DETERMINATION OF WATER RESOURCE CLASSES, RESERVE AND RESOURCE QUALITY OBJECTIVES IN THE KEISKAMMA AND FISH TO TSITSIKAMMA CATCHMENTS WITHIN THE MZIMVUBU-TSITSIKAMMA WATER MANAGEMENT AREA (WP11354)

TECHNICAL TASK GROUP MEETING
RESOURCE QUALITY OBJECTIVES

ALL WATER RESOURCES
Q, R, S - CATCHMENTS

Presented by: GroundTruth and Collaborators
Directorate: Classification

Date: 3 June 2025

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water & sanitation
Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

2030 NDP

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STUDY APPROACH: ALL WATER RESOURCES

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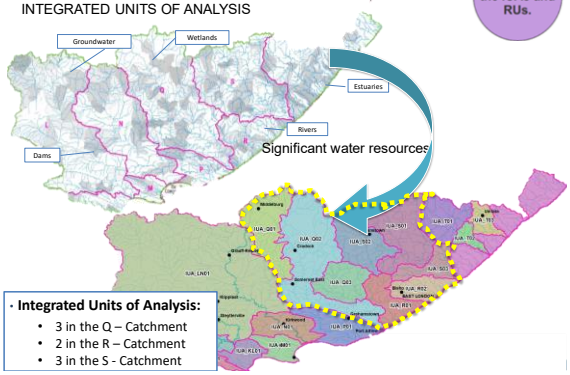
WATER RESOURCE CLASSIFICATION

INTEGRATED UNITS OF ANALYSIS

1. Delineate the IUAs and RUs.



- **Integrated Units of Analysis:**
  - 3 in the Q – Catchment
  - 2 in the R – Catchment
  - 3 in the S - Catchment

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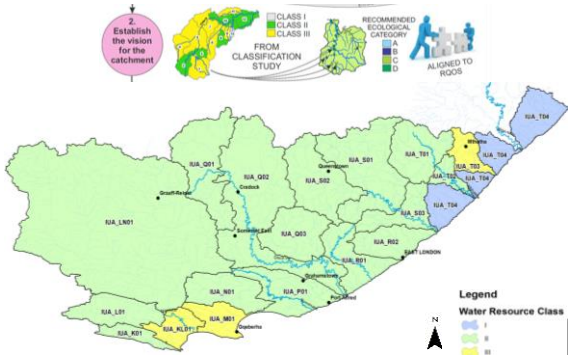
WATER RESOURCE CLASSES



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RESOURCE QUALITY OBJECTIVES

ALL WATER RESOURCES
Q, R, S CATCHMENTS

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SUMMARY OF IUAs – PRIORITY RU

IUA No.	IUA Code	River	Dams	Estuaries	Groundwater	Wetlands
8	IUA_Q01	✓	✗	✗	✓	✓
9	IUA_Q02	✓	✗	✓	✗	✓
10	IUA_Q03	✓	✓	✗	✗	✗
11	IUA_R01	✓	✓	✓	✗	✗
12	IUA_R02	✓	✓	✓	✗	✓
13	IUA_S01	✓	✓	✗	✓	✓
14	IUA_S02	✓	✓	✗	✗	✓
15	IUA_S03	✓	✓	✓	✗	✗

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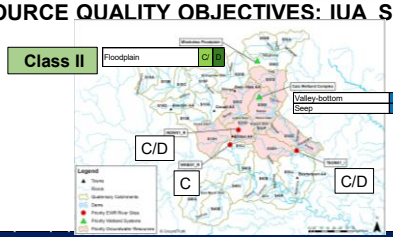
RESOURCE QUALITY OBJECTIVES: IUA_S01



IUA No.	IUA Code	PRIORITISATION OF RESOURCE UNITS FOR ALL WATER RESOURCES FOR RQOs											
		Rivers				Dams		Estuaries	Groundwater			Wetlands	
		RU No.	SQ Reach	Quat	River	RU No.	Dams	Estuaries	RU	Groundwater	RU	Quats	Wetlands
13	IUA_S01	13.1	S50E-06704	S50E	Tsomo	13.9	Xonxa	x	GW_RU35	S20C, S20D	WRU18	S50E	Cala wetland complex
		13.2	S50E-06741	S50E	Tsomo	13.10	Lubisi				WRU21	S50C	Mbokotwa floodplain
		13.3	S50J-07114	S50J	Tsomo	13.11	Indwe						
		13.4	S50G-06735	S50G	Tsomo	13.12	Ncora						
		13.5	S20D-06754	S20D	Indwe	13.13	Tsojana						
		13.6	S10J-06954	S10J	White-Kei								
		13.7	S10E-06699	S10E	White-Kei								
		13.8	S10F-06448	S10F	Cacadu								

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RESOURCE QUALITY OBJECTIVES: RIVERS AND DAMS

RU No.	SQ Reach	Quat	River	Rationale	Component: Quantity: Low Flows	Quantity: High Flows	Quality: Nutrients	Quality: Salts	Quality: System variables	Quality: Toxics	Quality: Pathogens	Quality: Geomorphology	Habitat: Riparian vegetation	Habitat: IHI	Biota: Fish	Biota: Aquatic macroinvertebrates	Biota: Diatoms
13.1	S50E-06704	S50E	Tsomo	*Same ecoregion, same RQOs as Priority RU 13.4*													
13.2	S50E-06741	S50E	Tsomo	*Same ecoregion, same RQOs as Priority RU 13.4*													
13.3	S50J-07114	S50J	Tsomo	*Same ecoregion, same RQOs as Priority RU 13.4*													
13.4	S50G-06735	S50G	Tsomo	*All indicators. EWR site TSOMO01_I*	X	X	X	X	X	X	X	X	X		X	X	X
13.5	S20D-06754	S20D	Indwe	*All indicators. EWR site INDW01_R*	X	X	X	X	X	X	X			X	X	X	X
13.6	S10J-06954	S10J	White-Kei	*All indicators. EWR site WKEI01_R*	X	X	X	X	X	X	X			X	X	X	X
13.7	S10E-06699	S10E	White-Kei	*Same ecoregion, same RQOs as Priority RU 13.6.*													
13.8	S10F-06448	S10F	Cacadu	*No data available to set RQOs*													

