, establish presence/absence of the copepod *Pseudodiaptomus hessei* or estuarine congeneric in the zooplankton of the estuary, 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

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

IUA	Class	Quaternary Catchment	RU	Resource Name	Component	Sub Component	Indicator/ Measure	RQO Narrative	RQO Numeric
A1 Upper Breede Tributaries	II	H10A, H10B, H10C	BB-1	Groundwater (all)	Quantity	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
		H10L, H10F, H10G, H10J	BB-3						
A3 Breede Working Tributaries	III	H20A, H20B, H20C, H20F	BB-2						
		H40B	BB-4						
		H20H, H10H, H40C	BB-5						
		H30B	BB-6						
A3 Breede Working Tributaries	III	H40J	BB-7						
A2 Middle Breede Renosterveld	III	H40K							
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	GGr-1						
C6 Gamka Buffels	II	J11E	GGr-3						
		J24B	GGa-1						
		J21A, J21B, J23A	GGa-2a, 2b and 2c						
D7 Gouritz-Olifants	III	J35B	GO-4						
F13 Lower Gouritz	II	J40C, J40D	GGo-1						
I18 Hessequa	III	H90E	GGo-2						
G15 Coastal	II	K40D	GC-2						
H16 Overberg West Coastal	II	G40H	BO-2	Groundwater (all)	Quantity	Groundwater level	Groundwater level	Minimum water level in abstraction boreholes within 2.5km from the ocean to avoid saline intrusion	>1 mamsl
F10 Overberg East Renosterveld	II	G50B	BO-3						
H17 Overberg East Fynbos	II	G50D, G50E							
G15 Coastal	II	K40D	GC-2	Groundwater (Coastal Cenozoic Deposits)					>0.5 mamsl

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)	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
G15 Coastal	II	K40D	GC-2						
		K70A	GC-3						
A3 Breede Working Tributaries	III	H40J	BB-7	Groundwater (superficial aquifers)					
A2 Middle Breede Renosterveld	III	H40K							
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							
F13 Lower Gouritz	II	J40C, J40D	GGo-1	Groundwater (all)					
G15 Coastal	II	K20A	GC-1						
A1 Upper Breede Tributaries	II	H10L, H10F, H10G, H10J	BB-3	Groundwater (all)	Quantity	Discharge	Buffer zones	No groundwater abstraction around wetland and river FEPAs in accordance with the implementation manual for FEPAs.	250m
A3 Breede Working Tributaries	III	H40J	BB-7						
A2 Middle Breede Renosterveld	III	H40K							
B4 Riversonderend Theewaters	III	H60A, H60B, H60C	BR-1						
H16 Overberg West Coastal	II	G40H	BO-2						
F10 Overberg East Renosterveld	II	G50B	BO-3						
H17 Overberg East Fynbos	II	G50D, G50E							
B5 Overberg West	II	G40C, G40D	BO-1						
C6 Gamka Buffels	II	J11E, J21A, J21B, J23A	GGr-3						
			GGa-2a, 2b and 2c						
F13 Lower Gouritz	II	J40C, J40D	GGo-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	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: 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: 12.567Mm3/a (28.63%MAR) at Nvii10	n/a
B5 Overberg West	II	G40C, G40D	BO-1					Maintenance low flow requirements: 12.669Mm3/a (31.79%MAR) at Piii1; 54.260Mm3/a (26.26%MAR) at G4H030; 77.111Mm3/a (30.79%MAR) at G4H007	n/a
F10 Overberg East Renosterveld	II	G50B	BO-3					Maintenance low flow requirements: 0.490Mm3/a (3.93%MAR) at Ni4; 2.067Mm3/a (13.40%MAR) at G5H003.	n/a
H17 Overberg East Fynbos	II	G50D, G50E							
A1 Upper Breede Tributaries	II	H10A, H10B, H10C	BB-1	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
		H10L, H10F, H10G, H10J	BB-3						
A3 Breede Working Tributaries	III	H20A, H20B, H20C, H20F	BB-2						
		H40B	BB-4						
		H20H, H10H, H40C	BB-5						
		H30B	BB-6						
A3 Breede Working Tributaries	III	H40J	BB-7						
A2 Middle Breede Renosterveld	III	H40K							
B4 Riversonderend Theewaters	III	H60A, H60B, H60C	BR-1						
B5 Overberg West	II	G40C, G40D	BO-1						
H16 Overberg West Coastal	II	G40H	BO-2						
F10 Overberg East Renosterveld	II	G50B	BO-3						

