

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)

**PUBLIC MEETING 2
QQEBERHA**

Presented by: GroundTruth and Collaborators
 Directorate: Classification
 Date: 12 February 2026

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water & sanitation

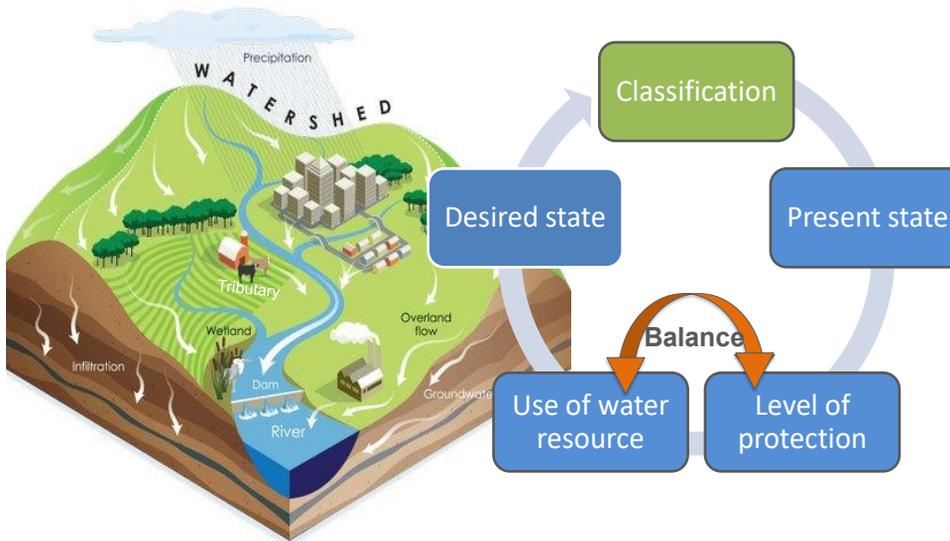
Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA



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CLASSIFICATION OF WATER RESOURCES

Integrated Water Resources Management (IWRM)



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BALANCING USE AND PROTECTION

Integrated Water Resources Management (IWRM)



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ECOSYSTEM GOODS AND SERVICES 101 & THE RESERVE

Ecosystem services (flow)

Provisioning

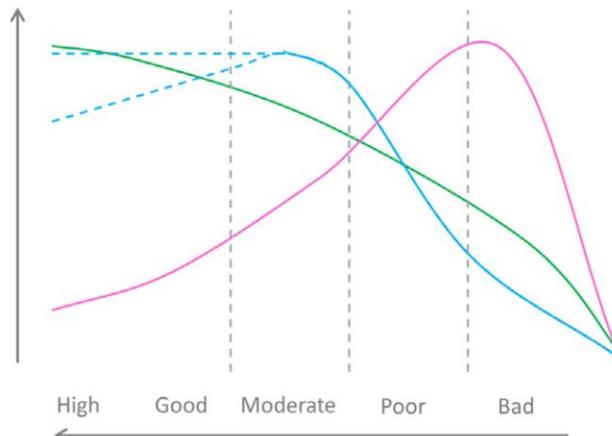
- water abstractions

Regulating

- water purification
- erosion retention
- flood protection
- coastal protection

Cultural

- recreation



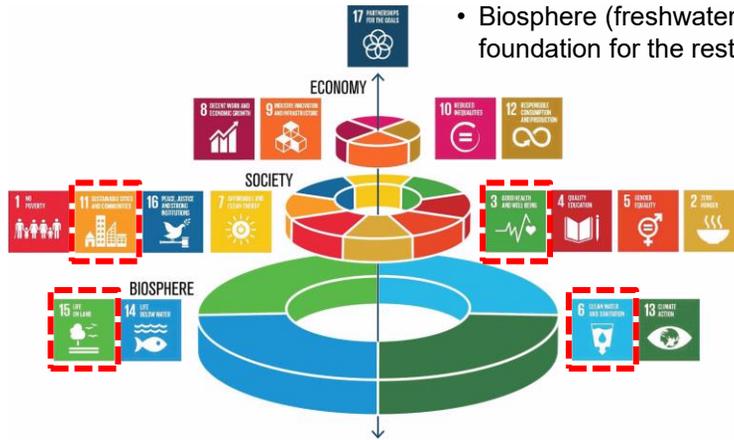
Ecological Status of aquatic ecosystems
as indicator of ecosystem condition

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HOW DOES THIS WORK RELATE TO SUSTAINABLE DEVELOPMENT GOALS?