13.6: White Kei and Xonxa Dam

IUA	RU No.	Dams	Quantity: Dam operation and levels	Quantity: System (dam) operating rules	Quantity: Reduction in live storage	Quality: Clarity/ Secchi Disc Indication	Quality: Cyanobacteria	Vegetation: Alien aquatic plant species	Vegetation: In-channel Phragmites sp./reeds
IUA_S01	13.9	Xonxa Dam	X		X	X			X
	13.1	Lubisi Dam	X		X	X	X	X	X
	13.11	Ncora Dam	X		X	X	X	X	X

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RESOURCE QUALITY OBJECTIVES: WETLANDS

Cala Wetland Complex

WRU	Wetland Name	Type	PES	EIS	BAS	Component Prioritised
WRU 18	Cala Wetland Complex	Valley-bottom	C	B	B	1. Habitat – Ecological Condition
						2. Habitat – management of state forests
		Seep	C	B	B	3. Habitat – Ecological Condition
						4. Habitat – Wise-use

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RESOURCE QUALITY OBJECTIVES: WETLANDS

Cala Wetland Complex

Type	Component prioritised	Indicator	RQO	Narrative/Numerical Criteria
Valley-bottom	1. Habitat – Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the Cala valley-bottom wetland.	The PES of the Cala valley-bottom wetland should not fall below the BAS – B category	Every 3-5 years, repeat the WET-Health Level 1B assessment carried out in this baseline assessment, which was based primarily on land-cover types in the wetland and the areas of influence in its catchment. This recommended monitoring comprises desktop detection of land-cover change in both the wetland and its associated catchment, including a field verification exercise of approximately 4-8 hours. Specific factors that need to be assessed include: - No further encroachment of IAPs should be permitted into the wetland. Levels should be maintained at less than 5% of the wetland and catchment areas. - No further erosion of the livestock access paths within the direct catchment associated lower portion of the wetland. - No further expansion of the Lanqanci village and surrounding homesteads into the wetland habitat. - No further canalisation/furrowing/diversion of the remaining intact areas of the wetland.
	2. Habitat – management of state forests	The extent of state-owned forests in the wetland and its 200m buffer.	The abandoned/ defunct state forests should be excised from the wetland habitat and its associated buffer area (200m).	Monitoring of the vegetation composition within the revegetated zones to ensure there is no encroachment of IAPs. Monitoring should be undertaken on an annual basis to ensure active mitigation measures can be adopted before any encroachment becomes unmanageable.

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RESOURCE QUALITY OBJECTIVES: WETLANDS

Cala Wetland Complex

Type	Component prioritised	Indicator	RQO	Narrative/Numerical Criteria
Seep	3. Habitat – Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the Cala seepage wetland.	The PES of the Cala seepage wetland should not fall below the BAS – B category	Every 3-5 years, repeat the WET-Health Level 1B assessment carried out in this baseline assessment, which was based primarily on land-cover types in the wetland and the areas of influence in its catchment. This recommended monitoring comprises desktop detection of land-cover change in both the wetland and its associated catchment, including a field verification exercise of approximately 4-8 hours. Specific factors that need to be assessed include: - No further encroachment of IAPs should be permitted into the wetland. Levels should be maintained at less than 5% of the wetland and catchment areas. - No further canalisation/furrowing/diversion of the remaining intact areas of the wetland.
	4. Habitat – Wise-use	Extent of the subsistence farming lands in the wetland in relation to the extent recorded in the baseline assessment.	The extent and land use practices should be managed to ensure it does not increase above the extent mapped in the baseline assessment and that wise-use practices have been adopted to ensure the BAS – B category is maintained.	Explore options to institute wise-use subsistence farming and grazing practices in the wetlands to limit the impacts on the receiving environment and to maintain the ecological condition of the system. Existing guidelines such as WET-Sustainable Use (Kotze, 2010) can be used to assess the ecological sustainability of agricultural activities (cultivation, grazing, and vegetation harvesting) within the Cala wetland, as well as make useful and actionable recommendations for sustaining the use of this wetland ecosystem. Monitoring of the activities should be aligned with the WET-Health site visits.

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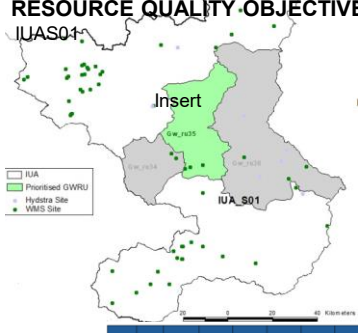
RESOURCE QUALITY OBJECTIVES: GROUNDWATER

IUAS01



IUA	QUAT	GRU	GW use (WARMS)	Stud GW areas	GW Dependency	Stress	Govt Control Areas	GW Quality (EC)	Eco reliance on GW (Baseflow)	Overall score (total /9)	% score	Priority (1-3)	Upgrade
IUA_S01	S20C	Gw_ru35	3	1	2	1	1	4	3	15	42.9	1	y
	S20D		4	1	2	3	1	4	3	18	51.4	1	y

