DEPARTMENT OF WATER AND SANITATION

NO. 5553 15 November 2024

NATIONAL WATER ACT, 1998

RESERVE DETERMINATION FOR WATER RESOURCES OF THE THUKELA CATCHMENTS IN THE PONGOLA-MTAMVUNA WATER MANAGEMENT AREA.

I, Pemmy Castelina Pamela Majodina, Minister of Water and Sanitation, in terms of section 16(1) and (2) of the National Water Act, 1998 (Act No. 36 of 1998), hereby determine the Reserve for the water resources in the Pongola-Mtamvuna Water Management Area, as set out in the Schedule.

MISS PEMMY C.P. MAJODINA (MP)
MINISTER OF WATER AND SANITATION
DATE: 03/10/2024

SCHEDULE

DEFINITIONS

1. **In this Schedule any word or expression to which a meaning has been assigned in the Act shall have the meaning so assigned and, unless the context indicates otherwise –**

"Baseflow" means a sustained low flow in rivers during dry or fair-weather conditions and includes contribution from delayed interflow and groundwater discharge.

"EWR" means Ecological Water Requirements and refers to the flow patterns (magnitude, timing and duration) and water quality needed to maintain a riverine ecosystem in a particular condition.

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

"The Act" means the National Water Act, 1998 (Act No. 36 of 1998).

DESCRIPTION OF WATER RESOURCE

2 (1) The Reserve is determined for all or part of every significant water resource within the catchments of the Thukela, as set out below:

Water Management Area: Pongola-Mtamvuna
Drainage Region: V Primary Drainage Region
River(s): Thukela River System

(2) The Reserve is hereby determined for all or part of the water resource referred to in sub-clause (1), which classes have been determined in Government Notice No. 3141 of 10 March 2023.

RESERVE DETERMINATION

3 (1) The Reserve determination for the quantity component of the Rivers in the Thukela catchment include the EWR sites as illustrated in (**Figure 2**) of Annexure B, and the basic human needs are as set out in Table 1 of Annexure B.

(2) The Reserve determination for the quality component of the Rivers at EWR sites in the Thukela catchment are as set out in Tables 2.1 to 2.15 of Annexure B.

(3) The Reserve determination for the groundwater contribution to the Reserve for Water Quantity for the Thukela catchment is set out in Table 3.1 of Annexure B.

(4) The Reserve determination for the groundwater contribution to the Reserve for Water Quality for the Thukela catchment is set out in Tables 4.1 to 4.5 of Annexure B.

COMMENCEMENT

4. The Reserve determinations made in this Notice shall commence on and apply from the date of publication hereof.

ANNEXURE A

ACRONYMS

Acronyms used in Annexure B

BHN	Basic Human Needs
EIS	Ecological Importance and Sensitivity
EWR	Ecological Water Requirement
IUA	Integrated Unit of Analysis
NMAR	Natural Mean Annual Runoff
MCM	Million Cubic Metres
PES	Present Ecological Status
REC	Recommended Ecological Category
TEC	Target Ecological Category

SURFACE-WATER - QUANTITY COMPONENT FOR RIVERS

Proposed results for the Reserve determination and ecological categorisation for the Thukela catchment, where the Reserve amounts are expressed as a percentage of the NMAR for the respective catchments (cumulative) in terms of section (16)(1).

ANNEXURE B

Table 1: Reserve determination for the quantity component for the rivers which include the EWR & BHN for the priority sites.

EWR site	Quaternary catchment/ Sub-reach	River	PES	EI/ES	REC	TEC	NMAR (MCM)[1]	EWR % NMAR[2]	BHN Reserve[3] (%NMAR)	Total Reserve[4] (%NMAR)
THU_EWR23	V31D-02370	Upper Buffalo	C	High	C	C	221.96	23.44	0.008	23.448
May13_EWR2	V31F-02600	Horn	C	Low	C	C	21.61	33.65	0.050	33.700
THU_EWR19	V31J-02487	Ncandu	C	Very high	B	B/C	50.83	29.36	1.217	30.577
Ngagane_dsk	V31K-02516	Ngagane	C	Moderate/ High	C	C/D	160.12	19.44	0.106	19.546
Thukela_EWR13	V32F-02707	Buffalo	D	Moderate	D	C/D	695.05	17.36	0.001	17.361
Thukela_EWR14	V33B-03090	Buffalo	B/C	High	B	C	831.09	23.24	0.016	23.256
Blood_dsk	V32H-02834	Blood	C	High	B/C	C	94.71	21.36	0.443	21.803
THU_EWR7A	V60B-02826	Sundays	C/D	High	C	C	24.94	31.79	0.384	32.174
Thukela_EWR7	V60C-03031	Sundays	B/C	Moderate	B/C	C/D	90.28	19.71	0.133	19.843
Thukela_EWR8	V60F-03210	Sundays	D	Moderate	D	D	197.03	16.45	0.125	16.575
THU_EWR20	V20C-03919	Nsonge	C	Very high / High	B/C	B/C	27.13	28.99	0.033	29.023
Thukela_EWR11	V20E-03742	Mooi	B/C	Moderate	B/C	B/C	301.14	35.41	0.070	35.480
THU_EWR21	V20G-03853	Mnyamvubu	C	High	B/C	C	31.71	19.94	0.139	20.079
THU_EWR12A	V20H-03500	Mooi	C/D	High	C	C	361.85	29.82	0.112	29.932
Thukela_EWR5	V70F-03548	Bushmans	B/C	Moderate	B/C	C	281.45	29.04	0.036	29.076
THU_EWR6A	V70G-03515	Bushmans	D	High	C	C/D	298.37	40.62	0.061	40.681

EWR site	Quaternary catchment/ Sub-reach	River	PES	EI/ES	REC	TEC	NMAR (MCM)[1]	EWR % NMAR[2]	BHN Reserve[3] (%NMAR)	Total Reserve[4] (%NMAR)
Thukela_EWR6	V70G-03440	Bushmans	B/C	High	B/C	C/D	303.14	29.39	0.060	29.450
Thukela_EWR1	V11J-03301	Thukela	D	Moderate	D	D	705.42	17.31	0.009	17.319
Thukela_EWR2	V11M-03280	Thukela	C	Moderate	C	C/D	798.4	17.67	0.003	17.673
Thukela_EWR3	V13E-03362	Little Thukela	C/D	Moderate	C/D	C/D	285.2	24.71	0.049	24.759
Thukela1_dsk	V14B-03296	Thukela	B	High	B	C/D	1145.20	18.33	0.017	18.347
THU_EWR22	V12A-03003	Klip	C	High / Very high	B/C	C	52.44	22.15	0.103	22.253
Klip_dsk	V12G-03256	Klip	C	High	B/C	C	253.09	20.0	0.647	20.647
Thukela_EWR4AThukela_EWR4B THU_EWR4C	V14E-03233	Thukela	C	High	B/C	C	1423.83	25.09	0.005	25.095
Thukela_EWR15	V40B-03429	Thukela	C	High	C	C	3424.00	21.98	0.004	21.984
THU_EWR16	V50C-03903	Thukela	C	High / Moderate	C	C	3679.97	37.83	0.027	37.857
V11A_dsk	V11A-03277	Thukela	B	High / Very high	B	B	66.90	38.32	0.129	38.449
V11B_dsk	V11B—3410 V11B-03470	Sithene Thonyelana	B	Moderate/ High	B	B	142.69	38.32	0.029	38.349
V11G_dsk	V11G-03572 V11G-03582	Mlambonja Mhlwazini	B	Moderate / High	B	B	191.99	38.01	0.008	38.018
V13A_dsk	V13A-03495	Little Thukela	C	High/ Very high	B	B	82.32	35.44	0.017	35.457
V70A_dsk	V70A-03876	Bushmans	B	High	B	B	113.46	40.524	0.028	40.552

EWR site	Quaternary catchment/ Sub-reach	River	PES	EI/ES	REC	TEC	NMAR (MCM)[1]	EWR % NMAR[2]	BHN Reserve[3] (%NMAR)	Total Reserve[4] (%NMAR)
V70B_dsk	V70B-03927	Nsibidwana	B	High	B	B	44.16	15.773	0.218	15.991
V20A_dsk	V20A-04023	Mooi	C	High	B	B	42.90	34.51	0.016	34,526
V20B_dsk	V20B-04034	Little Mooi	C	High	B/C	B/C	10.32	28.99	0.186	29.176
THU_EWR17	V50D-03903	Thukela	C	High	C	C	3690.53	37.38	0.012	37.392

1) NMAR is the Natural Mean Annual Runoff.
2) This amount represents the long-term mean based on the NMAR. If the NMAR changes, this volume will also change.
3) Represents the percentage of BHN. Population census of 2023 was used to determine the percentage BHN.
4) The total Reserve amount accounts for both the Ecological Reserve and the Basic Human Needs Reserve (BHN).

SURFACE-WATER - QUALITY COMPONENT FOR RIVERS

Reserve determination for the Quality component at EWR sites

Table 2.1: Water Quality Ecological Specifications: Upper Buffalo River

Quaternary Catchment/EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
V31A	Wetland resource unit: Wakkerstroom	Quality	Nutrients	Orthophosphate as P	≤0.01 mg/L (50th percentile)
				Total Inorganic Nitrogen (TIN)	≤0.5 milligrams per Litre (mg/L) (50th percentile)
			Salts	Total Dissolved Solids	≤120 milligrams per Litre (mg/L) (95th percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/100 mL)
		Response variable	Fish	*Enteromius (Barbus) anoplus* (BANO) *Amphilius natalensis* (ANAT) *Anguilla mossambica* (AMOS)	FRAI EC = B ≥ 82% BANO and ANAT ≥ 5 individuals per species.
			Aquatic invertebrates	Macroinvertebrate Response Assessment Index (MIRAI) South African Scoring System (SASS) (Baetidae 2 sp Perlidae Tricorythidae Hydropsychidae 1 sp Leptoceridae Ancylidae Psephenidae	At least 2 biotopes sampled: assemblages to be ≥ A abundances South African Scoring System (SASS) 5 score ≥180 Average Score per Taxon (ASPT): ≥6.0 MIRAI EC = B ≥ 82%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Diatoms EC should be maintained at B SPI: ≥15 PTV: 20% to < 40%
V31A	Zaaihoek Dam	Quality	Nutrients	Orthophosphate (PO_4^-) as Phosphorus	≤0.01 milligrams per Litre (mg/L) (50th percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤0.5 milligrams per Litre (mg/L) (50th percentile)
			Salts	Total Dissolved Solids	≤120 milligrams per Litre (mg/L) (95th percentile)
			System variables	pH range	≥6.5 (5th percentile) and ≤9.0 (95th percentile)

Quaternary Catchment/E WR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL)
V31B	Buffalo and Slang	Quality	Nutrients	Orthophosphate (PO_4^-) as Phosphorus	≤0.5 milligrams per Litre (mg/L) (50th percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤1 milligram per Litre (mg/L) (50th percentile)
			Salts	Total Dissolved Solids	≤350 milligrams per Litre (mg/L) (95th percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL) (95th percentile)
			System variables	pH range	≥6.5 (5th percentile) and ≤9.0 (95th percentile)
			Toxic substances	Ammonia as N	≤0.07 milligrams per Litre (mg/L)
		Biota	Fish	*Enteromius (Barbus) anoplus* (BANO) *Amphilius natalensis* (ANAT) *Anguilla mossambica* (AMOS) *Labeo rubromaculatus* (LRUB)	FRAI EC = C ≥ 62% BANO and ANAT ≥ 5 individuals per species.
			Aquatic invertebrates	Macroinvertebrate Response Assessment Index South African Scoring System (SASS) Baetidae 2 sp Perlidae Heptageniidae Hydropsychidae 2 sp Elmidae Leptophlebidae	At least 2 biotopes sampled: assemblages to be ≥ B abundances South African Scoring System (SASS) 5 score: 145 – 200 Average Score per Taxon (ASPT): 6.0 – 7.6 MIRAI EC = C ≥ 62%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as C SPI: 12 -14 PTV: 20% to < 40%
			Riparian habitat	Vegetation Response Assessment Index (VEGRAI)	VEGRAI survey every 5 years. VEGRAI EC = C ≥ 62%
V31C, V31D **(THU_EWR23)**	Buffalo to confluence with Ngagane	Quality	Nutrients	Orthophosphate (PO_4^-) as Phosphorus	≤0.5 mg/L (50th percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤1 milligram per Litre (mg/L) (50th percentile)
			Salts	Total Dissolved Solids	≤350 milligrams per Litre (mg/L) (95th percentile)
				Sulphate	≤80 milligrams per Litre (mg/L) (95th percentile)
				Chloride	≤30 milligrams per Litre (mg/L) (95th percentile)
			System variables	pH range	≥6.5 (5th percentile) and ≤9.0 (95th percentile)
				Alkalinity as mg/L $CaCO_3$	≤120 milligrams per Litre (mg/L) as $CaCO_3$

Quaternary Catchment/EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
			Toxic substances	Aluminium (Al)	≤ 0.1 milligrams per Litre (mg/L) (95th percentile)
				Manganese (Mn)	≤ 0.2 milligrams per Litre (mg/L) (95th percentile)
				Cadmium (Cd)	≤ 0.001 milligrams per Litre (mg/L) (95th percentile)
				Iron (Fe)	≤ 0.1 milligrams per Litre (mg/L) (95th percentile)
				Lead (Pb) hard	≤ 0.01 milligrams per Litre (mg/L) (95th percentile)
				Copper (Cu) hard	≤ 0.007 milligrams per Litre (mg/L) (95th percentile)
				Nickel (Ni)	≤ 0.07 milligrams per Litre (mg/L) (95th percentile)
				Ammonia (as N)	≤ 0.07 milligrams per Litre (mg/L) (95th percentile)
		Biota	Fish	Fish Response Assessment Index (FRAI) *Enteromius (Barbus) anoplus* (BANO) *Amphilius natalensis* (ANAT) *Anguilla mossambica* (AMOS) *Labeo rubromaculatus* (LRUB) *Barbus (Enteromius) pallidus* (BPAL) *Barbus (Enteromius) paludinosus* (BPAU)	FRAI EC = C ≥ 62% BANO, BPAL, BPAU – habitat indicators; and ANAT ≥ 5 individuals per species
			Aquatic invertebrates	Macroinvertebrate Response Assessment Index (MIRAI) and South African Scoring System Version 5 (SASS5) Baetidae 2 sp Atyidae Hydracarina Heptageniidae Leptophlebiidae Ecnomidae Elmidae Tricorythidae	3 biotopes sampled: assemblages to be ≥ B abundances. SASS 5 scores: 120 – 200 Average Score per Taxon (ASPT): 5.5 – 6.5 MIRAI EC = C ≥ 62%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Natural flow pattern must be maintained in C Ecological Category. SPI: 12 - 14 PTV: 20% to <40%
			Riparian habitat	Vegetation Response Assessment Index (VEGRAI) Index of Habitat Integrity (IHI): Riparian	VEGRAI survey every 5 years. VEGRAI EC = C ≥ 62%

Table 2.2: Water Quality Ecological Specifications: Ngagane River

Quaternary Catchment/EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
V31E	Upper Ngagane to Ntshingwayo Dam	Quality	Nutrients	Ortho-phosphate (PO_4^-) as Phosphorus	≤ 0.05 milligrams per Litre (mg/L) (50th percentile)
				Total Inorganic Nitrogen (TIN$^-$) as Nitrogen	≤ 1 milligram per Litre (mg/L) (50th percentile)
			Salts	Total Dissolved Solids	≤ 350 milligrams per Litre (mg/L) (95th percentile)
			System variables	pH range	≥6.5 (5th percentile) and ≤9.0 (95th percentile)
		Biota	Fish	Fish Response Assessment Index (FRAI) *Enteromius (Barbus) anoplus* (BANO) *Amphilius natalensis* (ANAT) *Labeo rubromaculatus* (LRUB) *Barbus (Enteromius) pallidus* (BPAL) *Barbus (Enteromius) paludinosus* (BPAU)	FRAI EC = C ≥ 62% BANO, BPAL, BPAU – habitat indicators; and ANAT ≥ 5 individuals per species
			Aquatic invertebrates	Macroinvertebrate Response Assessment Index (MIRAI) and South African Scoring System Version 5 (SASS5) Baetidae >2 spp Atyidae Heptageniidae Leptophlebiidae Hydropsychidae >1 spp	At least 2 biotopes sampled; assemblages to be ≥ B abundances SASS 5 scores: 120 – 200 Average Score per Taxon (ASPT): 5.5 – 6.5 MIRAI EC = C ≥ 62%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as B. SPI: 15 - 17 PTV: 20% to <40%
			Riparian habitat	Vegetation Response Assessment Index (VEGRAI) Index of Habitat Integrity (IHI): Riparian	VEGRAI survey every 5 years. VEGRAI EC = C ≥ 62%
V31E	Ntshingwayo Dam	Quality	Nutrients	Total Inorganic Nitrogen (TIN)	≤1.0 milligrams per Litre (mg/L) (50th percentile)
				Ortho-phosphate (PO_4^-) as Phosphorus	≤0.05 milligrams per Litre (mg/L) (50th percentile)
			Salts	Total Dissolved Solids	≤120 milligrams per Litre (mg/L) (95th percentile)
			System variables	pH	6.5 (5th percentile) and 9.0 (95th percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL)
		Biota	Riparian vegetation Health	80% riparian vegetation cover	
V31F **(May 13_ EWR 2)**	Horn to confluence	Quality	Nutrients	Ortho-phosphate (PO_4^-) as Phosphorus	≤ 0.02 milligrams per Litre (mg/L) (50th percentile)
				Total Inorganic Nitrogen (TIN$^-$) as Nitrogen	≤1.0 milligrams per Litre (mg/L) (50th percentile)
			Salts	Total Dissolved Solids	≤ 350 milligrams per Litre (mg/L) (95th percentile)