- All countries obligated to report on SDGs.
- Biosphere (freshwater) the foundation for the rest.



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STUDY OBJECTIVE

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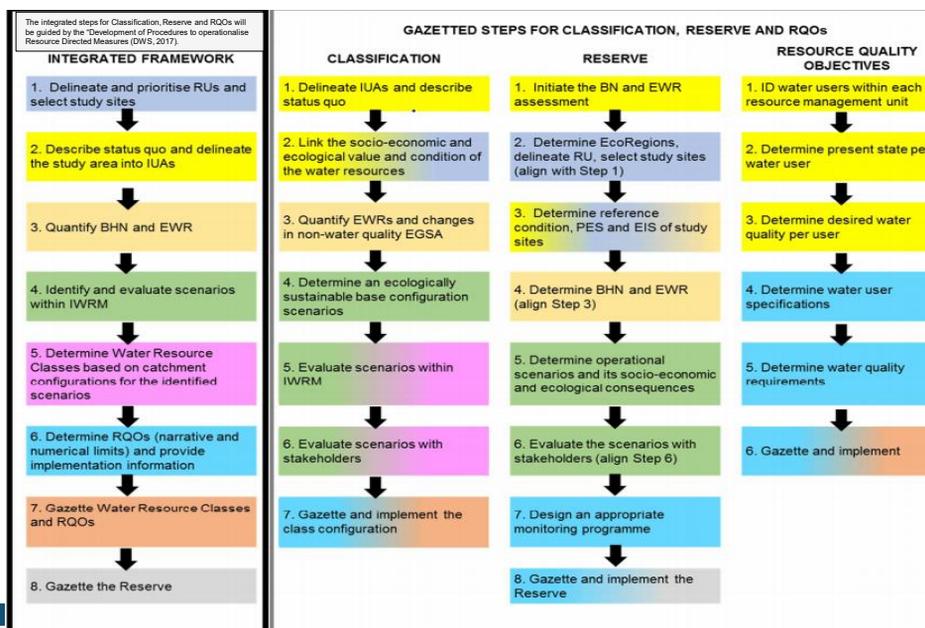
KEY AIM OF THIS STUDY

- The main objectives of the study are to determine
 - (i) the Water Resource Classes (current phase)
 - (ii) the Reserve (completed – gazette template next)
 - (iii) associated Resource Quality Objectives (RQOs) (next phase)
- Rivers, wetlands, estuaries and groundwater have been assessed and where applicable, integration/ linkages between these components were considered
- Consultative processes, with continual communication and liaison, with stakeholders in the study area continues to ensure the successful determination of the Water Resource Classes, Reserve and RQOs

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STUDY INTEGRATED APPROACH



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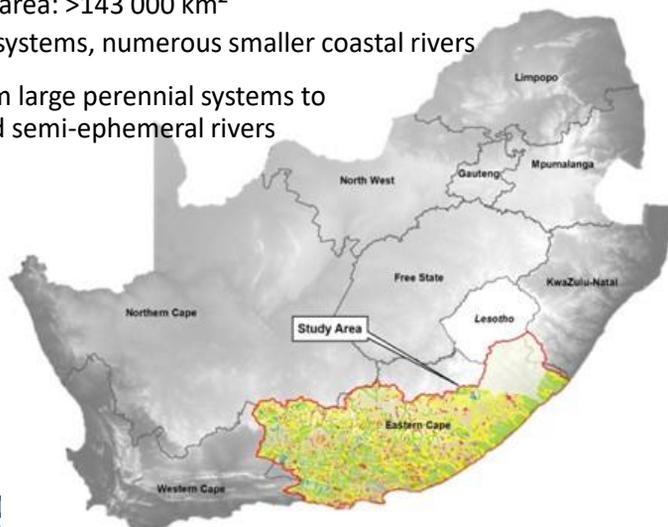
STUDY AREA