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RESOURCE QUALITY OBJECTIVES: GROUNDWATER

IUAS01

GWRU	Quat	Component	RQO	Indicator/Measure	Numeric Limit
Gw_ru35	S32C S32D	Quantity and Aquifer	For water use applications higher than requirements for Reserve, Schedule 1and General Authorizations, abstraction rates should not exceed the average recharge values of the aquifer.	Abstraction rates - Monthly Water Balance	Q < Average recharge per hectare Q < sustainable yield determined by yield test
			For large abstractions, or stressed catchments, increased level of assessment required; Desktop, Rapid, Intermediate, Comprehensive.	Recharge estimate Reserve determination Delineation of smaller sub regions	-
			Water Level in borehole not to exceed CD Medium to long term (1 to 5 years) water level trends (based on drawdown) must show recovery	Groundwater levels at active monitoring boreholes using Groundwater Monitoring Guidelines Time series water levels - Monthly	Active monitoring site available : None, hydrocensus Identify monitoring site - hydrocensus Peak drawdown in abstraction borehole < critical depth Regional drawdown < 75th percentile of identified monitoring
			The radius of influence should not intersect any other protection zone (L)	Radius of influence (r), r = 1.5*√(T*S/L T=Transmissivity(m²/d), m²/med(days), S=Storativity L = (T*t)/R, T=Transmissivity(m2/d), t=Groundwater Gradient, R=Recharge(m/d)	Determine from yield test data r < L [m]
	Quality		Preserve existing water quality Medium to long term (1 to 5 years) water quality must not exceed 75th percentile of monitoring data point	COCs Time series water quality (Quarterly/ Bi annual)	Active monitoring site available : 3 No Peak result < maximum monitoring borehole Long term trend < 75th percentile (mg/l) for COCs; Cl = 44 EC < 53 F < 0.33 NO3/NO2 < 3.7 Na < 27 SO4 < 10.2
			Protection zone from microbial pollution	Microbial radius (r), r = 2(0.2PT) + S3	r < L [m]
	Ecological		Groundwater flow reversal to be prevented near water courses Protection zone for watercourse is required to protect the ecological reserve	L = (T*t)/R, T=Transmissivity(m2/d), t=Groundwater Gradient, R=Recharge(m/d) Time series water levels - Monthly Abstraction rates - Monthly	Determine from yield test data r < L [m]

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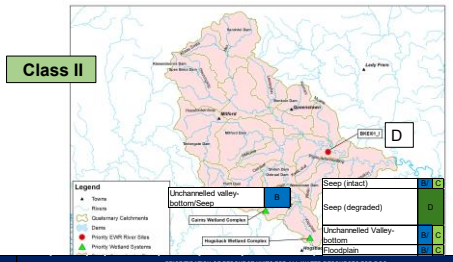
RESOURCE QUALITY OBJECTIVES: IUA_S02



IUA No.	IUA Code	PRIORITISATION OF RESOURCE UNITS FOR ALL WATER RESOURCES FOR RQOs										
		Rivers				Dams		Estuaries	Groundwater		Wetlands		
		RU No.	SQ Reach	Quat	River	RU No.	Dams	Estuaries	RU	Groundwater	RU	Quats	Wetlands
14	IUA_S02	14.1	S32K-07024	S32K	Black Kei	14.5	Waterdown	X	X		WRU12	S32E	Cairns Wetland Complex
		14.2	S32G-07224	S32G	Klipplaat	14.6	Oakraal				WRU13	S32D	Hogsback Wetland Complex
		14.3	S31G-06899	S31G	Klaas Smits								
		14.4	S31F-06731	S31F	Komani								

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RESOURCE QUALITY OBJECTIVES: RIVERS AND DAMS

RU No.	SQ Reach	Quat	River	Rationale	Component: Quantity: Low Flows	Quantity: High Flows	Quality: Nutrients	Quality: Salts	Quality: System variables	Quality: Toxics	Quality: Pathogens	Habitat: Geomorphology	Habitat: Riparian vegetation	Habitat: MI	Biota: Fish	Biota: Aquatic macroinvertebrates	Biota: Diatoms
14.1	S32K-07024	S32K	Black Kei	*All indicators: EWR site BKEI01_1*	X	X	X	X	X	X	X	X	X		X	X	X
14.2	S32G-07224	S32G	Klipplaat	*Selected according to the RU evaluation tool. Node KLPT01_FV*	X	X	X	X	X	X	X			X		X	X
14.3	S31G-06899	S31G	Klaas Smits	*Selected according to the RU evaluation tool. Node KSM01_FV*	X	X	X	X	X	X	X			X			X
14.4	S31F-06731	S31F	Komani	*Selected according to the RU evaluation tool.*			X	X	X	X	X						

14.1: Black Kei and Waterdown Dam

IUA	RU No.	Dams	Quantity: Dam operation and levels	Quantity: System (dam) operating rules	Quality: Reduction in live storage	Quality: Clarity/ Secchi Disc Indication	Quality: Cyanobacteria	Vegetation: Alien aquatic plant species	Vegetation: In-channel Phragmites sp./reeds
IUA_S02	14.5	Waterdown Dam	X						X
	14.6	Oakraal Dam	X		X	X	X	X	X

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RESOURCE QUALITY OBJECTIVES: WETLANDS

Hogsback Wetland Complex

WRU	Wetland Name	Type	PES	EIS	BAS	Component Prioritised
WRU 13	Hogsback Wetland Complex	Seeps (intact)	C	A	B/C	1. Habitat – Ecological Condition
						2. Biota - *Vandijkophrynus amatolicus*
						Habitat – Wise use and grazing
		Seeps (degraded)	D	B	D	Habitat – Ecological Condition
						Habitat - IAPs
						Habitat – Ecological connectivity
						Habitat – Wise use and grazing
		Unchannelled Valley-Bottom	C	B	B/C	Habitat – Ecological Condition
						Habitat - IAPs
		Floodplain	C	B	B/C	3. Habitat – Ecological Condition
						4. Habitat - Geomorphology