Quaternary Catchment/EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
	with Ngagane			Sulphate	≤ 165 milligrams per Litre (mg/L) (95th percentile)
				Chloride	≤ 120 milligrams per Litre (mg/L) (95th percentile)
			System variables	pH range	≥6.5 (5th percentile) and ≤9.0 (95th percentile)
			Toxic substances	Ammonia as N	≤ 0.07 milligrams per Litre (mg/L) (95th percentile)
				Aluminium (Al)	≤ 0.10 milligrams per Litre (mg/L) (95th percentile)
				Manganese (Mn)	≤ 0.15 milligrams per Litre (mg/L) (95th percentile)
				Iron (Fe)	≤ 0.1 milligrams per Litre (mg/L) (95th percentile)
				Lead (Pb) hard	≤ 0.001 milligrams per Litre (mg/L) (95th percentile)
				Copper (Cu) hard	≤ 0.007 milligrams per Litre (mg/L) (95th percentile)
				Nickel (Ni)	≤ 0.07 milligrams per Litre (mg/L) (95th percentile)
				Cobalt (Co)	≤ 0.05 milligrams per Litre (mg/L) (95th percentile)
				Zinc (Zn)	≤ 0.002 milligrams per Litre (mg/L) (95th percentile)
				Atrazine	≤0.08 milligrams per Litre (mg/L)
				Mancozeb	≤0.009 milligrams per Litre (mg/L)
				Glyphosate	≤0.7 milligrams per Litre (mg/L)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL) (95th percentile)
		Biota	Fish	Fish Response Assessment Index (FRAI) *Enteromius (Barbus) anoplus* (BANO) *Amphilius natalensis* (ANAT) *Anguilla mossambica* (AMOS) *Labeo rubromaculatus* (LRUB) *Barbus (Enteromius) pallidus* (BPAL) *Labeobarbus natalensis* (BNAT)	Fish Response Assessment Index (FRAI) should be conducted annually to monitor against the prescribed C ecological category. FRAI EC = C ≥ 62% During survey in all flow habitat classes all species present (BANO, ANAT, AMOS, LRUB, BPAL and BNAT). BANO, BPAL – habitat indicators; and ANAT ≥ 5 individuals per species

Quaternary Catchment/EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
			Aquatic invertebrates	Macroinvertebrate Response Assessment Index (MIRAI) and South African Scoring System Version 5 (SASS5) Baetidae 2 spp Leptophlebiidae Tricorythidae Leptoceridae Perlidae Hydropsychidae >2spp	3 biotopes sampled: assemblages to be ≥ B abundances. SASS 5 scores: ≥213 Average Score per taxon (ASPT) score: ≥7.2 MIRAI EC = C ≥ 62%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as C. SPI: 12-14 PTV: 20% to < 40%
			Riparian	Vegetation Response Assessment Index (VEGRAI)	VEGRAI survey every 5 years. VEGRAI EC = C ≥62%
V31H, V31J **(THU_EWR19)**	Ncandu to confluence with Ngagane	Quality	Nutrients	Orthophosphate (PO_4^-) as Phosphorus	≤0.05 milligrams per Litre (mg/L) (50th percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤1 milligrams per Litre (mg/L) (50th percentile)
			Salts	Total Dissolved Solids	≤350 milligrams per Litre (mg/L) (95th percentile)
				Sulphate	≤ 165 milligrams per Litre (mg/L) (95th percentile)
				Chloride	≤ 120 milligrams per Litre (mg/L) (95th percentile)
			System variables	pH range	≥6.5 (5th percentile) and ≤9.0 (95th percentile)
			Toxic substances	Ammonia as N	≤ 0.07 milligrams per Litre (mg/L) (95th percentile)
				Aluminium (Al)	≤ 0.10 milligrams per Litre (mg/L) (95th percentile)
				Manganese (Mn)	≤ 0.15 milligrams per Litre (mg/L) (95th percentile)
				Cadmium (Cd)	≤ 0.001 milligrams per Litre (mg/L) (95th percentile)
				Iron (Fe)	≤ 0.1 milligrams per Litre (mg/L) (95th percentile)
				Lead (Pb) hard	≤ 0.001 milligrams per Litre (mg/L) (95th percentile)
				Copper (Cu) hard	≤ 0.007 milligrams per Litre (mg/L) (95th percentile)
				Nickel (Ni)	≤ 0.07 milligrams per Litre (mg/L) (95th percentile)

Quaternary Catchment/EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
				Cobalt (Co)	≤ 0.05 milligrams per Litre (mg/L) (95th percentile)
				Zinc (Zn)	≤ 0.002 milligrams per Litre (mg/L) (95th percentile)
				Atrazine	≤0.08 milligrams per Litre (mg/L)
				Mancozeb	≤0.009 milligrams per Litre (mg/L)
				Glyphosate	≤0.7 milligrams per Litre (mg/L)
				Benzene	≤0.01 milligrams per Litre (mg/L) (95th percentile)
				Toluene	≤0.7 milligrams per Litre (mg/L) (95th percentile)
				Oil and grease	2.5 milligrams per Litre (mg/L)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL) (95th percentile)
		Biota	Fish	Fish Response Assessment Index (FRAI). *Amphilius natalensis* (ANAT) *Anguilla mossambica* (AMOS) *Labeo rubromaculatus* (LRUB) *Barbus (Enteromius) paludinosus* (BPAU) *Labeobarbus natalensis* (BNAT) *Barbus (Enteromius) viviparus* (BVIV)	FRAI Ecological Category = B/C ≥ 72% BVIV, BNAT, BPAU – habitat indicators; and ANAT ≥ 5 individuals per species
			Aquatic invertebrates	Macroinvertebrate Response Assessment Index (MIRAI) and South African Scoring System Version 5 (SASS5) Baetidae >2 spp Heptageniidae Leptophlebiidae Tricorythidae Leptoceridae Perlidae Hydropsychidae >1spp Elmidae Psephenidae Dixidae	3 biotopes sampled: assemblages to be ≥ B abundances. SASS 5 scores: ≥190 Average Score per Taxon (ASPT) score: ≥6.0 MIRAI Ecological Category = C ≥ 62%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as B. SPI: 15 - 17 PTV: < 20%
			Riparian	Vegetation Response Assessment Index (VEGRAI)	VEGRAI survey every 5 years. VEGRAI Ecological Category = C ≥ 62%
V31G, V31K	Ngagane from	Quality	Nutrients	Orthophosphate (PO_4^-) as Phosphorus	≤0.05 milligrams per Litre (mg/L) (50th percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤ 2.0 milligrams per Litre (mg/L) (50th percentile)

Quaternary Catchment/EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
(May 13_ EWR3)	Ntshingwayo Dam to confluence with Buffalo		Salts	Total Dissolved Solids	≤350 milligrams per Litre (mg/L) (95th percentile)
			System variables	pH range	≥6.5 (5th percentile) and ≤9.0 (95th percentile)
			Toxic substances	Ammonia as N	≤ 0.07 milligrams per Litre (mg/L) (95th percentile)
				Aluminium (Al)	≤ 0.1 milligrams per Litre (mg/L) (95th percentile)
				Cadmium (Cd) soft	≤ 0.001 milligrams per Litre (mg/L) (95th percentile)
				Manganese (Mn)	≤ 0.15 milligrams per Litre (mg/L) (95th percentile)
				Iron (Fe)	≤ 0.1 milligrams per Litre (mg/L) (95th percentile)
				Lead (Pb) hard	≤ 0.01 milligrams per Litre (mg/L) (95th percentile)
				Copper (Cu) hard	≤ 0.007 milligrams per Litre (mg/L) (95th percentile)
				Nickel (Ni)	≤ 0.07 milligrams per Litre (mg/L) (95th percentile)
				Cobalt (Co)	≤ 0.05 milligrams per Litre (mg/L) (95th percentile)
				Zinc (Zn)	≤ 0.002 milligrams per Litre (mg/L) (95th percentile)
				Atrazine	≤0.08 milligrams per Litre (mg/L)
				Mancozeb	≤0.009 milligrams per Litre (mg/L)
				Glyphosate	≤0.7 milligrams per Litre (mg/L)
				Oil and grease	2.5 milligrams per Litre (mg/L)
				Benzene	≤0.01 milligrams per Litre (mg/L) (95th percentile)
				Toluene	≤0.7 milligrams per Litre (mg/L) (95th percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL) (95th percentile)
		Biota	Fish	Fish Response Assessment Index (FRAI) *Amphilius natalensis* (ANAT) *Barbus (Enteromius) paludinosus* (BPAU) *Labeobarbus natalensis* (BNAT) *Barbus (Enteromius) pallidus* (BPAL) *Enteromius (Barbus) anoplus* (BANO)	FRAI EC = C/D ≥ 42% BNAT, BPAL and BANO – 2 of 3 *spp* present as habitat indicators; and ANAT ≥ 3 individuals per species
			Aquatic invertebrates	Macroinvertebrate Response Assessment Index (MIRAI) and South African Scoring System Version 5 (SASS5) Baetidae >2 spp Heptageniidae	3 biotopes sampled: assemblages to be ≥ B abundances SASS 5 scores: ≥213

Quaternary Catchment/EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
				Leptophlebiidae Tricorythidae Leptoceridae Hydropsychidae >1spp Elmidae Economidae	Average Score per Taxon (ASPT): ≥7.2 MIRAI EC = C/D ≥ 52%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as C. SPI: 12 - 14 PTV: 20% to <40%
			Riparian	Vegetation Response Assessment Index (VEGRAI) Index of Habitat Integrity (IHI): Riparian	VEGRAI survey every 5 years. VEGRAI EC = C ≥ 62%

Table 2.3: Water Quality Ecological Specifications: Middle Buffalo River

Quaternary Catchment/EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
V32A, B	Dorps (including Kweek and Wasbankspruit) to confluence with Buffalo River	Quality	Nutrients	Ortho-phosphate (PO_4^-) as Phosphorus	≤ 0.02 milligrams per Litre (mg/L) (50^{th} percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤ 1.0 milligrams per Litre (mg/L) (50^{th} percentile)
			Salts	Total Dissolved Solids	≤200 milligrams per Litre (mg/L) (95^{th} percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL) (95^{th} percentile)
V32C, D	Tiyna, Eersteling-Quaternary catchment	Quality	Nutrients	Ortho-phosphate (PO_4^-) as Phosphorus	≤0.02 milligrams per Litre (mg/L) (50^{th} percentile)
				Total Inorganic Nitrogen (NO_3) as Nitrogen	≤ 1.0 milligrams per Litre (mg/L) (50^{th} percentile)
			Salts	Total Dissolved Solids	≤200 milligrams per Litre (mg/L) (95^{th} percentile)
				Sulphate	≤ 165 milligrams per Litre (mg/L) (95^{th} percentile)
				pH range	≥6.5 (5^{th} percentile) and ≤9.0 (95^{th} percentile)

Quaternary Catchment/EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
			System variables	Turbidity	A 10% variation from background concentration. Limits must be determined.
		Biota	Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as C. SPI: 12 - 14 PTV: 20% to <40%
V32E	Mzinyashana including Sterkstroom and Sandspruit	Quality	Nutrients	Orthophosphate (PO_4^-) as Phosphorus	≤ 0.02 milligrams per Litre (mg/L) (50^{th} percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤ 1.0 milligrams per Litre (mg/L) (50^{th} percentile)
			Salts	Total Dissolved Solids	≤200 milligrams per Litre (mg/L) (95^{th} percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL) (95^{th} percentile)
V32B, V32C, V32D, V32E and V32F **(Thukela_EWR 13)**	Buffalo from Ngagane to Blood River confluence	Quality	Nutrients	Ortho-phosphate (PO_4^-) as Phosphorus	≤0.1 milligrams per Litre (mg/L) (50^{th} percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤2.0 milligrams per Litre (mg/L) (50^{th} percentile)
			Salts	Total Dissolved Solids	≤350 milligrams per Litre (mg/L) (95^{th} percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL)
		Biota	Fish	Fish Response Assessment Index (FRAI) *Labeo rubromaculatus* (LRUB) *Barbus (Enteromius) paludinosus* (BPAU) *Labeobarbus natalensis* (BNAT) *Barbus (Enteromius) pallidus* (BPAL) *Enteromius (Barbus) anoplus* (BANO)	FRAI Ecological Category = C/D ≥ 52% BNAT, BPAL and BANO – 2 of 3 spp present as habitat indicators; and LRUB ≥ 3 individuals per species.
			Aquatic invertebrates	Macroinvertebrate Response Assessment Index (MIRAI) and South African Scoring System Version 5 (SASS5)	3 biotopes sampled: assemblages to be ≥ B abundances.

Quaternary Catchment/EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
				Baetidae >2 spp Hydropsychidae >1spp Elmidae Hydracarina	SASS 5 scores: 77 - 180 Average Score per Taxon (ASPT): 5.5 – 7.0 MIRAI Ecological Category = C/D ≥ 52%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as C. SPI: 12 – 14 %PTV: 20% to <40%
			Riparian habitat	Vegetation Response Assessment Index (VEGRAI)	VEGRAI survey every 5 years. VEGRAI ≥C/D ≥ 52%

Table 2.4: Water Quality Ecological Specifications: Lower Buffalo River

Quaternary Catchment/EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
V33A, V33B, V33C and V33D **(Thukela_EWR 14)**	Buffalo from Blood to Thukela confluence	Quality	Nutrients	Ortho-phosphate (PO_4^-) as Phosphorus	≤0.1 milligrams per Litre (mg/L) (50th percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤2.0 milligrams per Litre (mg/L) (50th percentile)
			Salts	Total Dissolved Solids	≤350 milligrams per Litre (mg/L) (95th percentile)
			System variables	pH range	≥6.5 (5th percentile) and ≤9.0 (95th percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL)
		Biota	Fish	Fish Response Assessment Index (FRAI)	

Quaternary Catchment/EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
				Labeobarbus natalensis (BNAT) *Labeo molybdinus* (LMOL) *Enteromius (Barbus) anoplus* (BANO)	FRAI EC = C ≥ 62% Ensure all flow habitat classes are present for the following species: BNAT, BANO – 2 of 3 spp present as habitat indicators; and LMOL ≥ 3 individuals per species.
			Aquatic invertebrates	Macroinvertebrate Response Assessment Index (MIRAI) and South African Scoring System Version 5 (SASS5) Atyidae Baetidae >2 spp Tricorythidae Heptageniidae Hydropsychidae >1spp Elmidae	At least 2 biotopes sampled: assemblages to be ≥ B abundances. MIRAI EC = C ≥ 62%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as C. SPI: 12 – 14 %PTV: 20% to <40%
			Riparian	Vegetation Response Assessment Index (VEGRAI)	VEGRAI survey every 5 years. VEGRAI EC = C ≥ 62%

Table 2.5: Water Quality Ecological Specifications: Blood River

Quaternary Catchment/ EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
V32G	Wetland RU: Blood River	Quality	Nutrients	Ortho-phosphate (PO_4^-) as Phosphorus	≤0.02 milligrams per Litre (mg/L) (50th percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤1.0 milligrams per Litre (mg/L) (50th percentile)
			Salts	Total Dissolved Solids	≤200 milligrams per Litre (mg/L) (95th percentile)
		Biota	Fish	*Enteromius (Barbus) anoplus* (BANO) *Amphilius natalensis* (ANAT) *Anguilla mossambica* (AMOS)	FRAI EC = B ≥ 82% BANO and ANAT ≥ 5 individuals per species
			Aquatic invertebrates	Baetidae 2 sp Perlidae Tricorythidae Hydropsychidae 1 sp Leptoceridae Ancyidae Psephenidae	At least 2 biotopes sampled: assemblages to be ≥ A abundances MIRAI EC = B ≥ 82%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as B. SPI ≥15 %PTV: 20% to < 40%
V32H	Blood River from outlet of V32G to confluence	Quality	Nutrients	Ortho-phosphate (PO_4^-) as Phosphorus	≤0.06 milligrams per Litre (mg/L) (50th percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤2.0 milligrams per Litre (50th percentile)

Quaternary Catchment/ EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
	with the **V32H** Buffalo River		Salts	Total Dissolved Solids	≤350 milligrams per Litre (95th percentile)
			System variables	pH range	≥6.5 (5th percentile) and ≤9.0 (95th percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL)
		Biota	Fish	Fish Response Assessment Index (FRAI) *Enteromius (Barbus) anoplus* (BANO) *Labeo rubromaculatus* (LRUB) *Labeobarbus natalensis* (BNAT) *Tilapia sparrmanii* (TSPA)	Ensure all flow habitat classes are present for the following species: BNAT, BANO and TSPA – 2 of 3 spp present as habitat indicators; and LRUB ≥ 3 individuals per species. FRAI Ecological Category: C (≥ 62%)
			Aquatic invertebrates	Macroinvertebrate Response Assessment Index (MIRAI) and South African Scoring System Version 5 (SASS5) Atyidae Baetidae >1 spp Tricorythidae Heptageniidae Perlidae Pyralida Hydropsychidae >1spp Elmidae Psephenidae	3 biotopes to be sampled; assemblages to be A to B abundances. MIRAI EC = C ≥ 62%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as C.