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STUDY AREA

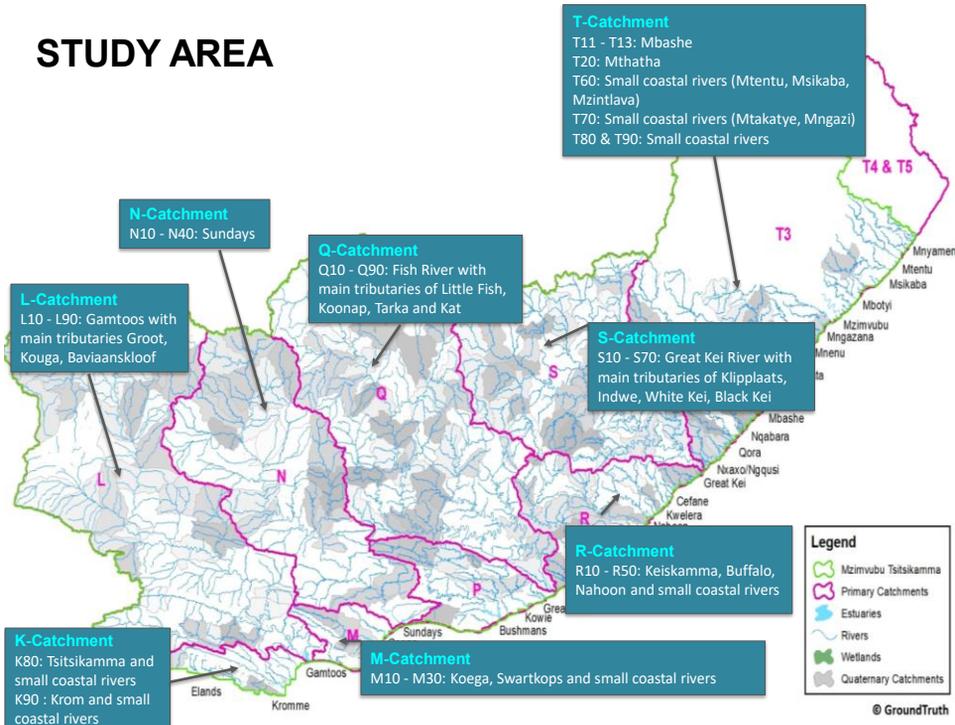
- Part of the Mzimvubu to Tsitsikamma WMA7
 - Excluded Mzimvubu catchment (T31-T36)
- Total catchment area: >143 000 km²
- Five major river systems, numerous smaller coastal rivers
- Rivers range from large perennial systems to small coastal and semi-ephemeral rivers



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STUDY AREA



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STUDY AREA

- Various major dams

Dams	DWS Dam No.	Dams	DWS Dam No.
Churchill Dam	K9R001	Rooikrantz Dam	R2R002
Mpofu Dam	K9R002	Bridledrift Dam	R2R003
Kouga Dam	L8R001	Nahoon Dam	R3R001
Groendal Dam	M1R001	Maden Dam	-
Nqweba Dam	N1R001	Xonxa Dam	S1R001
Darlington Dam	N2R001	Lubisi Dam	S2R001
Korhaansdrift Weir	N4H001	Ncora Dam	S5R001
Kat River Dam	Q9R001	Waterdown Dam	S3R001
Sandle Dam	R1R001	Oxkraal Dam	S3R003
Cata Dam	R1R002	Gcuwa Dam	S7R001
Binfield Dam	R1R003	Xilinx Dam	S7R002
Laing Dam	R2R001	Mthatha Dam	T2R001

Wetland systems scattered throughout

Catchment	Sub-catchment	Primary catchment	Hectares	%
Fish to Keiskamma	Gamtoos	L	1274	4.2
	Sundays	N	899	3.0
	Fish	Q	3,296	10.9
	Tsitsikamma	K	3,236	10.7
	Algoa	M	2,357	7.8
Mzimvubu to Keiskamma	Bushmans	P	634	2.1
	Kei	S	9,329	30.9
	Amatola	R	1,827	6.1
	Mbashe	T	4,304	14.3
	Mtata	T	1,102	3.7
Wild Coast	T	1,913	6.3	
Grand Total			30,171	100