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RESOURCE QUALITY OBJECTIVES: WETLANDS

Hogsback Wetland Complex

Type	Component prioritised	Indicator	RQO	Narrative/Numerical Criteria
Seeps (intact)	1. Habitat – Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the intact seep wetlands in the Hogsback complex.	The PES of the intact seep wetlands should not fall below the REC of B/C.	Every 3-5 years, repeat the WET-Health Level 1B assessment carried out in this baseline assessment, which was based primarily on land-cover types in the wetland and the areas of influence in its catchment. This recommended monitoring comprises desktop detection of land-cover change in the wetland and its catchment, as well as at least 8 hours of field verification for each wetland. Specific factors that need to be assessed include: - No further expansion of forestry activities or other impinging land uses into the remaining natural areas of the wetlands or their catchments. - No additional water-reducing activities in the wetlands or their catchments - No further canalisation/furrowing/diversion of the remaining intact areas of the wetland. - The extent of American bramble should not increase and should ideally decrease in extent to at most 2.5% of the overall wetland area.
	2. Biota - *Vandijkophrynus amatolicus*	Breeding population of *Vandijkophrynus amatolicus* (the Amathole Toad)	Maintain a viable breeding population of the Amathole Toad in the seep wetlands	The status of the Amathole Toad should be monitored in collaboration with the Endangered Wildlife Trust, who are already engaged in monitoring this species in the general Hogsback area. This should be reported every 3 – 5 years.

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RESOURCE QUALITY OBJECTIVES: WETLANDS

Hogsback Wetland Complex

Type	Component prioritised	Indicator	RQO	Narrative/Numerical Criteria
Floodplain	3. Habitat – Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the intact seep wetlands in the Hogsback complex.	The PES of the floodplain wetlands should not fall below the REC of B/C	Every 3-5 years, repeat the WET-Health Level 1B assessment carried out in this baseline assessment, which was based primarily on land-cover types in the wetland and the areas of influence in its catchment. This recommended monitoring comprises desktop detection of land-cover change in the wetland and its catchment, as well as at least 8 hours of field verification for each wetland. Specific factors that need to be assessed include: - No further expansion of forestry activities or other impinging land uses into the remaining natural areas of the wetlands. - No additional water-reducing activities in the wetlands or their catchments - No further canalisation/furrowing/diversion of the remaining intact areas of the wetland. - The extent of American bramble should not increase and should ideally decrease in extent to 2.5%.
	4. Habitat - Geomorphology	The risk of channel avulsion in the floodplain wetland.	The rehabilitation structures within the floodplain need to be reviewed, and the integrity of the channel and the geomorphic functioning of the floodplain wetland need to be monitored.	The floodplain wetland should be reviewed every 3-5 years during PES monitoring. The extent of sediment deposition and channel erosion within the floodplain wetland should be reviewed with each site visit. Rehabilitation interventions in the wetland should be reviewed in terms of maintenance requirements and ecological outcomes, including unintended negative outcomes. In terms of the latter, it appears that the Working for Wetlands weirs constructed in the floodplain wetland have greatly increased the likelihood of channel avulsion, and in terms of the long-term integrity of the wetland, may potentially benefit from a lowering of the current spillway height.

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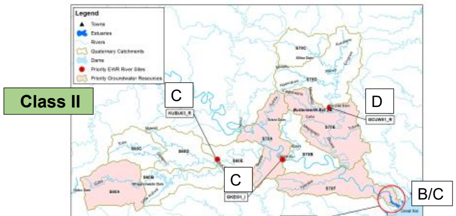
RESOURCE QUALITY OBJECTIVES: IUA_S03



IUA No.	IUA Code	Rivers				Dams		Estuaries	Groundwater		Wetlands		
		RU No.	SQ Reach	Quat	River	RU No.	Dams	Estuaries	RU	Groundwater	RU	Quats	Wetlands
15	IUA_S03	15.1	S60A-07662	S60A	Gubu	15.8	Wriggleswade	Great Kei	X		X		
		15.2	S60A-07606	S60A	Kubusi	15.9	Gcuwa						
		15.3	S60B-07635	S60B	Kubusi	15.10	Xilinxa						
		15.4	S70A-07454	S70A	Great Kei								
		15.5	S70D-07269	S70D	Gcuwa								
		15.6	S70D-07307	S70D	Gcuwa								
		15.7	S60B-07635	S60B	Kubusi								

PRIORITISATION OF RESOURCE UNITS FOR ALL WATER RESOURCES FOR RQOs

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RESOURCE QUALITY OBJECTIVES: RIVERS AND DAMS

RU No.	SQ Reach	Quat	River	Rationale	Quantity: Low Flows	Quantity: High Flows	Quality: Nutrients	Quality: Salts	Quality: System variables	Quality: Toxics	Quality: Pathogens	Habitat: Geomorphology	Habitat: Riparian vegetation	Habitat: IHI	Biota: Fish	Biota: Aquatic macroinvertebrates	Biota: Diatoms
15.1	S60A-07662	S60A	Gubu	*Selected according to the RU evaluation tool*	X*	X*											
15.2	S60A-07606	S60A	Kubusi	*Selected according to the RU evaluation tool*													
15.3	S60B-07635	S60B	Kubusi	*Make use of RQOs determined for priority RU 15.7*													
15.4	S70A-07454	S70A	Great Kei	*All indicators. EWR site GKEI_01_I*	X	X	X	X	X	X	X	X	X		X	X	X
15.5	S70D-07269	S70D	Gcuwa	*All indicators. EWR site GCIW01_R*	X	X	X	X	X	X	X			X	X	X	X
15.6	S70D-07307	S70D	Gcuwa	*Selected according to the RU evaluation tool. Node GCIUW01_FV*			X	X	X	X	X			X			X
15.7	S60B-07635	S60B	Kubusi	*All indicators. EWR sote KUBU03_R*	X	X	X	X	X	X	X			X	X	X	X