Quaternary Catchment/ EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
					SPI: 12 – 14 %PTV: 20% to <40%
			Riparian	Vegetation Response Assessment Index (VEGRAI)	VEGRAI survey every 5 years. VEGRAI EC = C ≥ 62%

Table 2.6: Water Quality Ecological Specifications: Sundays River

Quaternary Catchment/ EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
V60B	Nkunzi to confluence with Sundays	Quality	Nutrients	Orthophosphate (PO_4^-) as Phosphorus	≤0.06 milligrams per Litre (mg/L) (50th percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤2.0 milligrams per Litre (mg/L) (50th percentile)
			Salts	Total Dissolved Solids	≤350 milligrams per Litre (mg/L) (95th percentile)
			System variables	pH range	≥6.5 (5th percentile) and ≤9.0 (95th percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL)
		Biota	Fish	Fish Response Assessment Index (FRAI) *Enteromius (Barbus) anoplus* (BANO) *Labeo rubromaculatus* (LRUB) *Labeobarbus natalensis* (BNAT) *Tilapia sparrmanii* (TSPA) *Amphilius natalensis* (ANAT)	FRAI EC = C ≥ 62% Ensure all flow habitat classes are present for the following species: BNAT, BANO and TSPA – 2 of 3 spp present as habitat indicators; and LRUB ≥ 3 individuals per species.
			Aquatic invertebrates	Macroinvertebrate Response Assessment Index (MIRAI) and South African Scoring System Version 5 (SASS5) Baetidae 2 spp Tricorythidae Heptageniidae Hydropsychidae 2spp Economidae Psephenidae	3 biotopes to be sampled: assemblages to be A to B abundances. MIRAI EC = C ≥ 62%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as C. SPI: 12 - 14 %PTV: 20% to <40%

Quaternary Catchment/ EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
			Riparian	Vegetation Response Assessment Index (VEGRAI)	VEGRAI survey every 5 years. VEGRAI EC = C ≥ 62%
V60A, V60B, V60C **(Thukela_ EWR7)**	Sundays from source to confluence with Wasbank	Quality	Nutrients	Ortho-phosphate (PO_4^-) as Phosphorus	≤0.06 milligrams per Litre (mg/L) (50th percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤1.0 milligrams per Litre (mg/L) (50th percentile)
			Salts	Total Dissolved Solids	≤200 milligrams per Litre (mg/L) (95th percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL)
			System variables	pH range	≥6.5 (5th percentile) and ≤9.0 (95th percentile)
		Biota	Fish	Fish Response Assessment Index (FRAI) *Enteromius (Barbus) anoplus* (BANO) *Labeo rubromaculatus* (LRUB) *Labeobarbus natalensis* (BNAT) *Tilapia sparrmanii* (TSPA) *Amphilius natalensis* (ANAT)	FRAI EC = C/D ≥ 52% Ensure all flow habitat classes are present for the following species: BNAT, BANO and TSPA – 2 of 3 spp present as habitat indicators; and LRUB ≥ 3 individuals.
			Aquatic invertebrates	Macroinvertebrate Response Assessment Index (MIRAI) and South African Scoring System Version 5 (SASS5) Baetidae 2 spp Heptageniidae Hydropsychidae 2spp Elmidae Hydracarina Leptophlebiiidae Aeshnidae Athericidae	3 biotopes sampled: assemblages to be A to B abundances. SASS 5 score: 117 - 180 Average Score per Taxon (ASPT): 5.6 – 6.5 MIRAI EC = C/D ≥ 52%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as C. SPI: 12 – 14 %PTV: 20% to <40%
			Riparian	Vegetation Response Assessment Index (VEGRAI) Index of Habitat Integrity (IHI): Riparian	VEGRAI survey every 5 years. VEGRAI EC = C/D ≥ 52%
V60D, V60E	Wasbank to confluence with Sundays	Quality	Nutrients	Orthophosphate as P	≤0.01 mg/L (50th percentile)
				Total Inorganic Nitrogen as TIN	≤0.5 milligrams per Litre (mg/L) (50th percentile)
			Salts	Total Dissolved Solids	≤ 500 milligrams per Litre (mg/L) (95th percentile)
				Sulphate	≤ 250 milligrams per Litre (mg/L) (95th percentile)
				Chloride	≤ 120 milligrams per Litre (mg/L) (95th percentile)
			System variables	pH range	≥6.5 (5th percentile) and ≤9.0 (95th percentile)

Quaternary Catchment/ EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL)
			Toxic substances	Aluminium (Al)	≤ 0.10 milligrams per Litre (mg/L) (95th percentile)
				Manganese (Mn)	≤ 0.15 milligrams per Litre (mg/L) (95th percentile)
				Cadmium (Cd) soft	≤ 0.001 milligrams per Litre (mg/L) (95th percentile)
				Iron (Fe)	≤ 0.1 milligrams per Litre (mg/L) (95th percentile)
				Lead (Pb) hard	≤ 0.01 milligrams per Litre (mg/L) (95th percentile)
				Copper (Cu) hard	≤ 0.007 milligrams per Litre (mg/L) (95th percentile)
				Cobalt (Co)	≤ 0.05 milligrams per Litre (mg/L) (95th percentile)
				Nickel (Ni)	≤ 0.07 milligrams per Litre (mg/L) (95th percentile)
				Zinc (Zn)	≤ 0.002 milligrams per Litre (mg/L) (95th percentile)
		Biota	Fish	Fish Response Assessment Index (FRAI) *Enteromius (Barbus) anoplus* (BANO) *Labeobarbus natalensis* (BNAT) *Tilapia sparrmanii* (TSPA)	Fish Response Assessment Index (FRAI) should be conducted annually to monitor against the prescribed C/D ecological category. FRAI EC = C/D ≥ 52% Ensure all flow habitat classes are present for the following species: BNAT, BANO and TSPA – 2 of 3 spp. present as habitat indicators
			Aquatic invertebrates	Macroinvertebrate Response Assessment Index (MIRAI) and South African Scoring System Version 5 (SASS5) Baetidae 2 spp Heptageniidae Hydropsychidae 2spp Elmidae Leptophlebiiidae Trichorythidae Lestidae Psephenidae	At least 2 biotopes to be sampled: assemblages to be A to B abundances. SASS 5 score: ≥80 - 100 Average Score per Taxon (ASPT): ≥4.5 MIRAI EC = C/D ≥ 52%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as C. SPI: 12 - 14 %PTV: 20% to <40%

Quaternary Catchment/ EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
			Riparian	Vegetation Response Assessment Index (VEGRAI)	VEGRAI survey every 5 years. VEGRAI EC = C/D ≥ 52%
V60F **(Thukela_ EWR8)**	Sundays from Wasbank to Thukela confluence, including Nhlanyanga	Quality	System variables	pH range	≥6.5 (5th percentile) and ≤9.0 (95th percentile)
				Electrical Conductivity	≤ 55 milli Siemens per metre (mS/m) (95th percentile)
		Biota	Fish	Fish Response Assessment Index (FRAI) *Anguilla mossambica* (AMOS) *Enteromius (Barbus) anoplus* (BANO) *Labeo rubromaculatus* (LRUB) *Labeobarbus natalensis* (BNAT) *Tilapia sparrmanii* (TSPA) *Labeo molybdinus* (LMOL)	FRAI EC = C ≥ 62% Ensure all flow habitat classes are present for the following species: BNAT, BANO and TSPA – 2 of 3 spp present as habitat indicators; and LRUB and/ or LMOL ≥ 3 individuals per spp.
			Aquatic invertebrates	South African Scoring System Version 5 (SASS5) (not measured within this RU but to be achieved) Macroinvertebrate Response Assessment Index (MIRAI) Baetidae 2 spp Heptageniidae Hydropsychidae 2spp Leptophlebiiidae Tricorythidae	At least 2 biotopes sampled: assemblages to be A to B abundances. SASS 5 score: ≥120 Average Score per Taxon (ASPT): ≥4.8 MIRAI EC = C ≥ 62%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as C. SPI: 12 - 14 %PTV: 20% to <40%

Table 2.7: Water Quality Ecological Specifications: Upper Mooi River

Quaternary Catchment/ EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
V20B	Klein - Mooi from source to Mooi confluence V20B (lower portion), V20D	Quality	Nutrients	Orthophosphate (PO_4^-) as Phosphorus	≤0.01 milligrams per Litre (mg/L) (50th percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤0.5 milligrams per Litre (mg/L) (50th percentile)
			Salts	Total Dissolved Solids	≤ 120 milligrams per Litre (mg/L) (95th percentile)
			System variables	pH	6.5 (5th percentile) and 9.0 (95th percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL)
				Ammonia as N	≤ 0.07 milligrams per Litre (mg/L) (95th percentile)

Quaternary Catchment/ EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
			Toxic substances	Atrazine	≤0.08 milligrams per Litre (mg/L)
				Mancozeb	≤0.009 milligrams per Litre (mg/L)
				Glyphosate	≤0.7 milligrams per Litre (mg/L)
		Biota	Fish	Fish Response Assessment Index (FRAI) *Enteromius (Barbus) anoplus* (BANO) *Labeobarbus natalensis* (BNAT)	FRAI EC = C ≥ 62%
			Aquatic invertebrates	Macroinvertebrate Response Assessment Index (MIRAI) and South African Scoring System Version 5 (SASS5) Baetidae 2 spp Heptageniidae Hydropsychidae 2spp Leptophlebiiidae Trichorythidae Psephenidae Perlidae Oligoneuridae Polymitarcyidae Prosopistomatidae Pyralidae	3 biotopes sampled; assemblages to be A to B abundances SASS 5 score: ≥120 Average Score per Taxon (ASPT): ≥4.8 MIRAI EC = C ≥62%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as C. SPI: 12 - 14 %PTV: 20% to <40%
			Riparian	Vegetation Response Assessment Index (VEGRAI)	VEGRAI survey every 5 years VEGRAI EC = C ≥ 62%
V20C **(THU_ECOLOGICAL WATER REQUIREMENTS (EWR) 20)**	Nsonge tributary catchment	Quality	Nutrients	Orthophosphate (PO_4^-) as Phosphorus	≤0.01 milligrams per Litre (mg/L) (50th percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤0.5 milligrams per Litre (mg/L) (50th percentile)
			Salts	Total Dissolved Solids	≤120 milligrams per Litre (mg/L) (95th percentile)
			System variables	pH	6.5 (5th percentile) and 9.0 (95th percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL)
			Toxic substances	Ammonia as N	≤ 0.07 milligrams per Litre (mg/L) (95th percentile)
				Atrazine	≤0.08 milligrams per Litre (mg/L)
				Mancozeb	≤0.009 milligrams per Litre (mg/L)
				Glyphosate	≤0.7 milligrams per Litre (mg/L)
		Biota	Fish	Fish Response Assessment Index (FRAI) *Enteromius (Barbus) anoplus* (BANO) *Labeobarbus natalensis* (BNAT)	FRAI EC = C ≥ 62%

Quaternary Catchment/ EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
			Aquatic invertebrates	Macroinvertebrate Response Assessment Index (MIRAI) and South African Scoring System Version 5 (SASS5) Baetidae 2 spp Leptophlebiiidae Trichorythida	3 biotopes sampled: assemblages to be A to B abundances. SASS 5 score: 90 - 220 Average Score per Taxon (ASPT): 6.4 – 7.5 MIRAI EC = C ≥ 62%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as B. SPI: 15 - 17 %PTV: <20%
			Riparian	Vegetation Response Assessment Index (VEGRAI)	VEGRAI survey every 5 years. VEGRAI EC = B/C ≥ 72%
V20A (lower portion), V20D (upper)	Mooi upstream of Spring Grove Dam	Quality	Nutrients	Ortho-phosphate (PO_4^-) as Phosphorus	≤0.01 milligrams per Litre (mg/L) (50th percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤0.5 milligrams per Litre (mg/L) (50th percentile)
			Salts	Total Dissolved Solids	≤120 milligrams per Litre (mg/L) (95th percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL)
			Toxic substances	Ammonia as N	≤ 0.0725 milligrams per Litre (mg/L) (95th percentile)
				Atrazine	≤0.08 milligrams per Litre (mg/L)
				Mancozeb	≤0.009 milligrams per Litre (mg/L)
				Glyphosate	≤0.7 milligrams per Litre (mg/L)
		Biota	Fish	Fish Response Assessment Index (FRAI) *Enteromius (Barbus) anoplus* (BANO) *Labeobarbus natalensis* (BNAT)	FRAI EC = C ≥ 62% Ensure all flow habitat classes are present for the following species: BNAT, BANO
			Aquatic invertebrates	Macroinvertebrate Response Assessment Index (MIRAI) and South African Scoring System Version 5 (SASS5) Baetidae 2 spp Leptophlebiiidae Trichorythidae Heptageniidae Hydropsychidae 2spp.	3 biotopes sampled: assemblages to be A to B abundances SASS 5 score: ≥120 Average Score per Taxon (ASPT): ≥4.8 MIRAI EC = C ≥ 62%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as C. SPI: 12 - 14 %PTV: 20% to <40%
			Riparian	Vegetation Response Assessment Index (VEGRAI)	VEGRAI survey every 5 years. VEGRAI EC = C ≥ 62%

Quaternary Catchment/ EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
V20D	Spring Grove Dam/ Means Weir	Quality	Nutrients	Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤0.5 milligrams per Litre (mg/L) (50^{th} percentile)
				Ortho-phosphate (PO_4^-) as Phosphorus	≤0.01 milligrams per Litre (mg/L) (50^{th} percentile)
			Salts	Total Dissolved Solids	≤100 milligrams per Litre (mg/L) (95^{th} percentile)
			System variables	pH	6.5 – 9.0 (5^{th} and 95^{th} percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL)
		Biota	Periphyton/ phytoplankton	Chlorophyll-*a*	11-20 micrograms per Litre (µg/L) (50^{th} percentile)
V20D (lower) and V20E, portion of V20G (Thukela_ EWR11)	Downstream Spring Grove Dam to outlet of V20G **(***Note: *Current before Umkomaas transfer***)**	Quality	Nutrients	Orthophosphate as P	≤0.01 milligrams per Litre (mg/L) (50^{th} percentile)
				Total Inorganic Nitrogen as TIN	≤0.5 milligrams per Litre (mg/L) (50^{th} percentile)
			Salts	Total Dissolved Solids	≤350 milligrams per Litre (mg/L) (95^{th} percentile)
			System variables	pH	6.5 (5^{th} percentile) – 9.0 (95^{th} percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL)
		Biota	Fish	Fish Response Assessment Index (FRAI) *Enteromius (Barbus) anoplus* (BANO) *Labeobarbus natalensis* (BNAT) *Labeo molybdinus* (LMOL)	FRAI EC = C/D ≥ 52%
			Aquatic invertebrates	Macroinvertebrate Response Assessment Index (MIRAI) and South African Scoring System Version 5 (SASS5) Baetidae 2 spp Leptophlebiiidae Heptageniidae Hydropsychidae 2spp Elmidae	3 biotopes sampled: assemblages to be A to B abundances. SASS 5 score: ≥80 – 100 Average Score per Taxon (ASPT): ≥4.5 MIRAI EC = C/D ≥ 52%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as C. SPI: 12 - 14 %PTV: 20% to <40%
			Riparian habitat	Vegetation Response Assessment Index (VEGRAI)	VEGRAI survey every 5 years. VEGRAI EC = C/D ≥ 52%
V20D (lower) and V20E, portion of V20G (Thukela_ EWR11)	Downstream Spring Grove Dam to outlet of V20G **(***Note: **long term, after*	Quality	Nutrients	Ortho-phosphate (PO_4^-) as Phosphorus	≤0.06 milligrams per Litre (mg/L) (50^{th} percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤2.0 milligrams per Litre (mg/L) (50^{th} percentile)
			Salts	Total Dissolved Solids	≤250 milligrams per Litre (mg/L) (95^{th} percentile)
			System variables	pH	6.5 (5^{th} percentile) and 9.0 (95^{th} percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL)
			Toxic substances	Atrazine	≤0.08 milligrams per Litre (mg/L)
				Mancozeb	≤0.009 milligrams per Litre (mg/L)