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

IUA	Class	Quaternary Catchment	RU	Resource Name	Component	Sub Component	Indicator/ Measure	RQO Narrative	RQO Numeric
A1 Upper Breede Tributaries	II	H10A, H10B, H10C	BB-1	Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)	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	NO3 (as N)		<2.4 mg/l
						Salts	EC		<236 mS/m
				Groundwater (Nardouw Group)	Quality	Nutrients	NO3 (as N)		<4.4 mg/l
						Salts	EC		<119 mS/m
		H10F, H10G, H10J, H10L	BB-3	Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)		<9.6 mg/l
						Salts	EC		<73 mS/m
				Groundwater (Table Mountain Group)	Quality	Nutrients	NO3 (as N)		<1.8 mg/l
						Salts	EC		<109 mS/m
A3 Breede Working Tributaries	III	H20A, H20B, H20C, H20F	BB-2	Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)		<11.0 mg/l
						Salts	EC		<168 mS/m
				Groundwater (Bokkeveld Group)	Quality	Nutrients	NO3 (as N)		<1.8 mg/l
						Salts	EC		<329 mS/m
				Groundwater (Table Mountain Group)	Quality	Nutrients	NO3 (as N)		<3.7 mg/l
						Salts	EC		<63 mS/m
		H10H, H20H, H40C	BB-5	Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)		<3.1 mg/l
						Salts	EC		<591 mS/m
		H30B	BB-6	Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)		<9.8 mg/l
						Salts	EC		<170 mS/m
				Groundwater (Bokkeveld Group)	Quality	Nutrients	NO3 (as N)		<3.6 mg/l
						Salts	EC		<589 mS/m
				Groundwater (Nardouw Group)	Quality	Nutrients	NO3 (as N)		<4.4 mg/l
						Salts	EC		<119 mS/m
		H40J, H40K	BB-7	Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)		<10 mg/l
						Salts	EC		<280 mS/m
				Groundwater (Bokkeveld Group)	Quality	Nutrients	NO3 (as N)		<3.6 mg/l
						Salts	EC		<741 mS/m
				Groundwater (Table Mountain Group)	Quality	Nutrients	NO3 (as N)		<3.8 mg/l
						Salts	EC		<117 mS/m
B4 Riversonderend Theewaters	III	H60A, H60B, H60C	BR-1	Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)		<10 mg/l
						Salts	EC		<280 mS/m
				Groundwater (Bokkeveld Group)	Quality	Nutrients	NO3 (as N)		<3.6 mg/l
						Salts	EC		<741 mS/m
					Quality	Nutrients	NO3 (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
B5 Overberg West	II	G40A, G40C, G40D	BO-1	Groundwater (Bokkeveld Group)	Quality	Nutrients	NO3 (as N)		<3.6 mg/l
						Salts	EC		<589 mS/m
				Groundwater (Table Mountain Group)	Quality	Nutrients	NO3 (as N)		<3.8 mg/l
						Salts	EC		<117 mS/m
H16 Overberg West Coastal	II	G40H	BO-2	Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)		<9.8 mg/l
						Salts	EC		<280 mS/m
				Groundwater (Bokkeveld Group)	Quality	Nutrients	NO3 (as N)		<3.6 mg/l
						Salts	EC		<589 mS/m
				Groundwater (Table Mountain Group)	Quality	Nutrients	NO3 (as N)		<3.8 mg/l
						Salts	EC		<117 mS/m
F10 Overberg East Renosterveld	II	G50B	BO-3	Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)		<10 mg/l
H17 Overberg East Fynbos	II	G50D, G50E				Salts	EC		<280 mS/m
F10 Overberg East Renosterveld	II	G50B	BO-3	Groundwater (Bokkeveld Group)	Quality	Nutrients	NO3 (as N)		<3.6 mg/l
H17 Overberg East Fynbos	II	G50D, G50E				Salts	EC		<741 mS/m
F10 Overberg East Renosterveld	II	G50B	BO-3	Groundwater (Table Mountain Group)	Quality	Nutrients	NO3 (as N)		<3.8 mg/l
H17 Overberg East Fynbos	II	G50D, G50E				Salts	EC		<117 mS/m
C6 Gamka Buffels	II	J11E	GGr-3	Groundwater (all)	Quality	Nutrients	NO3 (as N)		<11.7 mg/l
						Salts	SO4		< 600 mg/l
						Salts	EC		<231 mS/m
		J24B	GGa-1	Groundwater (Beaufort Group)	Quality	Nutrients	NO3 (as N)		<12.0 mg/l
						Salts	SO4		< 237 mg/l
						Salts	EC		<226 mS/m
		J21A, J21B, J21D, J23A	GGa-2a, 2b and 2c	Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)		<15.8 mg/l
						Salts	SO4		<525 mg/l
						Salts	EC		<310 mS/m
				Groundwater (Beaufort Group, Karoo Supergroup)	Quality	Nutrients	NO3 (as N)		<15.9 mg/l
						Salts	SO4		<634 mg/l
						Salts	EC		<367 mS/m
E8 Touws	III	J12C, J12D	GGr-1	Groundwater (Cenozoic coastal deposits)	Quality	Nutrients	NO3 (as N)		<9.8 mg/l
						Salts	EC		<170 mS/m
				Groundwater (Witteberg Group)	Quality	Nutrients	NO3 (as N)		<11.0 mg/l
						Salts	EC		<420 mS/m

IUA	Class	Quaternary Catchment	RU	Resource Name	Component	Sub Component	Indicator/ Measure	RQO Narrative	RQO Numeric
				Groundwater (Bokkeveld Group)	Quality	Nutrients	NO3 (as N)		<3.6 mg/l
						Salts	EC		<589 mS/m
D7 Gouritz-Olifants	III	J35B	GO-4	Groundwater (Bokkeveld Group)	Quality	Nutrients	NO3 (as N)		<11.0 mg/l
						Salts	EC		<589 mS/m
				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