15.6: Gcuwa and Gcuwa Dam

IUA	RU No.	Dams	Quantity: Dam operation and levels	Quantity: System (dam) operating rules	Quantity: Reduction in live storage	Quality: Clarity/ Secchi Disc Indication	Quality: Cyanobacteria	Vegetation: Alien aquatic plant species	Vegetation: In-channel Phragmites sp./reeds
IUA_S03	15.8	Wriggleswade Dam	X	X	X		X	X	X
	15.9	Gcuwa Dam	X			X			X

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RESOURCE QUALITY OBJECTIVES: ESTUARIES

Great Kei Estuary

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RESOURCE QUALITY OBJECTIVES: IUA_R01

IUA No.	IUA Code	Rivers				Dams		Estuaries	Groundwater		Wetlands		
		RU No.	SQ Reach	Quat	River	RU No.	Dams	Estuaries	RU	Groundwater	RU	Quats	Wetlands
11	IUA_R01	11.1	R10B-07640	R10B	Cata	11.8	Sandile	Keiskamma, Tyolomnqa, Mpekweni, Mtati (Mthathi),Mgwalana,Bira (Bhirha), Gqutywa, Ngculura (Ngculurha), Mtana, Nqinisa, Kiwane (Khiwane), Tyolomnqa, Lilyvale, Ross' Creek, Ncera (Ncerha), Goda, Hlozi	X		X		
		11.2	R10B-07769	R10B	Keiskamma	11.9	Cata						
		11.3	R10D-07807	R10D	Keiskamma	11.10	Binfield						
		11.4	R10G-07651	R10G	Tyume								
		11.5	R10E-08012	R10E	Keiskamma (Upper)								
		11.6	R10L-08173	R10L	Keiskamma (Lower)								
		11.7	R10H-07896	R10H	Tyume								

PRIORITISATION OF RESOURCE UNITS FOR ALL WATER RESOURCES FOR RQOs

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RESOURCE QUALITY OBJECTIVES: RIVERS AND DAMS

RU No.	SQ Reach	Quat	River	Rationale	Quantity: Low Flows	Quantity: High Flows	Quality: Nutrients	Quality: Salts	Quality: System variables	Quality: Toxics	Quality: Pathogens	Habitat: Geomorphology	Habitat: Riparian vegetation	Habitat: IHI	Biota: Fish	Biota: Aquatic macroinvertebrates	Biota: Diatoms
11.1	R10B-07640	R10B	Cata	*No data to set RQOs*													
11.2	R10B-07769	R10B	Keiskamma	*Biological data available to set RQOs*			X		X		X					X	
11.3	R10D-07807	R10D	Keiskamma	*Same ecoregion, same RQOs as Priority RU 11.5*													
11.4	R10G-07651	R10G	Tyume	*Same ecoregion, same RQOs as Priority RU 11.7*													
11.5	R10E-08012	R10E	Keiskamma (Upper)	*All indicators. EWR site KEIS01_I*	X	X	X	X	X	X	X	X	X		X	X	X
11.6	R10L-08173	R10L	Keiskamma (Lower)	*All indicators. EWR site KEIS02_R*	X	X	X	X	X	X	X			X	X	X	X
11.7	R10H-07896	R10H	Tyume	*All indicators. EWR site TYUM01_R*	X	X	X	X	X	X	X			X	X	X	X

IUA	RU No.	Dams	Quantity: Dam operation and levels	Quantity: System (dam) operating rules	Quantity: Reduction in live storage	Quality: Clarity/ Secchi Disc Indication	Quality: Cyanobacteria	Vegetation: Alien aquatic plant species	Vegetation: In-channel Phragmites sp./reeds
IUA_R01	11.8	Sandile Dam	X			X	X	X	X
	11.9	Cata Dam	X				X	X	X
	11.1	Binfield Dam	X			X	X	X	X

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11.5: Upper Keiskamma and Sandile Dam

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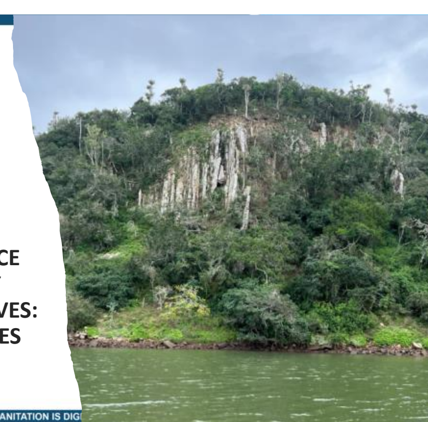

RESOURCE QUALITY OBJECTIVES: ESTUARIES

Keiskamma Estuary

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RESOURCE QUALITY OBJECTIVES: IUA_R02

IUA No.	IUA Code	PRIORITISATION OF RESOURCE UNITS FOR ALL WATER RESOURCES FOR RQOs										
		Rivers				Dams		Estuaries	Groundwater		Wetlands	
		RU No.	SQ Reach	Quat	River	RU No.	Dams	Estuaries	RU	Groundwater	RU	Quats	Wetlands
12	IUA_R02	12.1	R20A-07788	R20A	Buffalo	12.6	Laing	Nahoon, Great Kei, Qinira (Quinsha), Kwelera (Kwelerha), Bulura (Buluha), Cunge, Cirba, Cefane,Kwenxura (Kwenxutha), Nyara (Nyatha), Imtwendwe (Mtwendwe), Haga-haga, Mwindwe, Quko, Morgan, Cwili	X		WRU15	R20E	eDraycot Floodplain Wetland
		12.2	R20E-07775	R20E	Yellowwoods	12.7	Rooikrantz				WRU26	R20D	KwaMasele Wetland Complex
		12.3	Not digitised	R20E	KwaNkwebu	12.8	Bridledrift						
		12.4	R20F-08045	R20F	Buffalo	12.9	Nahoon						
		12.5	R20B-07915	R20B	Buffalo	12.10	Maden						