Quaternary Catchment/ EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
	*Umkomaas transfer is implemented and transfers out of the system are reduced***)**	Biota	Fish	Fish Response Assessment Index (FRAI) *Enteromius (Barbus) anoplus* (BANO) *Labeobarbus natalensis* (BNAT) *Anguilla mossambica* (AMOS) *Anguilla bengalensis* (ALAB) *Barbus (Enteromius) viviparus* (BVIV) *Labeo rubromaculatus* (LRUB) *Labeo molybdinus* (LMOL) *Barbus (Enteromius) pallidus* (BPAL)	FRAI EC = B/C ≥ 72% Ensure all flow habitat classes are present for the following species: BNAT, BANO, BVIV, BPAL – 3 of the 4 vegetation/ cover representatives. 1 of following AMOS, ALAB, LRUB as flow dependent and depth class representatives.
			Aquatic invertebrates	Macroinvertebrate Response Assessment Index (MIRAI) and South African Scoring System Version 5 (SASS5) Baetidae 2 spp Leptophlebiiidae Trichorythidae Heptageniidae Hydropsychidae 2spp Elmidae Psephenidae Perlidae Oligoneuridae	3 biotopes sampled: assemblages to be A to B abundances. SASS 5 score: ≥150 Average Score per Taxon (ASPT): ≥5.5 MIRAI EC = B/C ≥ 72%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as B. SPI: 15 - 17 %PTV: <20%
			Riparian	Vegetation Response Assessment Index (VEGRAI)	VEGRAI survey every 5 years. VEGRAI EC = B/C ≥ 72%
V20E	Joubertsvlei to confluence with Mooi	Quality	Nutrients	Ortho-phosphate (PO_4^-) as Phosphorus	≤0.02 milligrams per Litre (mg/L) (50^{th} percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤1.0 milligrams per Litre (mg/L) (50^{th} percentile)
			Salts	Total Dissolved Solids	≤195 milligrams per Litre (mg/L) (95^{th} percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL)
			Toxic substances	Atrazine	≤0.08 milligrams per Litre (mg/L)
				Mancozeb	≤0.009 milligrams per Litre (mg/L)
				Glyphosate	≤0.7 milligrams per Litre (mg/L)
		Biota	Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as D. SPI: 8 - 10 %PTV: 40% - 60%

Table 2.8: Water Quality Ecological Specifications: Middle/ Lower Mooi River

Quaternary Catchment/EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
V20F	Craigieburn Dam	Quality	Nutrients	Ortho-phosphate (PO_4^-) as Phosphorus	≤0.02 milligrams per Litre (mg/L) (50th percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤1.0 milligrams per Litre (mg/L) (50th percentile)
			Salts	Total Dissolved Solids	≤195 milligrams per Litre (mg/L) (95th percentile)
			System variables	Ph	≥6.5 (5th percentile) and ≤9.0 (95th percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL)
		Biota	Periphyton/ phytoplankton	Chlorophyll-*a*	11-20 micrograms per Litre (µg/L) (50th percentile)
V20G **(THU_EWR21)**	Mnyamvubu downstream dam to confluence with Mooi	Quality	Nutrients	Ortho-phosphate as P	≤0.01 milligrams per Litre (mg/L) (50th percentile)
				Total Inorganic Nitrogen as TIN	≤0.5 milligrams per Litre (mg/L) (50th percentile)
			Salts	Total Dissolved Solids	≤120 milligrams per Litre (mg/L) (95th percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL)
		Biota	Fish	Fish Response Assessment Index (FRAI) *Enteromius (Barbus) anoplus* (BANO) *Labeobarbus natalensis* (BNAT) *Anguilla mossambica* (AMOS) *Labeo molybdinus* (LMOL) *Barbus (Enteromius) pallidus* (BPAL) *Tilapia sparrmanii* (TSPA)	FRAI EC = C ≥ 62% Ensure all flow habitat classes are present for the following species: BNAT, BANO, BVIV, BPAL – 3 of the 4 vegetation/ cover representatives. 1 of following AMOS, ALAB, LRUB as flow dependent and depth class representatives
			Aquatic invertebrates	Macroinvertebrate Response Assessment Index (MIRAI) and South African Scoring System Version 5 (SASS5) Baetidae >2 spp Leptophlebiiidae Trichorythidae Hydropsychidae >2spp Atydae Hydracarina	3 biotopes sampled: assemblages to be A to B abundances. SASS 5 score: ≥120 Average Score per Taxon (ASPT): ≥4.8 MIRAI EC = C ≥ 62%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as B. SPI: 15 - 17 %PTV: <20%
			Riparian	Vegetation Response Assessment Index (VEGRAI)	VEGRAI survey every 5 years. VEGRAI EC = C ≥ 62%

Quaternary Catchment/EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
V20H, J (THU_EWR 12A)	Mooi from Mnyamvubu to Thukela confluence	Quality	Nutrients	Ortho-phosphate (PO_4^-) as Phosphorus	≤0.02 milligrams per Litre (mg/L) (50th percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤1.0 milligrams per Litre (mg/L) (50th percentile)
			Salts	Total Dissolved Solids	≤350 milligrams per Litre (mg/L) (95th percentile)
			System variables	pH	6.5 (5th percentile) and 9.0 (95th percentile)
			Toxic substances	Atrazine	≤0.08 milligrams per Litre (mg/L)
				Mancozeb	≤0.009 milligrams per Litre (mg/L)
				Glyphosate	≤0.7 milligrams per Litre (mg/L)
		Biota	Fish	Fish Response Assessment Index (FRAI) *Anguilla mossambica* (AMOS) *Labeobarbus natalensis* (BNAT) *Barbus (Enteromius) viviparus* (BVIV) *Clarias gariepinus* (CGAR) *Labeo molybdinus* (LMOL) *Barbus (Enteromius) pallidus* (BPAL) *Tilapia sparrmanii* (TSPA) *Amphilius natalensis* (ANAT)	FRAI EC = C ≥ 62% Ensure all flow habitat classes are present for the following species: BNAT, BVIV, BPAL and TSPA – 3 of the 4 vegetation/ cover representatives. 1 of following AMOS, and LMOL as flow dependent and depth class representatives.
			Aquatic invertebrates	Macroinvertebrate Response Assessment Index (MIRAI) and South African Scoring System Version 5 (SASS5) Baetidae >2 spp Leptophlebiiidae Atydae Aeshnidae Hydropsychidae >2spp	3 biotopes sampled: assemblages to be A to B abundances SASS 5 score: 124 - 200 Average Score per Taxon (ASPT): 5.4 - 7.5 MIRAI EC = C ≥ 62%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as C. SPI: 12 - 14 %PTV: 20% - < 40%
			Riparian habitat	Vegetation Response Assessment Index (VEGRAI)	VEGRAI survey every 5 years. VEGRAI EC = C ≥ 62%

Table 2.9: Water Quality Ecological Specifications: Middle/ Lower Bushman's River

Quaternary Catchment/EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
V70C	Wagendrift Dam	Quality	Nutrients	Ortho-phosphate (PO_4^-) as Phosphorus	≤0.01 milligrams per Litre (mg/L) (50th percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤1.0 milligrams per Litre (mg/L) (50th percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL)
		Biota	Periphyton/ phytoplankton	Chlorophyll-*a*	11-20 micrograms per Litre (µg/L) (50th percentile)
V70D	Little Bushman's to confluence with Bushman's	Quality	Nutrients	Ortho-phosphate (PO_4^-) as Phosphorus	≤0.06 milligrams per Litre (mg/L) (50th percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤2.0 mg/L (50th percentile)
			Salts	Total Dissolved Solids	≤300 mg/L (95th percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL)
			System variables	pH range	≥6.5 (5th percentile) and ≤9.0 (95th percentile)
		Biota	Fish	Fish Response Assessment Index (FRAI) *Anguilla mossambica* (AMOS) *Enteromius (Barbus) anoplus* (BANO) *Labeobarbus natalensis* (BNAT)	Fish Response Assessment Index (FRAI) should be conducted annually to monitor against the prescribed C ecological category FRAI EC = C ≥ 62% Ensure all flow habitat classes are present for the following species: BNAT, BANO – 5 specimens of each. AMOS, 1 -2 specimens as flow dependent and depth class representatives.
			Aquatic invertebrates	Macroinvertebrate Response Assessment Index (MIRAI) and South African Scoring System Version 5 (SASS5) Baetidae 2 spp Leptophlebiiidae Hydropsychidae 2spp Heptageniidae Elmidae	3 biotopes sampled: assemblages to be A to B abundances SASS 5 score: ≥120 Average Score per Taxon (ASPT): ≥4.8 MIRAI EC = C ≥ 62%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as C. SPI: 12 - 14 %PTV: 20% - < 40%
			Riparian	Vegetation Response Assessment Index (VEGRAI)	VEGRAI survey every 5 years. VEGRAI EC = C ≥ 62%
V70E, V70F, (Upper	Bushman's from Wagendrif	Quality	Nutrients	Orthophosphate (PO_4^-) as Phosphorus	≤0.06 milligrams per Litre (mg/L) (50th percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤2.0 milligrams per Litre (mg/L) (50th percentile)

Quaternary Catchment/EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
portion) V70G	t Dam to confluence with Rens-burgspruit downstream of Estcourt		Salts	Total Dissolved Solids	≤350 milligrams per Litre (mg/L) (95th percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL)
			System variables	pH range	≥6.5 (5th percentile) and ≤9.0 (95th percentile)
			Toxic substances	Ammonia as N	≤ 0.07 milligrams per Litre (mg/L) (95th percentile)
				Atrazine	≤0.08 milligrams per Litre (mg/L)
				Mancozeb	≤0.009 milligrams per Litre (mg/L)
				Glyphosate	≤0.7 milligrams per Litre (mg/L)
V70F (lower) (Thukela_ EWR 5)	Bushman's from Rensburg spruit Dam to outlet of V70F	Quality	Nutrients	Ortho-phosphate (PO_4^-) as Phosphorus	≤0.058 milligrams per Litre (mg/L) (50th percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤2.0 milligrams per Litre (mg/L) (50th percentile)
			Salts	Total Dissolved Solids	≤350 milligrams per Litre (mg/L) (95th percentile)
			System variables	pH range	≥6.5 (5th percentile) and ≤9.0 (95th percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL)
			Toxic substances	Ammonia as N	≤ 0.07 milligrams per Litre (mg/L) (95th percentile)
				Atrazine	≤0.08 milligrams per Litre (mg/L)
				Mancozeb	≤0.009 milligrams per Litre (mg/L)
				Glyphosate	≤0.7 milligrams per Litre (mg/L)
		Biota	Fish	Fish Response Assessment Index (FRAI) *Enteromius (Barbus) anoplus* (BANO) *Labeobarbus natalensis* (BNAT) **–** *Barbus (Enteromius) trimaculatus* (BTRI) *Barbus (Enteromius) viviparus* (BVIV) *Anguilla mossambica* (AMOS) *Labeo rubromaculatus* (LRUB) *Tilapia sparrmanii* (TSPA)	FRAI EC = C ≥ 62% Ensure all flow habitat classes are present for the following species: BNAT, BVIV, BANO and TSPA – 3 of the 4 vegetation/ cover representatives. 1 of following AMOS, and LRUB as flow dependent and depth class representatives.
			Aquatic invertebrates	Macroinvertebrate Response Assessment Index (MIRAI) and South African Scoring System Version 5 (SASS5) Baetidae 2 spp Leptophlebiiidae Heptageniidae Hydropsychidae 2spp Perlidae* Elmidae* Trichorythidae*	3 biotopes sampled: assemblages to be A to B abundances. SASS 5 score: ≥120 Average Score per Taxon (ASPT): ≥4.8 MIRAI EC = C ≥ 62%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as C. SPI: 12 - 14 %PTV: 20% - < 40%
			Riparian habitat	Vegetation Response Assessment Index (VEGRAI)	VEGRAI survey every 5 years.

Quaternary Catchment/EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
					VEGRAI EC = C ≥62%
V70G (THU_EWR 6A)	Bushman's from outlet of V70F to confluence with Thukela	Quality	Nutrients	Ortho-phosphate (PO_4^-) as Phosphorus	≤0.06 milligrams per Litre (mg/L) (50th percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤2.0 milligrams per Litre (mg/L) (50th percentile)
			Salts	Total Dissolved Solids	≤350 milligrams per Litre (mg/L) (95th percentile)
			System variables	pH range	≥6.5 (5th percentile) and ≤9.0 (95th percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL)
			Toxic substances	Ammonia s N	≤ 0.07 milligrams per Litre (mg/L) (95th percentile)
				Atrazine	≤0.08 milligrams per Litre (mg/L)
				Mancozeb	≤0.009 milligrams per Litre (mg/L)
				Glyphosate	≤0.7 milligrams per Litre (mg/L)
		Biota	Fish	Fish Response Assessment Index (FRAI) *Anguilla mossambica* (AMOS) *Enteromius (Barbus) anoplus* (BANO) *Labeobarbus natalensis* (BNAT) *Barbus (Enteromius) trimaculatus* (BTRI) *Barbus (Enteromius) viviparus* (BVIV) *Clarias gariepinus* (CGAR) *Labeo molybdinus* (LMOL) *Barbus (Enteromius) pallidus* (BPAL) *Tilapia sparrmanii* (TSPA) *Amphilius natalensis* (ANAT)	FRAI EC = C/D ≥ 52% Ensure all flow habitat classes are present for the following species: BNAT, BVIV, BPAL and TSPA – 3 of the 4 vegetation/ cover representatives. 1 of following AMOS, and LMOL as flow dependent and depth class representatives.
			Aquatic invertebrates	Macroinvertebrate Response Assessment Index (MIRAI) and South African Scoring System Version 5 (SASS5) Baetidae >2 spp Leptophlebiiidae Heptageniidae Hydropsychidae 2spp	At least 2 biotopes sampled: assemblages to be A to B abundances SASS 5 score: 80 - 180 Average Score per Taxon (ASPT): 5.7 - 7.5 MIRAI EC = C/D ≥ 52%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as C. SPI: 12 - 14 %PTV: 20% - < 40%
			Riparian habitat	Vegetation Response Assessment Index (VEGRAI)	VEGRAI survey every 5 years. VEGRAI EC = C/D ≥52%

Table 2.10: Water Quality Ecological Specifications: Upper Thukela River

Quaternary Catchment/EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
V11A (lower portion), V11C, V11D	Thukela, Putterill, Majaneni, Khombe tributary catchments	Quality	Nutrients	Orthophosphate (PO_4^-) as Phosphorus	≤0.1 milligrams per Litre (mg/L) (50th percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤2.0 milligrams per Litre (mg/L) (50th percentile)
			System variables	pH range	≥6.5 (5th percentile) and ≤9.0 (95th percentile)
				Electrical Conductivity	≤ 55 milli Siemens per metre (mS/m) (95th percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL)
			Toxic substances	Ammonia as N	≤ 0.0725 milligrams per Litre (mg/L) (95th percentile)
				Atrazine	≤0.08 milligrams per Litre (mg/L)
				Mancozeb	≤0.009 milligrams per Litre (mg/L)
				Glyphosate	≤0.7 milligrams per Litre (mg/L)
		Biota	Fish	Fish Response Assessment Index (FRAI) *Anguilla mossambica* (AMOS) *Amphilius natalensis* (ANAT) *Enteromius (Barbus) anoplus* (BANO) *Labeobarbus natalensis* (BNAT) *Labeo rubromaculatus* (LRUB)	FRAI EC = B/C ≥ 72% Ensure all flow habitat classes are present for the following species: ANAT, BANO and BNAT – 2 of the 3 vegetation/ cover representatives. 1 of the following AMOS, mature BNAT and LRUB as flow dependent and depth class representatives.
			Aquatic invertebrates	Macroinvertebrate Response Assessment Index (MIRAI) and South African Scoring System Version 5 (SASS5) Baetidae 2 spp Leptophlebiiidae Heptageniidae Hydropsychidae 2spp Psephidae	At least 2 biotopes sampled: assemblages to be A to B abundances. SASS5: ≥150 Average Score per Taxon (ASPT): ≥15.5 MIRAI EC = B/C ≥ 72%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as C. SPI: 12 – 14 %PTV: 20% - < 40%
			Riparian	Vegetation Response Assessment Index (VEGRAI)	VEGRAI survey every 5 years. VEGRAI EC = B/C ≥ 72%
V11D, V11E	Woodstock Dam	Quality	Nutrients	Total Inorganic Nitrogen as TIN	≤0.7 milligrams per Litre (mg/L) (50th percentile)
				Ortho-phosphate as P	≤0.010 milligrams per Litre (mg/L) (50th percentile)
			Salts	Total Dissolved Solids	≤100 milligrams per Litre (mg/L) (95th percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL)

Quaternary Catchment/EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
		Biota	Periphyton/ phytoplankton	Chlorophyll-*a*	11-20 micrograms per Litre (µg/L) 50th percentile
V11F	Sandspruit tributary catchment	Quality	Nutrients	Orthophosphate (PO_4^-) as Phosphorus	≤0.06 milligrams per Litre (mg/L) (50th percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤1.0 milligrams per Litre (mg/L) (50th percentile)
			Salts	Total Dissolved Solids	≤350 milligrams per Litre (mg/L) (95th percentile)
			System variables	pH range≥	≥6.5 (5th percentile) and ≤9.0 (95th percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL)
			Toxic substances	Ammonia as N	≤ 0.07 milligrams per Litre (mg/L) (95th percentile)
				Atrazine	≤0.08 milligrams per Litre (mg/L)
				Mancozeb	≤0.009 milligrams per Litre (mg/L)
				Glyphosate	≤0.7 milligrams per Litre (mg/L)
		Biota	Fish	Fish Response Assessment Index (FRAI) *Anguilla mossambica* (AMOS) *Amphilius natalensis* (ANAT) *Enteromius (Barbus) anoplus* (BANO) *Labeobarbus natalensis* (BNAT)	FRAI EC = C ≥ 62% Ensure all flow habitat classes are present for the following species: ANAT, BANO and BNAT – 2 of the 3 vegetation/ cover representatives. 1 of the following AMOS and mature BNAT as flow dependent and depth class representatives.
			Aquatic invertebrates	South African Scoring System 5 (SASS5) (not measured within this RU but to be achieved) Macroinvertebrate Response Assessment Index (MIRAI) Baetidae 2 spp Leptophlebiiidae Heptageniidae Hydropsychidae 2spp Elmidae	At least 2 biotopes sampled; assemblages to be A to B abundances SASS 5 score: ≥120 Average Score per Taxon (ASPT): ≥4.8 MIRAI EC = C ≥ 62%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as C. SPI: 12 - 14 %PTV: 20% - < 40%
			Riparian	Vegetation Response Assessment Index (VEGRAI)	VEGRAI survey every 5 years. VEGRAI C Ecological Category (≥ 62%)
V11L	Spioenkop Dam	Quality	Nutrients	Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤0.7 milligrams per Litre (mg/L) (50th percentile)
				Ortho-phosphate (PO_4^-) as Phosphorus	≤0.01 milligrams per Litre (mg/L) (50th percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL)