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RESOURCE QUALITY OBJECTIVES: RIVERS AND DAMS

RU No.	SQ Reach	Quat	River	Rationale	Component: Quantity: Low Flows	Quantity: High Flows	Quality: Nutrients	Quality: Salts	Quality: System variables	Quality: Toxics	Quality: Pathogens	Habitat: Geomorphology	Habitat: Riparian vegetation	Habitat: MI	Biota: Fish	Biota: Aquatic macroinvertebrates	Biota: Diatoms
12.1	R20A-07788	R20A	Buffalo	*Same ecoregion, same RQOs as Priority RU 12.5*													
12.2	R20E-07775	R20E	Yellowwoods	*Biological data available to set RQOs*												X	
12.3	Not digitised (sub-set of above RU)	R20E	KwaNkwebu	*Selected following discussions with DWS regarding transfers with reference to Sandklota capensis/barnsiae*											X		
12.4	R20F-08045	R20F	Buffalo	*MI indicators , EWR site BUFF01_I*	X	X	X	X	X	X	X	X	X		X	X	X
12.5	R20B-07915	R20B	Buffalo	*Selected according to the RU evaluation tool, Node BUFF03_FV*					X					X		X	X

12.3: KwaNkwebu and Bridledrift Dam

IUA	RU No.	Dams	Quantity: Dam operation and levels	Quantity: System (dam) operating rules	Quantity: Reduction in live storage	Quality: Clarity/ Secchi Disc Indication	Quality: Cyanobacteria	Vegetation: Alien aquatic plant species	Vegetation: In-channel Phragmites sp./reeds
IUA_R02	12.6	Laing Dam	X			X	X	X	X
	12.7	Rooikrantz Dam				X	X	X	X
	12.8	Bridledrift Dam	X			X	X	X	X
	12.9	Nahoon Dam	X			X	X	X	X
	12.1	Maden Dam					X	X	X

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RESOURCE QUALITY OBJECTIVES: ESTUARIES

Nahoon Estuary

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RESOURCE QUALITY OBJECTIVES: WETLANDS

KwaMasele Wetlands

WRU	Wetland Name	Type	PES	EIS	BAS	Component Prioritised
WRU 26	KwaMasele Wetland Complex	Valley-bottom & Seep	C	B	C	1. Habitat – Ecological Condition
						3. Habitat – Wise-use
						2. Biota – the Vulnerable *Arctotis debensis*

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RESOURCE QUALITY OBJECTIVES: WETLANDS

KwaMasele Wetlands

Type	Component prioritised	Indicator	RQO	Narrative/Numerical Criteria
Valley Bottom and Seeps	1. Habitat – Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the KwaMasele Wetlands.	The PES of the wetland complex should not fall below the REC of C.	Every 3-5 years, repeat the WET-Health Level 1B assessment carried out in this baseline assessment, which was based primarily on land-cover types in the wetland and the areas of influence in its catchment. This recommended monitoring comprises desktop detection of land-cover change in the wetland and its catchment as well as at least 8 hours of field verification for each wetland. Specific factors that need to be assessed include: - No further expansion of residential developments or other impinging land-uses such as roads or agriculture into the remaining natural areas of the wetlands, and they should be limited within a 200m buffer around the wetlands. - No further erosion should be allowed to occur within the wetland, and the extent of active erosion should be assessed during each site visit and compared to the extent of erosion mapped in the baseline assessment. - Where necessary, explore erosion control options if the extent of erosion increases.
	2. Biota – the Vulnerable *Arctotis debensis*	A sustained population of *Arctotis debensis*	Maintain the population of *Arctotis debensis* in the wetlands through the establishment of formal protection of the KwaMasele wetland, especially in terms of encroachment of the wetland by human settlement and cultivation.	The status of *Arctotis debensis* in the KwaMasele wetland should be monitored during the PES monitoring every 3-5 years. A coarse assessment of abundance based on the following five classes is recommended: 1=Absent; 2=Present but <10 plants; 3=10-100 plants; 4=101-1000 pants and 5=>1000 plants).

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RESOURCE QUALITY OBJECTIVES: WETLANDS

KwaMasele Wetlands

Type	Component prioritised	Indicator	RQO	Narrative/Numerical Criteria
Valley Bottom and Seeps	3. Habitat – Wise-use	Extent of the subsistence farming lands and grazing in the wetland in relation to the extent recorded in the baseline assessment	Create a wetland management plan. The extent of subsistence farming in the wetland should be managed to ensure it does not increase above the extent mapped in the baseline assessment, and that wise-use practices have been adopted to ensure the REC category of C is maintained.	Extensive grazing and the currently active agricultural practices in the wetlands pose a large threat to the wetland's integrity and the viability of the vulnerable *Arctotis debensis*. It is acknowledged that livestock production and subsistence agriculture are currently an important source of subsistence and income generation for several households surrounding the KwaMasele wetland. These uses contribute to the well-being of local households and there is, therefore, a need to support these activities, but simultaneously a need to promote and empower the adoption of sustainable / better management practices related to farming and livestock rearing practices. Existing guidelines such as WET-Sustainable Use (Kotze, 2010) can be used to assess the ecological sustainability of agricultural activities (cultivation, grazing and vegetation harvesting) within the KwaMasele wetland, as well as make useful and actionable recommendations for sustaining the use of this WRU. This would require an additional veld condition assessment to be undertaken and would contribute significantly to understanding the current and historical impacts on vegetation within the wetland. Although this would require additional specialist expertise and would add considerably more time and resources to the assessment, it would greatly increase the resolution of the vegetation component of the assessment and would contribute significantly to the development of a wise use/sustainable use plan for the wetland.

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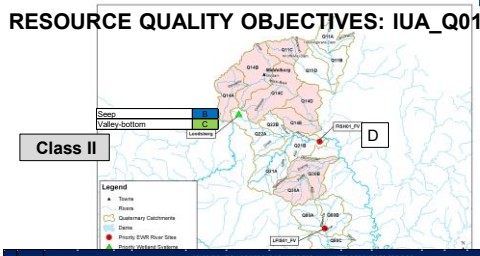
RESOURCE QUALITY OBJECTIVES: IUA_Q01



IUA No.	IUA Code	PRIORITISATION OF RESOURCE UNITS FOR ALL WATER RESOURCES FOR RQOs											
		Rivers				Dams		Estuaries	Groundwater		Wetlands		
		RU No.	SQ Reach	Quat	River	RU No.	Dams	Estuaries	RU	Groundwater	RU	Quats	Wetlands
8	IUA_Q01	8.1	Q30B-07056	Q30B	Pauls	x		x	GW_RU20	Q14A, Q14B, Q14C and Q14D	WRU27	Q22A	Loodsberg
		8.2	Q30B-07051	Q30B	Pauls								
		8.3	Q30E-07122	Q30E	Great Fish								
		8.4	Q21B-06831	Q21B	Great Fish								
		8.5	Q21B-06817	Q21B	Great Fish								
		8.6	Q80B-7553	Q80B	Little Fish (upper)								
		8.7	Q13B-06763	Q13B	Great Brak								

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RESOURCE QUALITY OBJECTIVES: RIVERS

RU No.	SQ Reach	Quat	River	Rationale	Component											
					Quantity		Quality						Habitat		Biota	
					Low Flows	High Flows	Nutrients	Salts	System variables	Toxics	Pathogens	Geomorphology	Riparian vegetation	IHI	Fish	Aquatic macroinvertebrates	Diatoms
8.1	Q30B-07056	Q30B	Pauls	*Ephemeral - no RQOs*													
8.2	Q30B-07051	Q30B	Pauls	*Ephemeral - no RQOs*													
8.3	Q30E-07122	Q30E	Great Fish	*Part of transfer scheme owing to importance of water supply to Qgeberha. There is a priority RU on the Great Fish further down in IUA_Q02 where more appropriate to set RQOs.*													
8.4	Q21B-06831	Q21B	Great Fish	*Same acreage, same RQOs as Priority RU 8.5*													
8.5	Q21B-06817	Q21B	Great Fish	*Selected according to the RU evaluation tool. Riparian set owing to agriculture encroachment into the riparian zone*										X			X
8.6	Q80B-7553	Q80B	Little Fish (upper)	*Ephemeral - no RQOs*													
8.7	Q13B-06763	Q13B	Great Brak	*Part of transfer scheme owing to importance of water supply to Qgeberha. There is a priority RU on the Great Fish further down in IUA_Q02 where more appropriate to set RQOs.*													

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RESOURCE QUALITY OBJECTIVES: GROUNDWATER

IUAQ01

IUA	QUAT	GRU	GW use (WARMS)	Stnd GW areas	GW Dependency	Stress	Govt Control Areas	GW Quality - (EC)	Eco reliance on GW (Base Flow)	Overall score (total 30)	% score	Priority (1-3)	Upgrade
IUA_Q01	Q14A	Gw_ru20	4	5	3	3	1	5	1	22	62.9	1	y
	Q14B		5	5	3	5	1	5	1	25	71.4	1	y
	Q14C		4	2	3	5	1	4	1	20	57.1	1	y
	Q14D		3	1	3	3	1	4	1	16	45.7	1	y

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RESOURCE QUALITY OBJECTIVES: GROUNDWATER

GWRU	Quats	Component	RQO	Indicator/Measure	Numeric Limit
Gw_ru20	Q14A Q14B Q14C Q14D	Quantity and Aquifer	For water use applications higher than requirements for Reserve, Schedule 1 and General Authorizations, abstraction rates should not exceed the average recharge values of the aquifer.	Abstraction rates - Monthly Water Balance	Q < Average recharge per hectare Q < sustainable yield determined by yield test
			For large abstractions, or stressed catchments, increased level of assessment required; Desktop, Rapid, Intermediate, Comprehensive.	Recharge estimate Reserve determination Delineation of smaller sub regions	-
			Water Level in borehole not to exceed CD Medium to long term (1 to 5 years) water level trends (based on drawdown) must show recovery	Groundwater levels at active monitoring boreholes using Groundwater Monitoring Guidelines Time series water levels - Monthly	Active monitoring site available: 12 No Peak drawdown in abstraction borehole < critical depth Regional peak groundwater drawdown < 4.3m Regional LT groundwater drawdown < 75th percentile of 3.1 m
			The radius of influence should not intersect any other protection zone (L)	Radius of influence (r), r = 1.5*√(T*t/S), T=Transmissivity(m²/d), t=Time(days), S=Storativity L = (T*t)/R, T=Transmissivity(m2/d), i=Groundwater Gradient, R=Recharge(m/d)	Determine from yield test data r < L(m)
		Quality	Preserve existing water quality Medium to long term (1 to 5 years) water quality must not exceed 75th percentile of monitoring data point	CDQs Time series water quality (Quarterly / Bi annual)	Active monitoring site available: 11 No Peak result < maximum monitoring borehole Long term trend < 75th percentile (mg/l) for CDQs: Cl <42 EC <98 F <0.8 **NO3/NO2 <2.8** Na <.38 SO4 <.70
			Protection zone from microbial pollution	Microbial radius (r), r = 2(0.2PT) + 53	r < L(m)
		Ecological	Groundwater flow reversal to be prevented near water courses Protection zone for watercourse is required to protect the ecological reserve	L = (T*t)/R, T=Transmissivity(m2/d), i=Groundwater Gradient, R=Recharge(m/d) Time series water levels - Monthly Abstraction rates - Monthly	Determine from yield test data r < L(m)