Quaternary Catchment/EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
		Biota	Periphyton/ phytoplankton	Chlorophyll-*a*	11-20 micrograms per Litre (µg/L) (50th percentile)
V11M **EWR 2**	Spioenkop Dam to Little Thukela confluence	Quality	Nutrients	Ortho-phosphate (PO_4^-) as Phosphorus	≤0.02 milligrams per Litre (mg/L) (50th percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤1.0 milligrams per Litre (mg/L) (50th percentile)
			Toxic substances	Ammonia as N	≤ 0.07 milligrams per Litre (mg/L) (95th percentile)
				Atrazine	≤0.08 milligrams per Litre (mg/L)
				Mancozeb	≤0.009 milligrams per Litre (mg/L)
				Glyphosate	≤0.7 milligrams per Litre (mg/L)
		Biota	Fish	Fish Response Assessment Index (FRAI) *Anguilla mossambica* (AMOS) *Enteromius (Barbus) anoplus* (BANO) *Labeobarbus natalensis* (BNAT) *Labeo rubromaculatus* (LRUB) *Oreochromis mossambicus* (OMOS)	FRAI EC = C/D ≥ 52% Ensure all flow habitat classes are present for the following species: BNAT, BANO and OMOS – 2 of the 3 vegetation/ cover representatives. 1 of the following AMOS, and LRUB as flow dependent and depth class representatives.
			Aquatic invertebrates	South African Scoring System 5 (SASS5) (not measured within this RU but to be achieved) Macroinvertebrate Response Assessment Index (MIRAI) Baetidae 2 spp Leptophlebiiidae Heptageniidae Hydropsychidae 2spp	At least 2 biotopes sampled: assemblages to be A to B abundances. SASS 5 score: ≥80 – 100 Average Score per Taxon (ASPT): ≥4.5 MIRAI EC = C/D ≥ 52%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as C. SPI: 12 - 14 %PTV: 20% - < 40%
			Riparian	Vegetation Response Assessment Index (VEGRAI) Index of Habitat Integrity (IHI): Riparian	VEGRAI survey every 5 years. VEGRAI EC = C/D ≥ 52%
V13B, V13D	Sterkspruit, Situlwane tributary catchment	Quality	Nutrients	Orthophosphate (PO_4^-) as Phosphorus	≤0.02 milligrams per Litres (mg/L) (50th percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤1.0 milligrams per Litres (mg/L) (50th percentile)
			Toxic substances	Ammonia as N	≤ 0.07 milligrams per Litres (mg/L) (95th percentile)
				Atrazine	≤0.08 milligrams per Litres (mg/L)
				Mancozeb	≤0.009 milligrams per Litres (mg/L)
				Glyphosate	≤0.7 milligrams per Litres (mg/L)

Quaternary Catchment/EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
		Biota	Fish	Fish Response Assessment Index (FRAI) *Anguilla mossambica* (AMOS) *Enteromius (Barbus) anoplus* (BANO) *Labeobarbus natalensis* (BNAT) *Clarias gariepinus* (CGAR) *Labeo rubromaculatus* (LRUB) *Oreochromis mossambicus* (OMOS) *Amphilius natalensis* (ANAT)	FRAI EC = B/C ≥ 72% Ensure all flow habitat classes are present for the following species: BNAT, BANO, OMOS and ANAT – 3 of the 4 vegetation/ cover representatives. CGAR present. 2 of the following AMOS, mature BNAT and LRUB as flow dependent and depth class representatives.
			Aquatic invertebrates	South African Scoring System 5 (SASS5) (not measured within this RU but to be achieved) Macroinvertebrate Response Assessment Index (MIRAI) Baetidae >2 spp Leptophlebiiidae Heptageniidae Tricorythidae Hydropsychidae 2spp Elmidae Psepheniidae Dixidae	3 biotopes to be sampled: assemblages to be A to B abundances. SASS 5 score: ≥150 Average Score per Taxon (ASPT): ≥5.5 MIRAI EC = B/C ≥ 72%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as C. SPI: 12 - 14 %PTV: 20% - < 40%
			Riparian	Vegetation Response Assessment Index (VEGRAI)	VEGRAI survey every 5 years. VEGRAI EC = B/C ≥ 72%
V13A (lower portion), V13C, V13E	Little Tugela from IUA14 outlet to confluence with Thukela River	Quality	Nutrients	Ortho-phosphate (PO_4^-) as Phosphorus	≤0.02 milligrams per Litre (mg/L) (50^{th} percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤2.0 milligrams per Litre (mg/L) (50^{th} percentile)
			Salts	Total Dissolved Solids	≤350 milligrams per Litre (mg/L) (95^{th} percentile)
			Toxic substances	Ammonia as N	≤ 0.07 milligrams per Litre (mg/L) (95^{th} percentile)
				Atrazine	≤0.08 milligrams per Litre (mg/L)
				Mancozeb	≤0.009 milligrams per Litre (mg/L)
				Glyphosate	≤0.7 milligrams per Litre (mg/L)

Quaternary Catchment/EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
(Thukela_ EWR 3)		Biota	Fish	Fish Response Assessment Index (FRAI) *Anguilla mossambica* (AMOS) *Enteromius (Barbus) anoplus* (BANO) *Labeobarbus natalensis* (BNAT) *Labeo rubromaculatus* (LRUB) *Amphilius natalensis* (ANAT) *Labeo molybdinus* (LMOL)	FRAI EC = C/D ≥ 52% Ensure all flow habitat classes are present for the following species: BNAT, BANO and ANAT – 2 of the 3 vegetation/ cover representatives. 1 of the following AMOS, mature BNAT and LMOL as flow dependent and depth class representatives.
			Aquatic invertebrates	South African Scoring System 5 (SASS5) (not measured within this RU but to be achieved) Macroinvertebrate Response Assessment Index (MIRAI) Baetidae >2 spp Leptophlebiiidae Heptageniidae Oligoneuridae Tricorythidae Hydropsychidae 1spp Polycentropodidae Elmidae Psephenidae	At least 2 biotopes sampled: assemblages to be A to B abundances. SASS 5 score: ≥80 - 100 Average Score per Taxon (ASPT): ≥4.5 MIRAI EC = C/D ≥ 52%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as C. SPI: 12 - 14 %PTV: 20% - < 40%
			Riparian	Vegetation Response Assessment Index (VEGRAI)	VEGRAI survey every 5 years. VEGRAI EC = C/D ≥ 52%
V14A, V14B	Tugela from Little Tugela confluence to proposed Jana Dam/ Klip River confluence	Quality	Nutrients	Ortho-phosphate (PO_4^-) as Phosphorus	≤0.10 milligrams per Litre (mg/L) (50^{th} percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤2.0 milligrams per Litre (mg/L) (50^{th} percentile)
			Salts	Total Dissolved Solids	≤350 milligrams per Litre (mg/L) (95^{th} percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL)
			Toxic substances	Ammonia as N	≤ 0.07 milligrams per Litre (mg/L) (95^{th} percentile)
				Atrazine	≤0.08 milligrams per Litre (mg/L)
				Mancozeb	≤0.009 milligrams per Litre (mg/L)
				Glyphosate	≤0.7 milligrams per Litre (mg/L)

Quaternary Catchment/EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
		Biota	Fish	Fish Response Assessment Index (FRAI) *Anguilla mossambica* (AMOS) *Enteromius (Barbus) anoplus* (BANO) *Labeobarbus natalensis* (BNAT) *Labeo rubromaculatus* (LRUB) *Amphilius natalensis* (ANAT)	FRAI EC = C/D ≥ 52% Ensure all flow habitat classes are present for the following species: BNAT, BANO and ANAT – 2 of the 3 vegetation/ cover representatives. 1 of the following AMOS, mature BNAT and LRUB as flow dependent and depth class representatives.
			Aquatic invertebrates	South African Scoring System 5 (SASS5) (not measured within this RU but to be achieved) Macroinvertebrate Response Assessment Index (MIRAI) Baetidae >2 spp Leptophlebiidae Heptageniidae Oligoneuridae Tricorythidae Hydropsychidae 1spp Polycentropodidae Elmidae Psephenidae	At least 2 biotopes sampled: assemblages to be A to B abundances. SASS 5 score: ≥80 - 100 Average Score per Taxon (ASPT): ≥4.5 MIRAI EC = C/D ≥ 52%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as C. SPI: 12 - 14 %PTV: 20% - < 40%
			Riparian	Vegetation Response Assessment Index (VEGRAI)	VEGRAI survey every 5 years. VEGRAI EC = C/D ≥ 52%

Table 2.11: Water Quality Ecological Specifications: Klip River

Quaternary Catchment/ EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
V12D, V12E and V12F	Sandspruit and tributaries	Quality	Nutrients	Ortho-phosphate (PO_4^-) as Phosphorus	≤0.058 milligrams per Litre (mg/L) (50^{th} percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤2.0 milligrams per Litre (mg/L) (50^{th} percentile)
			Salts	Total Dissolved Solids	≤350 milligrams per Litre (mg/L) (95^{th} percentile)

Quaternary Catchment/ EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL)
		Biota	Fish	Fish Response Assessment Index (FRAI) *Anguilla mossambica* (AMOS) *Enteromius (Barbus) anoplus* (BANO) *Labeobarbus natalensis* (BNAT) *Labeo rubromaculatus* (LRUB) *Clarias gariepinus* (CGAR) *Amphilius natalensis* (ANAT)	FRAI EC = C/D ≥ 52% Ensure all flow habitat classes are present for the following species: BNAT, BANO, CGAR (juvenile) and ANAT – 3 of the 4 vegetation/ cover representatives. 2 of the following AMOS, mature BNAT and LRUB as flow dependent and depth class representatives.
			Aquatic invertebrates	SASS 5 (not measured within this RU but to be achieved) MIRAI Baetidae 2 spp Leptophlebiidae Heptageniidae Tricorythidae Elmidae	At least 2 biotopes sampled: assemblages to be A to B abundances. SASS 5 score: ≥80 – 100 Average Score per Taxon (ASPT): ≥4.5 MIRAI EC = C/D ≥ 52%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as C. SPI: 12 - 14 %PTV: 20% - < 40%
			Riparian	Vegetation Response Assessment Index (VEGRAI)	VEGRAI survey every 5 years. VEGRAI EC = C/D≥ 52%
V12A, V12B, V12C (THU_ EWR 22)	Klip, Braamhoek, Tatana, Ngoga,	Quality	Nutrients	Ortho-phosphate (PO_4^-) as Phosphorus	≤0.06 milligrams per Litre (mg/L) (50th percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤2.0 milligrams per Litre (mg/L) (50th percentile)
			Salts	Total Dissolved Solids	≤350 milligrams per Litre (mg/L) (95th percentile)

Quaternary Catchment/ EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
	Mhlwane, catchments	Biota	Fish	Fish Response Assessment Index (FRAI) *Anguilla mossambica* (AMOS) *Enteromius (Barbus) anoplus* (BANO) *Labeobarbus natalensis* (BNAT) *Labeo rubromaculatus* (LRUB) *Clarias gariepinus* (CGAR) *Amphilius natalensis* (ANAT)	FRAI EC = C ≥ 62% Ensure all flow habitat classes are present for the following species: BNAT, ANAT, BANO and juvenile CGAR – 3 of the 4 vegetation/ cover representatives. 2 of the following AMOS, mature BNAT, mature CGAR and LRUB as flow dependent and depth class representatives.
			Aquatic invertebrates	Macroinvertebrate Response Assessment Index (MIRAI) and South African Scoring System Version 5 (SASS5) Hydracarina Perlidae Baetidae > 2 sp Heptageniidae Leptophlebiidae Aeshnidae Crambidae Ecnomidae Elmidae Psephenidae	3 biotopes sampled: assemblages to be A to B abundances. SASS 5 score: 213 – 220 Average Score per Taxon (ASPT): 5.9 - 7.5 MIRAI EC = C ≥ 62%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as C. SPI: 12 - 14 %PTV: 20% - < 40%
			Riparian	Vegetation Response Assessment Index (VEGRAI)	VEGRAI survey every 5 years. VEGRAI EC = C ≥ 62%
V12G	Klip from Ladysmith to confluence with Thukela	Quality	Nutrients	Ortho-phosphate (PO_4^-) as Phosphorus	≤0.06 milligrams per Litre (mg/L) (50th percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤2.0 milligrams per Litre (mg/L) (50th percentile)
			Salts	Total Dissolved Solids	≤500 milligrams per Litre (mg/L) (95th percentile)
			System variables	pH range	≥6.5 (5th percentile) and ≤9.0 (95th percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL)
			Toxic substances	Ammonia as N	≤ 0.07 milligrams per Litre (mg/L) (95th percentile)

Quaternary Catchment/ EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
				Aluminium (Al)	≤ 0.1 milligrams per Litre (mg/L) (95th percentile)
				Cadmium (Cd) soft	≤ 0.001 milligrams per Litre (mg/L) (95th percentile)
				Manganese (Mn)	≤ 0.2 milligrams per Litre (mg/L) (95th percentile)
				Iron (Fe)	≤ 0.1 milligrams per Litre (mg/L) (95th percentile)
				Lead (Pb) hard	≤ 0.009 milligrams per Litre (mg/L) (95th percentile)
				Copper (Cu) hard	≤ 0.007 milligrams per Litre (mg/L) (95th percentile)
				Nickel (Ni)	≤ 0.07 milligrams per Litre (mg/L) (95th percentile)
				Cobalt (Co)	≤ 0.05 milligrams per Litre (mg/L) (95th percentile)
				Zinc (Zn)	≤ 0.002 milligrams per Litre (mg/L) (95th percentile)
		Biota	Fish	Fish Response Assessment Index (FRAI) *Anguilla mossambica* (AMOS) *Enteromius (Barbus) anoplus* (BANO) *Labeobarbus natalensis* (BNAT) *Labeo rubromaculatus* (LRUB) *Clarias gariepinus* (CGAR) *Amphilius natalensis* (ANAT)	FRAI EC = C ≥ 62% Ensure all flow habitat classes are present for the following species: BNAT, BANO, ANAT and juvenile CGAR – 3 of the 4 vegetation/ cover representatives. 2of following AMOS, mature CGAR, mature BNAT and LRUB as flow dependent and depth class representatives.
			Aquatic invertebrates	Macroinvertebrate Response Assessment Index (MIRAI) and South African Scoring System Version 5 (SASS5) Baetidae 2 spp Leptophlebiiidae Heptageniidae Hydropsychidae 2spp Elmidae	At least 2 biotopes sampled: assemblages to be A to B abundances. SASS 5 score: ≥120 Average Score per Taxon (ASPT): ≥4.8 MIRAI EC = C ≥ 62%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as C. SPI: 12 - 14 %PTV: 20% - < 40%
			Riparian	Vegetation Response Assessment Index (VEGRAI)	VEGRAI survey every 5 years. VEGRAI EC = C ≥ 62%

Table 2.12: Water Quality Ecological Specifications: Middle Thukela River

Quaternary Catchment/ EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
V14E (Thukela_ EWR 4B)	Thukela From Klip confluence to Bushman's confluence	Biota	Fish	Fish Response Assessment Index (FRAI) *Anguilla mossambica* (AMOS) *Amphilius natalensis* (ANAT) *Enteromius (Barbus) anoplus* (BANO) *Labeobarbus natalensis* (BNAT) *Labeo molybdinus* (LMOL) *Labeo rubromaculatus* (LRUB) *Clarias gariepinus* (CGAR) *Barbus (Enteromius) trimaculatus* (BTRI) *Barbus (Enteromius) viviparus* (BVIV) *Pseudocrenilabrus philander* (PPHI)	FRAI EC = C ≥ 62% Ensure all flow habitat classes are present for the following species: BNAT, BVIV, BANO, BTRI and PPHI – 4 of the 5 vegetation/ cover representatives. 4 of the following AMOS, ANAT, mature BNAT, CGAR, LRUB and LMOL as flow dependent and depth class representatives.
			Aquatic invertebrates	Macroinvertebrate Response Assessment Index (MIRAI) and South African Scoring System Version 5 (SASS5) Atyidae Baetidae > 2 sp Heptageniidae Leptophlebiidae Chlorocyphidae Crambidae Elmidae	3 biotopes sampled: assemblages to be A to B abundances. SASS 5 score: 145 - 200 Average Score per Taxon (ASPT): 6.0 – 7.6 MIRAI EC = C ≥ 62%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as B. SPI: 15 – 17 %PTV: < 20%
			Riparian	Vegetation Response Assessment Index (VEGRAI)	VEGRAI survey every 5 years. VEGRAI EC = C ≥ 62%
V60G, V60H, V60J, V60K **(Thukela _EWR 9)**	Thukela from Bushman's confluence to d/s Mooi confluence	Quality	Nutrients	Orthophosphate (PO_4^-) as Phosphorus	≤0.1 milligrams per Litre (mg/L) (50^{th} percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤2.0 milligrams per Litre (mg/L) (50^{th} percentile)
			Salts	Total Dissolved Solids	≤500 milligrams per Litre (mg/L) (95^{th} percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL)
			System variables	pH range	≥6.5 (5^{th} percentile) and ≤9.0 (95^{th} percentile)
			Toxic substances	Ammonia as N	≤ 0.07 milligrams per Litre (mg/L) (95^{th} percentile)