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RESOURCE QUALITY OBJECTIVES: WETLANDS

Loodsberg Wetland

WRU	Wetland Name	Type	PES	EIS	BAS	Component Prioritised
WRU 26	KwaMasele Wetland Complex	Seep	B	B	B	1. Habitat – Ecological Condition
		Valley-bottom	C	B	C	Habitat – Ecological Condition

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RESOURCE QUALITY OBJECTIVES: WETLANDS

Loodsberg Wetland

Type	Component prioritised	Indicator	RQO	Narrative/Numerical Criteria
Seep	1. Habitat – Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the Loodsberg seep wetlands.	The PES of the Loodsberg seep wetlands should not fall below the REC, which is a B category.	Every 3-5 years, the WET-Health Level 1B assessment carried out in this baseline assessment needs to be repeated, which was based primarily on land-cover types in the wetland and the areas of influence in its catchment. This recommended monitoring comprises desktop detection of land-cover change, but with approximately 8 hours of field verification for each wetland. Specific features that need to be assessed include - No further expansion of IAP infestations in the wetland and its buffer (<2.5%), - No additional new furrows or drains are to be excavated in the wetlands. - No further expansion of agricultural activities or other impinging land uses into the remaining natural areas of the wetlands. - No additional water-reducing activities in the wetlands or their catchments - Erosion control structures must be reviewed for maintenance each site visit. These should be verified by undertaking a rapid field verification and checking these issues against the GPS locations recorded for the baseline assessment.

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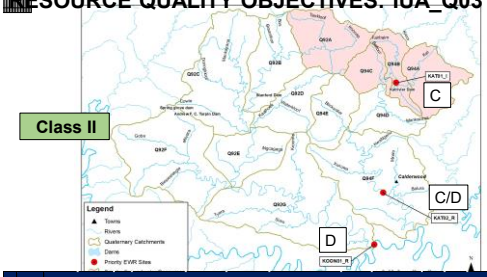
RESOURCE QUALITY OBJECTIVES: IUA_Q03



PRIORITISATION OF RESOURCE UNITS FOR ALL WATER RESOURCES FOR RQOs

IUA No.	IUA Code	Rivers				Dams		Estuaries	Groundwater		Wetlands	
		RU No.	SQ Reach	Quat	River	RU No.	Dams	Estuaries	RU	Groundwater	RU	Quats	Wetlands
10	IUA_Q03	10.1	Q94A-07526	Q94A	Kat	10.5	Kat River	x	x		x		
		10.2	Q94B-07623	Q94B	Kat								
		10.3	Q92G-07950	Q92G	Koonap								
		10.4	Q94F-07813	Q94F	Kat (Lower)								

RESOURCE QUALITY OBJECTIVES: RIVERS AND DAMS

RU No.	SQ Reach	Quat	River	Rationale	Component: Quantity: Low Flows	Quantity: High Flows	Quality: Nutrients	Quality: Salts	Quality: System variables	Quality: Toxics	Quality: Pathogens	Habitat: Geomorphology	Habitat: Riparian vegetation	Habitat: IHI	Biota: Fish	Biota: Aquatic macroinvertebrates	Biota: Diatoms
10.1	Q94A-07526	Q94A	Kat	Same ecoregion, same RQOs as Priority RU 10.2													
10.2	Q94B-07623	Q94B	Kat	All indicators. EWR site KATD1_I		X	X	X	X	X	X	X	X		X	X	X
10.3	Q92G-07950	Q92G	Koonap	All indicators. EWR site KOONS1_R		X	X	X	X	X	X			X	X	X	X
10.4	Q94F-07813	Q94F	Kat (Lower)	All indicators. EWR site KATD2_R		X	X	X	X	X	X			X	X	X	X

IUA	RU No.	Dams	Quantity: Dam operation and levels	Quantity: System (dam) operating rules	Quantity: Reduction in live storage	Quality: Clarity/ Secchi Disc Indication	Quality: Cyanobacteria	Vegetation: Alien aquatic plant species	Vegetation: In-channel Phragmites sp./reeds
IUA_Q03	10.5	Kat River Dam	X						X

10.2: Upper Kat and Kat River Dam

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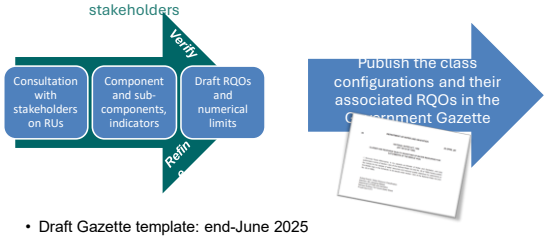
NEXT STEPS:

Step: Agree RUs, RQOs & numerical limits with stakeholders

Step: Finalise and Gazette



- Draft Gazette template: end-June 2025
- Out for public review: September – October 2025 (60 days)
- Public meeting: August/September 2025
- Minister to sign off Gazette

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THANK YOU!

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All study reports can be accessed from the DWS website: https://www.dws.gov.za/RDM/WRCS/

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