Quaternary Catchment/ EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
		Biota	Fish	Fish Response Assessment Index (FRAI) *Anguilla mossambica* (AMOS) *Amphilius natalensis* (ANAT) *Enteromius (Barbus) anoplus* (BANO) *Labeobarbus natalensis* (BNAT) *Labeo molybdinus* (LMOL) *Clarias gariepinus* (CGAR) *Barbus (Enteromius) trimaculatus* (BTRI) *Tilapia sparrmanii* (TSPA)	FRAI EC = D ≥ 42% Ensure all flow habitat classes are present for the following species: BNAT, BTRI, juvenile CGAR and TSPA – 3 of the 4 vegetation/ cover representatives. 1 of following AMOS, mature CGAR and LMOL as flow dependent and depth class representatives.
			Aquatic invertebrates	Macroinvertebrate Response Assessment Index (MIRAI) and South African Scoring System Version 5 (SASS5) Baetidae >2 spp Leptophlebiidae Heptageniidae Elmidae Psephenidae	At least 2 biotopes sampled: assemblages to be A to B abundances. SASS 5 score: ≥60 Average Score per Taxon (ASPT): ≥4.0 MIRAI EC = D ≥ 42%
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as C. SPI: 12 – 14 %PTV: 20% - < 40%
			Riparian	Vegetation Response Assessment Index (VEGRAI)	VEGRAI survey every 5 years. VEGRAI EC = D ≥ 42%

Table 2.13: Water Quality Ecological Specifications: Lower Thukela River

Quaternary Catchment/EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
V40A, V40B **(Thukela_ EWR 15)**	Thukela from d/s Mooi confluence to Middeldrift transfer	Quality	Nutrients	Ortho-phosphate (PO_4^-) as Phosphorus	≤0.06 milligrams per Litre (mg/L) (50th percentile)
				Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤2.0 milligrams per Litre (mg/L) (50th percentile)
			Salts	Total Dissolved Solids	≤350 milligrams per Litre (mg/L) (95th percentile)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL)
			System variables	pH range	≥6.5 (5th percentile) and ≤9.0 (95th percentile)
			Toxic substances	Ammonia as N	≤ 0.07 milligrams per Litre (mg/L) (95th percentile)

Quaternary Catchment/EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
		Biota	Fish	Fish Response Assessment Index (FRAI) *Anguilla mossambica* (AMOS) *Labeobarbus natalensis* (BNAT) *Barbus (Enteromius) trimaculatus* (BTRI) *Barbus (Enteromius) viviparus* (BVIV) *Clarias gariepinus* (CGAR) *Labeo molybdinus* (LMOL) *Tilapia sparrmanii* (TSPA) *Amphilius natalensis* (ANAT)	FRAI EC = C ≥ 62% Ensure all flow habitat classes are present for the following species: BNAT, BVIV, juvenile CGAR, and TSPA – 3 of the 4 vegetation/ cover representatives. 1 of the following AMOS, CGAR and LMOL as flow dependent and depth class representatives.
			Aquatic invertebrates	Macroinvertebrate Response Assessment Index (MIRAI) and South African Scoring System Version 5 (SASS5) Baetidae 2 spp Leptophlebiiidae Heptageniidae Perlidae Elmidae Psephenidae Hydropsychidae 2spp	At least 2 biotopes sampled: assemblages to be A to B abundances. SASS 5 score: ≥120 Average Score per Taxon (ASPT): ≥4.8 MIRAI EC = C/D ≥ 62%
			Riparian habitat	Vegetation Response Assessment Index (VEGRAI)	VEGRAI survey every 5 years. VEGRAI EC = C ≥ 62%
V40E, V50A, V59B, V50C, V50D (upper reach) **(THU_ EWR 16)**	Thukela from Middeldrift to Mandini Transfer (Mgeni) weir in V50D	Quality	Salts	Total Dissolved Solids	≤350 milligrams per Litre (mg/L) (95th percentile)
		Biota	Fish	Fish Response Assessment Index (FRAI) *Anguilla mossambica* (AMOS) *Labeobarbus natalensis* (BNAT) *Barbus (Enteromius) trimaculatus* (BTRI) *Clarias gariepinus* (CGAR) *Labeo molybdinus* (LMOL) *Labeo rubromaculatus* (LRUB)	FRAI EC = C ≥ 62% Ensure all flow habitat classes are present for the following species: BNAT, BTRI and juvenile CGAR – 2 of the 3 vegetation/ cover representatives. 2 of the following AMOS, LRUB and LMOL as flow dependent and depth class representatives.
			Aquatic invertebrates	Macroinvertebrate Response Assessment Index (MIRAI) South African Scoring System Version 5 (SASS5) Baetidae >2 spp Heptageniidae Perlidae Oligoneuridae Tricorythidae	At least 2 biotopes sampled: assemblages to be A to B abundances. SASS 5 score: ≥120 Average Score per Taxon (ASPT): ≥4.8 MIRAI EC = C ≥ 62%

Quaternary Catchment/EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
				Prosopistomatidae Elmidae Hydropsychidae 2spp	
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as C. SPI: 12 – 14 %PTV: 20% - < 40%
			Riparian	Vegetation Response Assessment Index (VEGRAI)	VEGRAI survey every 5 years. VEGRAI EC = C ≥ 62%

Table 2.14: Water Quality Ecological Specifications: Thukela Estuary and Upstream Thukela

Quaternary Catchment/EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
V50D (Upper Portions Quaternary catchment V50D) **(EWR 17)**	Thukela from Mandini Transfer (Mngeni) weir to upstream Estuary, including Mandini Stream	Quality	Nutrients	Orthophosphate (PO_4^-) as Phosphorus	≤0.1 milligrams per Litre (mg/L) (50th percentile) (Thukela River only)
					≤0.1 milligrams per Litre (mg/L) (50th percentile) (Mandini Stream only)
				Total Inorganic Nitrogen (TIN) as Nitrogen	≤2.0 milligrams per Litre (mg/L) (percentile) (Thukela River and Mandini Stream)
			Salts	Total Dissolved Solids	≤500 milligrams per Litre (mg/L) (95th percentile) (Thukela River and Mandini Stream)
				Chloride	≤175 milligrams per Litre (mg/L) (95th percentile) Mandini Stream
				Sodium	≤115 milligrams per Litre (mg/L) (95th percentile) (Mandini Stream only)
			Pathogens	*Escherichia coli*	≤130 Counts per 100 millilitres (counts/ 100 mL) (Thukela River and Mandini Stream)
			System variables	pH	6.5 – 8.9 with <5% of measurements outside of this during a given year (Thukela River and Mandini Stream)
				Temperature	17°C (10th percentile) and 30°C (90th percentile) with <5% of measurements outside of this range within a given year (Thukela River and Mandini Stream)
				Dissolved oxygen	≥ 6 milligrams per Litre (mg/L) (Thukela River and Mandini Stream)
			Toxic substances	Ammonia as N	≤ 0.1 milligrams per Litre (mg/L) (95th percentile) (Thukela River and Mandini Stream)
				Aluminium (Al)	≤ 0.10 milligrams per Litre (mg/L) (95th percentile) (Thukela River and Mandini Stream)
				Manganese (Mn)	≤ 0.2 milligrams per Litre (mg/L) (95th percentile) (Thukela River and Mandini Stream)
				Iron (Fe)	≤ 0.1 milligrams per Litre (mg/L) (95th percentile) (Thukela River and Mandini Stream)
				Lead (Pb) hard	≤ 0.009 milligrams per Litre (mg/L) (95th percentile) (Thukela River and Mandini Stream)

Quaternary Catchment/EWR Site	River	Component	Sub-component	Indicator	Water Quality Ecological Specifications
				Copper (Cu) hard	≤ 0.007 milligrams per Litre (mg/L) (95th percentile) (Thukela River and Mandini Stream)
				Nickel (Ni)	≤ 0.07 milligrams per Litre (mg/L) (95th percentile) (Thukela River and Mandini Stream)
				Cobalt (Co)	≤ 0.05 milligrams per Litre (mg/L) (95th percentile) (Thukela River and Mandini Stream)
				Zinc (Zn)	≤ 0.002 milligrams per Litre (mg/L) (95th percentile) (Thukela River and Mandini Stream)
		Biota	Fish	Fish Response Assessment Index (FRAI) *Anguilla spp.* *Glossogobius spp.* *Awaous aeneofuscus* (AAEN) *Barbus (Enteromius) trimaculatus (*BTRI) *Labeobarbus natalensis (*BNAT) *Labeo molybdinus* (LMOL) *Labeo rubromaculatus* (LRUB) *Oreochromis mossambicus (*OMOS)	FRAI EC = C ≥ 62% (Thukela River) Ensure all flow habitat classes are present for the following species: *Glossogobius spp.,* BNAT, BTRI and juvenile OMOS – 3 of the 4 vegetation/ cover representatives. 2 of the following *Anguilla spp.* (elvers), mature BNAT, LMOL and LRUB as flow dependent and depth class representatives.
			Aquatic invertebrates	Macroinvertebrate Response Assessment Index (MIRAI) and South African Scoring System Version 5 (SASS5) Perlidae Baetidae > 2 sp Heptageniidae Leptophlebiidae Oligoneuridae Prosopistomatidae Elmidae Hydropsychidae 2spp	3 biotopes sampled: assemblages to be A to B abundances. SASS 5 score: 100 – 120 Average Score per Taxon (ASPT): 5.5 - 6.5 MIRAI EC = C ≥ 62% (Thukela River)
			Diatoms	Specific Pollution Sensitivity Index (SPI) Percentage pollution tolerant values (%PTV)	Ecological category should be maintained as C. SPI: 12 - 14 %PTV: 20% - < 40% (Thukela River)
			Riparian	Vegetation Response Assessment Index (VEGRAI)	VEGRAI survey every 5 years. VEGRAI EC = C ≥ 62% (Thukela River)

Table 2.15: Water Quality and Ecological Specifications for Priority Wetland Clusters and Systems in the Thukela Catchments

IUA	Wetland Name	Wetland Type	Ecological Condition			Component prioritised	Indicator	Water Quality Ecological Specifications
			PES	EIS	REC			
1: Upper Buffalo River	Wakkerstroom	Unchannelled valley bottom (Peatland)	**C**	**Very High**	**B**	Quality	Ortho-phosphate as P	≤0.01 milligrams per Litre (mg/L) (50th percentile)
							Total Inorganic Nitrogen (TIN)	≤0.5 milligrams per Litre (mg/L) (50th percentile)
								≤120 milligrams per Litre (mg/L) (95th percentile)
							Escherichia coli	≤130 Counts per 100 millilitres (counts/ 100 mL)
						Habitat	Present Ecological State (PES) Category	PES score above 70%
							Peat depth and humification	Less than 10% reduction in peat profile depth and quality/humification from the baseline measurements at each sampling site.
						Biota	SABAP 2 reporting rates for aquatic/wetland dependent Red Data bird species: • White-Winged Flufftail • Grey Crowned Crane • African Marsh Harrier • African Grass Owl • Blue Crane • Maccoa Duck • Greater Flamingo • Lesser Flamingo • Half-Collared Kingfisher • Greater Painted Snipe	Over the next 5 years the reporting rate for each species must not decline from the SABAP2 reporting rates (as at 15 April 2021): • White-Winged Flufftail (~0.3%) • Grey Crowned Crane (~59.6%) • African Marsh Harrier (~49.1%) • African Grass Owl (~0.5%) • Blue Crane (~12.2%) • Maccoa Duck (~1.6%) • Greater Flamingo (~1.1%) • Lesser Flamingo (~0.3%) • Half-Collared Kingfisher (~4.5%) • Greater Painted Snipe (~0.1%)
	Groenvlei	Channelled valley bottom and Floodplain	**C**	**High**	**B/C**	Quality	Ortho-phosphate as P	≤0.01 milligrams per Litre (mg/L) (50th percentile)
							Total Inorganic Nitrogen (TIN)	≤0.5 milligrams per Litre (mg/L) (50th percentile)
							Total Dissolved Solids	≤120 milligrams per Litre (mg/L) (95th percentile)
							Escherichia coli	≤130 Counts per 100 millilitres (counts/ 100 mL)
						Habitat	Present Ecological State (PES) Category	PES score above 70%
3: Middle Buffalo River	Boschoffsvlei	Floodplain	**B/C**	**High**	**B**	Quality	Ortho-phosphate (PO_4^-) as Phosphorus	≤ 0.02 milligrams per Litre (mg/L) (50th percentile)
							Total Inorganic Nitrogen (TIN)	≤1.0 milligrams per Litre (mg/L) (50th percentile)

IUA	Wetland Name	Wetland Type	Ecological Condition			Component prioritised	Indicator	Water Quality Ecological Specifications
			PES	EIS	REC			
							Total Dissolved Solids	≤200 milligrams per Litre (mg/L) (95th percentile)
							Escherichia coli	≤130 Counts per 100 millilitres (counts/ 100 mL) (95th percentile)
						Habitat	Present Ecological State (PES) Category	PES score above 75%
	Boschoffsvlei pan complex	Depressions / Pans	**A**	**Very High**	**A**	Quality	pH, Electrical Conductivity, Total Dissolved Solids, Total Alkalinity as CaCO3, Sodium, Calcium, Magnesium, Sulphate, Iron, Chloride, Potassium, Magnesium, Manganese, Aluminium, Phosphorous, Silica, Fluoride Ammonia, Nitrate and Fluoride.	Maintain the water chemistry pan type applicable for each pan.
		Seeps	**B**					
						Habitat	Present Ecological State (PES) Category	PES score above 85% for each pan.
5: Blood River	Upper Blood River	Seeps and Channelled valley bottom	**A**	**High**	**A**	Habitat	Present Ecological State (PES) Category -	PES score above 90% for the northern cluster and above 80% for the southern cluster.
		Unchannelled valley bottom	**B**		**A/B**			
	Blood River Vlei	Unchannelled valley bottom and Floodplain	**C**	**Very High**	**B**	Quality	Ortho-phosphate (PO_4^-) as Phosphorus	≤0.02 milligrams per Litre (mg/L) (50th percentile)
							Total Inorganic Nitrogen (TIN)	≤1.0 milligrams per Litre (mg/L) (50th percentile)
							Total Dissolved Solids	≤200 milligrams per Litre (mg/L) (95th percentile)
						Habitat	Present Ecological State (PES) Category	PES score above 70% north of R34 crossing and PES score above 55% south of R34 crossing.
6: Sunday River	Boschbergvlei	Floodplain	**B/C**	**High**	**B**	Quality	Ortho-phosphate (PO_4^-) as Phosphorus	≤0.06 milligrams per Litre (mg/L) (50th percentile)
							Total Inorganic Nitrogen (TIN^-) as Nitrogen	≤1.0 milligrams per Litre (mg/L) (50th percentile)
							Total Dissolved Solids	≤200 milligrams per Litre (mg/L) (95th percentile)
							Escherichia coli	≤130 Counts per 100 millilitres (counts/ 100 mL)
							pH range	≥6.5 (5th percentile) and ≤9.0 (95th percentile)
							Turbidity	A 10% variation from background concentration. Limits must be determined.
						Habitat	Present Ecological State (PES) Category	PES score above 75%
	Paddavlei	Unchannelled and Channelled valley bottom	**C**	**High**	**B/C**	Habitat	Present Ecological State (PES) Category	PES score above 70%

IUA	Wetland Name	Wetland Type	Ecological Condition			Component prioritised	Indicator	Water Quality Ecological Specifications
			PES	EIS	REC			
						Biota	Presence of Critically Endangered Wattled Crane.	Continued presence of Wattled Crane.
7: Upper Mooi River (and portion of 14: Escarpment)	Hlatikulu	Channelled and Unchannelled valley bottom	**C**	**Very High**	**B**	Quality	Ortho-phosphate (PO4-) as Phosphorus	≤0.01 milligrams per Litre (mg/L) (50th percentile)
							Total Inorganic Nitrogen (TIN-) as Nitrogen	≤0.5 milligrams per Litre (mg/L) (50th percentile)
							Total Dissolved Solids	≤120 milligrams per Litre (mg/L) (95th percentile)
							pH	6.5 (5th percentile) and 9.0 (95th percentile)
							Escherichia coli	≤130 Counts per 100 millilitres (counts/ 100 mL)
							Ammonia as N	≤ 0.07 milligrams per Litre (mg/L) (95th percentile)
							Atrazine	≤0.078 milligrams per Litre (mg/L)
							Mancozeb	≤0.009 milligrams per Litre (mg/L)
							Glyphosate	≤0.7 milligrams per Litre (mg/L)
						Habitat	Present Ecological State (PES) Category	PES score above 65%
						Biota	South African Bird Atlas Project 2 (SABAP 2) reporting rates for aquatic/wetland dependent Red Data bird species: • Wattled Crane • Grey Crowned Crane • African Marsh Harrier • African Grass Owl • Blue Crane • Half-Collared Kingfisher Verify from monitoring records and recorded sightings from available avifaunal reporting data.	Over the next 5 years the reporting rate for each species must not decline from the SABAP2 reporting rates (as at 15 April 2021): • Wattled Crane (~19.6%) • Grey Crowned Crane (~43.5%) • African Marsh Harrier (~15.2%) • African Grass Owl (~2.2%) • Blue Crane (~21.7%) • Half-Collared Kingfisher (~13.0%).
	Stillerust	Channelled valley bottom and Floodplain	**A**	**Very High**	**A**	Quality	Ortho-phosphate (PO4-) as Phosphorus	≤0.01 milligrams per Litre (mg/L) (50th percentile)
							Total Inorganic Nitrogen (TIN-) as Nitrogen	≤0.5 milligrams per Litre (mg/L) (50th percentile)
							Total Dissolved Solids	≤120 milligrams per Litre (mg/L) (95th percentile)
							Escherichia coli	≤130 Counts per 100 millilitres (counts/ 100 mL)
							Ammonia as N	≤ 0.07 milligrams per Litre (mg/L) (95th percentile)
							Atrazine	≤0.08 milligrams per Litre (mg/L)

IUA	Wetland Name	Wetland Type	Ecological Condition			Component prioritised	Indicator	Water Quality Ecological Specifications
			PES	EIS	REC			
							Mancozeb	≤0.009 milligrams per Litre (mg/L)
							Glyphosate	≤0.7 milligrams per Litre (mg/L)
						Habitat	Present Ecological State (PES) Category	PES score above 90%
						Biota	South African Bird Atlas Project 2 (SABAP 2) reporting rates for aquatic/wetland dependent Red Data bird species: • Wattled Crane • Grey Crowned Crane • African Marsh Harrier • Blue Crane Verify from monitoring records and recorded sightings from available avifaunal reporting data.	Over the next 5 years the reporting rate for each species must not decline from the SABAP2 reporting rates (as at 15 April 2021): • Wattled Crane (~27.6%) • Grey Crowned Crane (~37.9%) • African Marsh Harrier (~6.9%) • Blue Crane (~3.4%).
							The continued presence of breeding Wattled Cranes. Wattled Crane monitoring, including breeding success monitoring	At least 1 breeding pair of Wattled Cranes
8: Middle/ Lower Mooi River	Melmoth	Channelled valley bottom	**A**	**Very High**	**A**	Habitat	Present Ecological State (PES) Category	PES score above 90%
						Biota	South African Bird Atlas Project 2 (SABAP 2) reporting rates for aquatic/wetland dependent Red Data bird species: • Wattled Crane • Grey Crowned Crane • African Marsh Harrier • Blue Crane Verify from monitoring records and recorded sightings from available avifaunal reporting data.	Over the next 5 years the reporting rate for each species must not decline from the SABAP2 reporting rates (as at 15 April 2021): • Wattled Crane (~21.1%) • Grey Crowned Crane (~28.9%) • African Marsh Harrier (~7.9%) • Blue Crane (~34.2%).
	Dartmoor	Unchannelled Valley Bottom and Channelled Valley Bottom	**A**	**Very High**	**A**	Habitat	Present Ecological State (PES) Category	PES score above 90%
						Biota	South African Bird Atlas Project 2 (SABAP 2) reporting rates for aquatic/wetland dependent Red Data bird species: • Wattled Crane • Grey Crowned Crane • African Marsh Harrier • Blue Crane Verify from monitoring records and recorded sightings from available avifaunal reporting data.	Over the next 5 years the reporting rate for each species must not decline from the SABAP2 reporting rates (as at 15 April 2021): • Wattled Crane (~21.1%) • Grey Crowned Crane (~28.9%) • African Marsh Harrier (~7.9%) • Blue Crane (~34.2%).

IUA	Wetland Name	Wetland Type	Ecological Condition			Component prioritised	Indicator	Water Quality Ecological Specifications
			PES	EIS	REC			
	Scawby	Unchannelled Valley Bottom and Channelled Valley Bottom	**B/C**	**Very High**	**A/B**	Habitat	Present Ecological State (PES) Category	PES score above 75%
						Biota	South African Bird Atlas Project 2 (SABAP 2) reporting rates for aquatic/wetland dependent Red Data bird species: • Wattled Crane • Grey Crowned Crane • African Marsh Harrier • Blue Crane Verify from monitoring records and recorded sightings from available avifaunal reporting data.	Over the next 5 years the reporting rate for each species must not decline from the SABAP2 reporting rates (as at 15 April 2021): • Wattled Crane (~21.1%) • Grey Crowned Crane (~28.9%) • African Marsh Harrier (~7.9%) • Blue Crane (~34.2%).
9: Middle/ Lower Bushman's River	Ntabamhlope	Floodplain, Channelled and Unchannelled valley bottom	**C**	**Very High**	**B**	Quality	Ortho-phosphate (PO4-) as Phosphorus	≤0.06 milligrams per Litre (mg/L) (50th percentile)
							Total Inorganic Nitrogen (TIN-) as Nitrogen	≤2.0 milligrams per Litre (mg/L) (50th percentile)
							Total Dissolved Solids	≤300 milligrams per Litre (mg/L) (95th percentile)
							Escherichia coli	≤130 Counts per 100 millilitres (counts/ 100 mL)
							pH range	≥6.5 (5th percentile) and ≤9.0 (95th percentile)
						Habitat	Present Ecological State (PES) Category	PES score above 70%
14: Escarpment	Highmoor	Channelled valley bottom	**A**	**High**	**A**	Habitat	Present Ecological State (PES) Category	PES score above 90% for southern cluster and PES score above 75% for northern cluster.
		Unchannelled valley bottom	**C**		**B/C**	Biota	South Africa Bird Atlas Project 2 (SABAP 2) reporting rates for aquatic/wetland dependent Red Data bird species: • Wattled Crane • Grey Crowned Crane • African Marsh Harrier • Blue Crane Verify from monitoring records and recorded sightings from available avifaunal reporting data.	Over the next 5 years the reporting rate for each species must not decline from the SABAP2 reporting rates (as at 15 April 2021): • Wattled Crane (~17.9%) • Grey Crowned Crane (~10.7%) • African Marsh Harrier (~3.69%) • Blue Crane (~10.7%).

GROUNDWATER - QUANTITY COMPONENT

GROUNDWATER RESERVE – WATER QUANTITY COMPONENT

The Thukela catchment consists of 88 quaternary catchments delineated and grouped into 25 resource units (A - Y). The resource units are made up of one or several quaternary catchments, based on geological and hydrogeological characteristics as outlined in **Table 3.1.** The groundwater quantity component was determined using values obtained during the determination of a High Confidence Groundwater Reserve Determination Study in the Thukela catchment. Population values were obtained from the Directorate Water Services and were adjusted from the 2023 census data.

Table 3.1. Groundwater Quantity Component of the Reserve for the Thukela catchment.

RESOURCE UNIT	QUATERNARY	POPULATION	RECHARGE			RESERVE		
			TOTAL AREA Km^2	EFFECTIVE AREA Km^2	RECHARGE Mm^3/a	BASEFLOW Mm^3/a	BHN Mm^3/a	RESERVE Mm^3/a
A	V11A	9 481	206.9	206.9	13.45	1.21	0.09	1.3
	V11B	4 574	252.6	252.6	23.997	2.65	0.04	2.69
	V11E	10 607	192.6	192.6	12.52	0.92	0.10	1.02
	V11G	1 590	313.5	313.5	29.78	4.81	0.01	4.82
	V11H	9 924	132.9	132.9	8.64	0.17	0.09	0.26
B	V13A	1 504	231.7	231.7	15.07	1.22	0.01	1.23
	V13B	10 077	293.8	293.8	13.22	0.81	0.09	0.9
	V13C	39 114	255.6	255.6	8.179	0.48	0.36	0.84
	V13D	17 514	283.4	283.4	12.75	0.55	0.16	0.71

	V11C	7 122	252.4	252.4	16.41	1.43	0.07	1.5
C	V11D	24 306	265.9	265.9	17.25	0.57	0.22	0.79
	V11F	7 541	160.7	160.7	7.599	0.12	0.07	0.19
D	V11J	7 290	144.0	144	6.48	0.18	0.07	0.25
	V11K	6 917	246.8	246.8	13.93	0.31	0.06	0.37
E	V11L	7 813	311.7	311.7	13.96	0.37	0.07	0.44
	V11M	2 507	154.3	154.3	4.94	0.09	0.02	0.11
	V13E	15 344	280.9	280.9	8.98	0.26	0.14	0.4
F	V14A	1 710	223.9	223.9	7.17	0.18	0.02	0.2
	V12A	5 929	307.1	307.1	17.83	1.39	0.05	1.44
	V12B	10 977	293.3	293.3	17.57	1.16	0.10	1.26
G	V12C	21 106	154.8	154.8	6.97	0.18	0.19	0.37
	V12D	4 230	236.0	236	15.34	0.89	0.04	0.93
	V12E	3 386	324.4	324.4	14.598	0.79	0.03	0.82
H	V12F	3 191	332.4	332.4	10.64	0.77	0.03	0.8
	V12G	179 541	505.9	505.9	16.19	1.72	1.64	3.36
	V14B	21 843	170.1	170.1	5.44	0.18	0.20	0.38
I	V14E	7 821	286.6	286.6	9.17	0.53	0.071	0.601
	V14C	19 190	195.2	195.2	6.25	0.30	0.18	0.48
J	V14D	9 843	631.8	631.8	20.22	2.59	0.09	2.68
	V60A	1 396	106.8	106.8	6.27	0.07	0.01	0.08
	V60B	10 499	551.7	551.7	24.83	3.87	0.10	3.97
K	V60C	13 179	360.6	360.6	11.54	0.91	0.12	1.03
	V60D	1 471	307.9	307.9	13.86	1.22	0.01	1.23
L	V60E	82 486	747.2	747.2	23.91	3.88	0.75	4.63
	V20H	44 228	603.4	603.4	19.31	2.38	0.40	2.78
	V20J	18 170	314.0	314	10.05	0.61	0.17	0.78
	V60F	27 077	406.0	406	12.92	0.98	0.25	1.23
	V60G	39 942	461.4	461.4	14.77	1.21	0.34	1.55
	V60H	49 219	354.9	354.9	11.36	0.62	0.45	1.07
	V60J	22 710	185.9	185.9	5.95	0.21	0.21	0.42

M	V60K	15 054	228.0	228	7.296	0.33	0.14	0.47
	V70A	3 519	280.2	280.2	26.62	2.39	0.03	2.42
	V70B	10 552	121.2	121.2	11.51	0.17	0.10	0.27
	V70C	9 945	341.5	341.5	15.37	2.10	0.09	2.19
	V70D	85 027	198.4	198.4	8.93	0.38	0.78	1.16
N	V70E	1 952	105.3	105.3	4.30	0.05	0.02	0.07
	V20A	729	267.1	267.1	22.95	1.64	0.01	1.65
	V20B	2 106	190.3	190.3	12.37	0.50	0.02	0.52
	V20C	975	187.9	187.9	12.21	0.44	0.01	0.45
O	V20D	7 989	299.2	299.2	14.81	1.33	0.07	1.4
	V70F	11 007	364.5	364.5	11.50	0.83	0.10	0.93
P	V70G	19 934	504.5	504.5	16.14	1.47	0.18	1.65
	V20E	23 103	598.7	598.7	19.16	2.81	0.21	3.02
	V20F	2 817	153.9	153.9	6.93	0.22	0.03	0.25
Q	V20G	4 818	253.6	253.6	8.12	0.46	0.04	0.5
	V31A	13 357	621.7	621.7	36.53	4.29	0.12	4.41
	V31B	33 073	505.3	505.3	22.74	2.56	0.30	2.86
	V31C	4 248	395.9	395.9	17.82	1.53	0.04	1.57
	V31D	2 018	467.1	467.1	21.86	1.30	0.02	1.32
	V31E	6 107	833.9	833.9	42.42	5.91	0.06	5.97
	V31F	1 194	155.6	155.6	8.54	0.21	0.011	0.221
	V31G	20 439	254.7	254.7	10.21	0.47	0.19	0.66
	V31H	0.0	128.5	128.5	8.35	0.14	0.0	0.14
	V31J	67 782	357.9	357.9	19.26	1.08	0.62	1.7
	V31K	18 640	226.7	226.7	9.75	0.38	0.17	0.55
R	V32A	5 687	194.7	194.7	8.76	0.33	0.05	0.38
	V32B	12 645	556.9	556.9	24.80	2.19	0.12	2.31
	V32C	343 654	629.9	629.9	22.11	2.58	3.14	5.72
	V32D	33 069	589.9	589.9	18.88	2.33	0.30	2.63
	V32E	87 425	783.3	783.3	25.07	3.81	0.80	4.61
S	V32F	1 050	201.4	201.4	6.45	0.24	0.01	0.25

	V32G	2 839	544.3	544.3	24.49	2.09	0.03	2.12
T	V32H	45 998	517.4	517.4	16.56	1.58	0.42	2
	V33A	46 083	576.9	576.9	18.46	2.16	0.42	2.58
	V33B	14 495	406.6	406.6	13.01	1.05	0.13	1.18
	V33C	14 922	398.1	398.1	12.74	1.05	0.14	1.19
U	V33D	24 467	455.2	455.2	14.57	1.29	0.22	1.51
	V40A	14 980	372.2	372.2	11.91	1.70	0.14	1.84
	V40B	14 534	292.3	292.3	9.35	0.94	0.13	1.07
V	V40E	28 232	300.9	300.9	9.63	0.93	0.26	1.19
	V40C	28 232	454.9	454.9	20.47	2.40	0.26	2.66
W	V40D	19 122	333.3	333.3	13.84	1.29	0.17	1.46
	V50A	25 441	408.9	408.9	13.99	2.34	0.23	2.57
	V50B	26 982	383.8	383.8	17.27	2.63	0.25	2.88
X	V50C	109 984	409.1	409.1	26.59	4.88	1.00	5.88
Y	V50D	50 262	146.8	146.8	9.542	0.25	0.46	0.71

GROUNDWATER RESERVE – WATER QUALITY COMPONENT

The groundwater quality of quaternary catchments with available hydrochemistry data was assessed against the domestic water target water quality ranges (Upper limit of Class I Water Quality [Drinking]) as shown in **Table 4.1** A summary of the results for the groundwater quality classification at quaternary level in the terms of basic human needs requirements is outlined in **Table 4.2.**

Table 4.1: Physical and chemical water quality

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

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

Class 0: Water is classed as ideal drinking water, suitable for lifetime use. The values are essentially the same as the target water guideline in the South African Water Quality Guideline for Domestic Use.

Class I: Water is still safe for lifetime use; however, some mild health effects may, in very rare cases, occur. They may also be some aesthetic effects.

Class II: Water allowable for limited short term or emergency use. Health effects may be felt more commonly, as compared to Class I, especially by those who are long term users of the water. Therefore, it is not recommended that the water be used continuously for life. This is only class in the guideline which is not specific in terms of the exact duration that the water can be used for. It states that it can be used for short term use; but does not define what length of time “short term” refers to.

Class III: Class III water will cause serious health effects, particular in infants and elderly people. Use of this water is not recommended for drinking purposes.

The following quaternary catchments with limited water quality data were excluded from the analysis, and no Groundwater Quality Component has been established:

- V11A, V11B, V11C, V11E, V11F, V11G, V11H, V11J, V11K, V11L, V11M
- V12A, V12B, V12C, V12D, V12E, V12F
- V13A, V13B, V13C, V13D, V13E
- V14A, V14B, V14C, V14E
- V20A, V20B, V20C, V20D, V20F, V20G
- V31B, V31C, V31D, V31H
- V32A, V32D, V32F, V32G, V32H
- V33B, V33C, V33D
- V40C
- V50B, V50D
- V60A, V60C, V60D, V60E, V60F, V60G
- V70A, V70B, V70C, V70D, V70E, V70F, V70G

Table 4.2. Groundwater Quality Reserve: Thukela Catchment

Chemical Parameter	Unit	Quaternary Catchments V12G, V31A, V31E, V32B												
		No. of Samples				Ambient GW quality or median[1]				BHN Threshold[2]	Groundwater Quality Reserve[3]			
		V12G	V31A	V31E	V32B	V12G	V31A	V31E	V32B		V12G	V31A	V31E	V32B
pH		11	11	27	49	8.12	7.36	8.16	7.93	5.0 – 9.5	8.93	8.10	8.98	8.72
Electrical Conductivity	mS/m	11	11	27	49	73.9	17.5	34.2	18.07	<150	81.29	19.25	37.62	19.88
Calcium as Ca	mg/l	11	11	23	45	53.4	17.2	17.1	15.48	<150	58.74	18.92	18.81	17.02
Magnesium as Mg	mg/l	11	11	23	44	36.4	6	6.38	5.14	<100	40.4	6.6	7.02	5.66
Sodium as Na	mg/l	11	11	23	42	62.6	7.3	46.7	9.08	<200	68.86	8.03	51.37	9.99
Chloride as Cl	mg/l	11	11	23	45	18.5	3.4	5	5	<200	20.35	3.74	5.5	5.5
Sulphate as SO_4	mg/l	11	11	23	45	24.6	7.5	4.6	3	<400	27.06	8.25	5.06	3.3
Nitrate as NO_x-N	mg/l	11	11	23	44	1.14	0.02	0.04	0.18	<10	1.25	0.02	0.04	0.19
Fluoride as F	mg/l	11	11	23	42	0.62	0.19	0.34	0.18	<1.0	0.68	0.21	0.37	0.2
Chemical Parameter	**Unit**	**Quaternary Catchments V32C, V40A, V40D, V40E**												
		No. of Samples				**Ambient GW quality or median[1]**				**BHN Threshold[2]**	**Groundwater Quality Reserve[3]**			
		V32C	**V40A**	**V40D**	**V40E**	**V32C**	**V40A**	**V40D**	**V40E**		**V32C**	**V40A**	**V40D**	**V40E**
pH		33	23	12	14	8.35	7.9	8.21	7.99	5.0 – 9.5	9.18	8.69	9.03	8.78
Electrical Conductivity	mS/m	33	23	12	14	50.80	64.7	115.8	124.25	<150	55.88	71.17	127.38	136.68
Calcium as Ca	mg/l	33	23	12	14	38.42	49.1	51.8	59.75	<150	42.27	54.01	56.98	65.73
Magnesium as Mg	mg/l	33	23	12	14	22.96	26.7	50.4	60.5	<100	25.25	29.37	55.44	66.55
Sodium as Na	mg/l	27	23	12	14	43.3	51.7	114.3	119.95	<200	47.63	56.87	125.73	131.95
Chloride as Cl	mg/l	18	23	12	14	12.49	25	54.4	84.35	<200	13.74	27.5	59.84	96.09
Sulphate as SO_4	mg/l	33	23	12	14	17.64	13.4	65.3	34.8	<400	19.4	14.74	71.83	38.28
Nitrate as NO_x-N	mg/l	33	23	12	14	0.05	0.67	0.24	1.47	<10	0.06	0.73	0.26	1.62
Fluoride as F	mg/l	31	23	12	14	0.25	0.36	1.02	0.73	<1.0	0.24	0.4	1.12	0.8

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

Table 4.3. Groundwater Quality Reserve: Thukela Catchment

Chemical Parameter	Unit	Quaternary Catchments V11D, V14D, V20E, V31B												
		No. of Samples				Ambient GW quality or median[1)]				BHN Threshold[2)]	Groundwater Quality Reserve[3)]			
		V11D	V14D	V20E	V31B	V11D	V14D	V20E	V31B		V11D	V14D	V20E	V31B
pH		14	12	9	10	7.99	8.3	8.53	8.01	5.0 – 9.5	8.79	9.13	9.39	8.81
Electrical Conductivity	mS/m	14	12	9	10	20.1	59.8	98.4	56.5	<150	22.11	65.78	108.24	62.15
Calcium as Ca	mg/l	14	12	9	10	7.9	35.65	9.32	17.9	<150	8.69	39.22	10.25	19.69
Magnesium as Mg	mg/l	14	12	9	10	1.97	19.6	2.18	6.05	<100	2.17	21.56	2.4	6.66
Sodium as Na	mg/l	14	12	7	9	22.9	85.2	**226.72**	65.1	<200	25.19	93.72	**226.72**	71.61
Chloride as Cl	mg/l	14	12	6	10	4.7	24.65	11.12	16.1	<200	5.17	27.12	12.23	17.71
Sulphate as SO_4	mg/l	14	12	9	9	3.24	17.7	130.57	10.6	<400	3.57	19.47	143.63	11.66
Nitrate as NO_x-N	mg/l	14	12	9	10	0.87	0.06	0.27	0.24	<10	0.96	0.06	0.3	0.26
Fluoride as F	mg/l	14	12	8	10	1.22	1.19	3.13	0.31	<1.0	1.34	1.3	3.44	0.34
Chemical Parameter	**Unit**	**Quaternary Catchments V31F, V31G, V31K, V33A**												
		No. of Samples				**Ambient GW quality or median[1)]**				**BHN Threshold[2)]**	**Groundwater Quality Reserve[3)]**			
		V31F	**V31G**	**V31K**	**V33A**	**V31F**	**V31G**	**V31K**	**V33A**		**V31F**	**V31G**	**V31K**	**V33A**
pH		16	21	33	13	8.16	8.08	7.99	7.98	5.0 – 9.5	8.97	8.88	8.79	8.78
Electrical Conductivity	mS/m	16	21	33	13	18.94	56.7	32.31	41	<150	20.83	62.37	35.54	45.1
Calcium as Ca	mg/l	16	21	32	13	12.8	46.17	21.1	20.9	<150	14.08	50.79	23.21	22.99
Magnesium as Mg	mg/l	16	21	32	13	4.14	11.58	7.68	13.2	<100	4.56	12.74	8.45	14.52
Sodium as Na	mg/l	14	18	24	13	18.39	67.01	40.39	39.8	<200	20.23	73.71	44.43	43.78
Chloride as Cl	mg/l	11	16	22	13	1.31	13.03	6.03	8.3	<200	1.44	14.34	6.64	9.13
Sulphate as SO_4	mg/l	16	21	20	13	1.5	67.14	20.96	6.5	<400	1.65	73.85	23.05	7.15
Nitrate as NO_x-N	mg/l	16	21	33	13	0.05	0.05	0.05	0.08	<10	0.06	0.06	0.06	0.09
Fluoride as F	mg/l	14	19	31	13	0.25	0.41	0.34	0.26	<1.0	0.27	0.45	0.37	0.29

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

Table 4.4. Groundwater Quality Reserve: Thukela Catchment

Chemical Parameter	Unit	Quaternary Catchments V31J, V32E						
		No. of Samples		Ambient GW quality or median[1)]		BHN Threshold[2)]	Groundwater Quality Reserve[3)]	
		V31J	V32E	V31J	V32E		V31J	V32E
pH		58	257	7.69	8.32	5.0 – 9.5	8.45	9.15
Electrical Conductivity	mS/m	58	257	63.9	57.95	<150	70.29	63.77
Calcium as Ca	mg/l	58	257	25.75	26.85	<150	28.33	29.53
Magnesium as Mg	mg/l	58	256	10	14.29	<100	11	15.71
Sodium as Na	mg/l	58	187	79.8	70.31	<200	87.78	77.34
Chloride as Cl	mg/l	58	163	51.25	11.79	<200	56.38	12.97
Sulphate as SO_4	mg/l	58	256	15.5	4.77	<400	17.05	5.24
Nitrate as NO_x-N	mg/l	58	256	0.04	0.05	<10	0.04	0.06
Fluoride as F	mg/l	58	229	0.94	0.41	<1.0	0.94	0.45

Chemical Parameter	Unit	Quaternary Catchments V40B			
		No. of Samples	Ambient GW quality or median[1)]	BHN Threshold[2)]	Groundwater Quality Reserve[3)]
		V40B	V40B		V40B
pH		9	7.72	5.0 – 9.5	8.49
Electrical Conductivity	mS/m	9	33	<150	36.3
Calcium as Ca	mg/l	9	26.8	<150	29.48
Magnesium as Mg	mg/l	9	15.5	<100	17.05
Sodium as Na	mg/l	9	15.9	<200	17.49
Chloride as Cl	mg/l	9	12.2	<200	13.42
Sulphate as SO_4	mg/l	9	8.4	<400	9.24
Nitrate as NO_x-N	mg/l	9	0.45	<10	0.49
Fluoride as F	mg/l	9	0.23	<1.0	0.25

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

Table 4.5. Groundwater Quality Reserve: Thukela Catchment

Chemical Parameter	Unit	Quaternary Catchments V50A, V50C						
		No. of Samples		Ambient GW quality or median[1)]		BHN Threshold[2)]	Groundwater Quality Reserve[3)]	
		V50A	V50C	V50A	V50C		V50A	V50C
pH		34	15	8.24	7.6	5.0 – 9.5	9.06	8.36
Electrical Conductivity	mS/m	34	15	**173**	20.5	<150	**173**	22.55
Calcium as Ca	mg/l	34	15	54.65	6.7	<150	60.12	7.37
Magnesium as Mg	mg/l	34	15	67.3	3.8	<100	74.03	4.18
Sodium as Na	mg/l	34	15	**188.45**	19.3	<200	**188.45**	21.23
Chloride as Cl	mg/l	34	15	**218.95**	15	<200	**218.95**	16.5
Sulphate as SO_4	mg/l	34	15	7.4	7.1	<400	49.72	8.14
Nitrate as NO_x-N	mg/l	34	15	2.32	0.8	<10	2.55	0.88
Fluoride as F	mg/l	34	15	1.85	0.38	<1.0	2.04	0.42
Chemical Parameter	**Unit**	**Quaternary Catchments V60B, V60H**						
		No. of Samples		**Ambient GW quality or median[1)]**		**BHN Threshold[2)]**	**Groundwater Quality Reserve[3)]**	
		V60B	**V60H**	**V60B**	**V60H**		**V60B**	**V60H**
pH		13	12	8.03	8.14	5.0 – 9.5	8.83	8.95
Electrical Conductivity	mS/m	13	12	36.2	65.75	<150	39.68	72.33
Calcium as Ca	mg/l	13	12	27.9	42.1	<150	30.69	46.31
Magnesium as Mg	mg/l	13	12	13.8	18.1	<100	15.18	19.91
Sodium as Na	mg/l	13	12	32	77.85	<200	35.2	85.69
Chloride as Cl	mg/l	13	12	5.9	25	<200	6.49	27.5
Sulphate as SO_4	mg/l	13	12	6.6	9.8	<400	7.26	10.78
Nitrate as NO_x-N	mg/l	13	12	0.02	0.3	<10	0.02	0.33
Fluoride as F	mg/l	13	12	0.28	0.59	<1.0	0.31	0.64

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

The delineated resource units and quaternary catchments making up the Thukela catchment are shown below in Figure 1 and Figure 2 respectively.

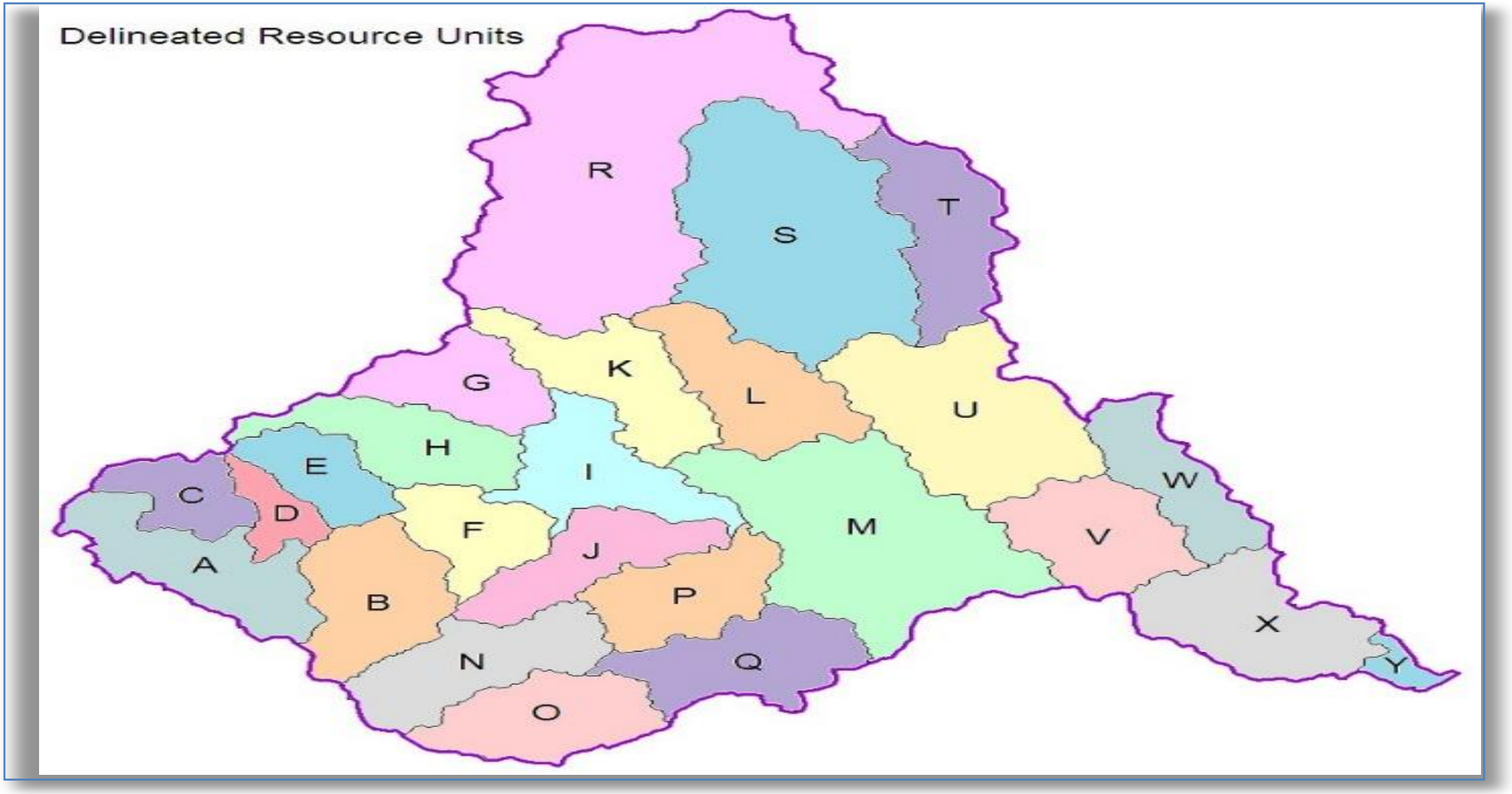

Figure 1: Delineated Resource Units

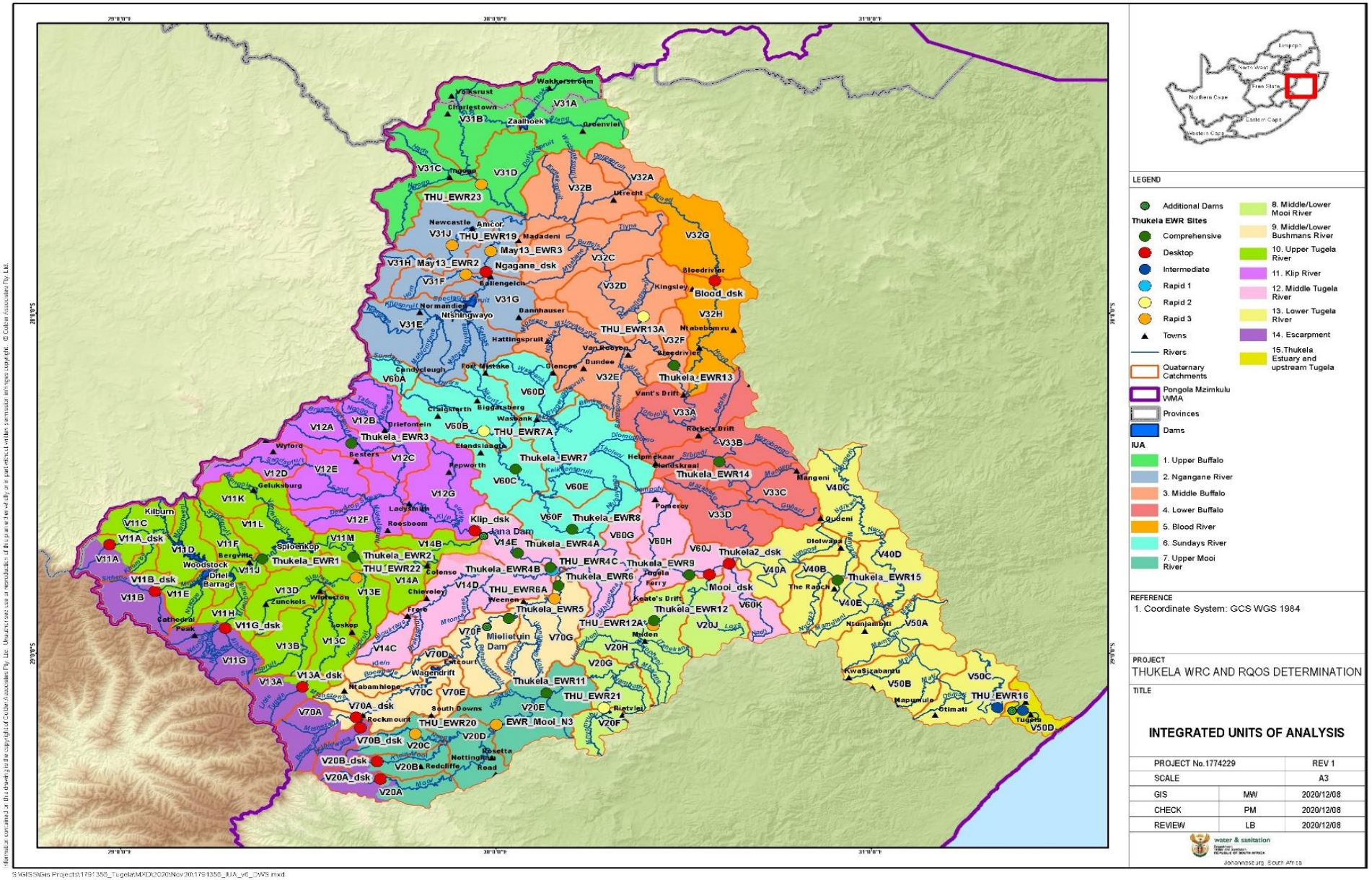

Figure 2: Locality map for the Thukela catchment showing IUAs with EWR sites and Quaternary Catchments.