- 154 estuaries and 97 coastal microsystems, many located adjacent to Marine Protected Areas, reflecting high ecological importance of the region
- Groundwater mainly in fractured aquifers associated with the Cape and Karoo Supergroups, limited intergranular aquifers in sands and alluvium

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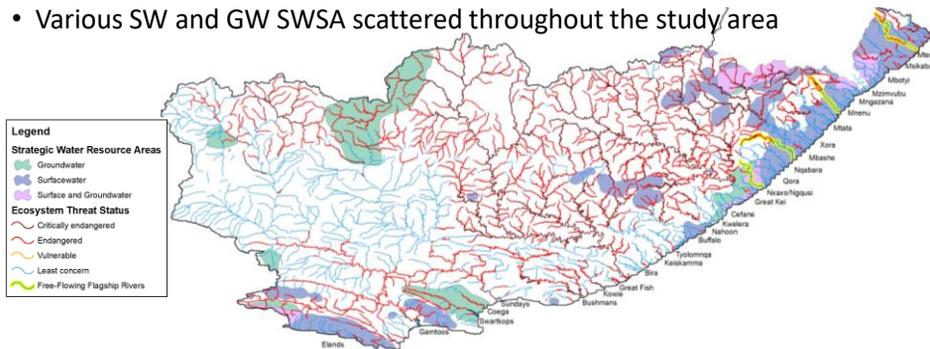
STATUS QUO AND INTEGRATED UNITS OF ANALYSIS AND RESOURCE UNITS SUMMARY

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STRATEGIC WATER SOURCE AREAS PROTECTED AREAS

- Various SW and GW SWSA scattered throughout the study area

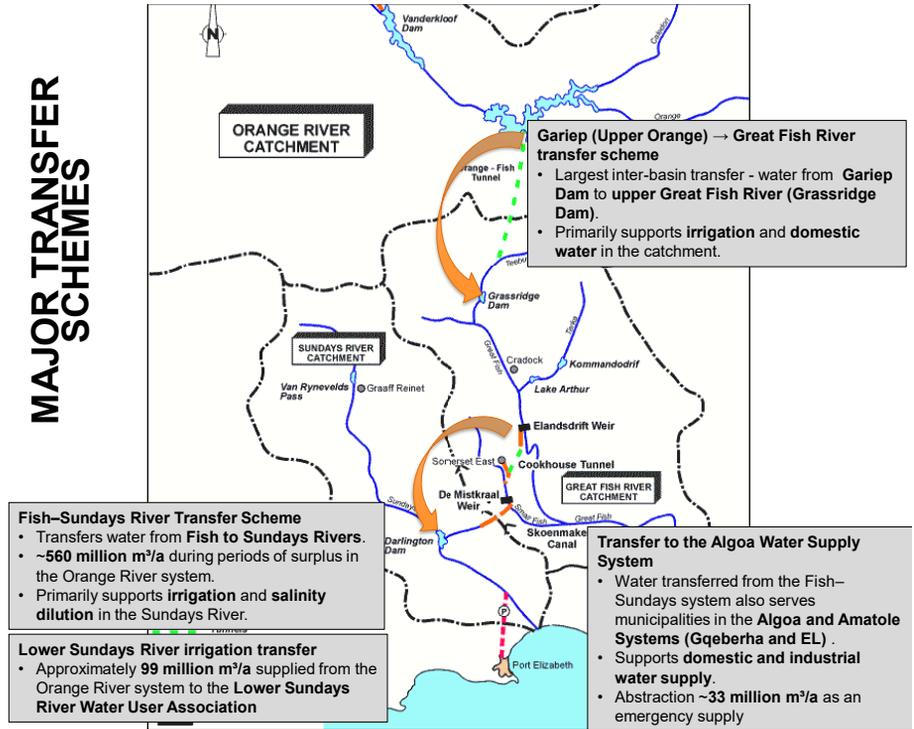


- Range of biodiverse, conservation, national parks (*Addo Elephant, Tsitsikamma, Mountain Zebra*), nature reserves (*Hamburg, Great Fish, Mpofu, Groendal, Baviaanskloof, Formosa*), protected areas, heritage sites (*Cape Floral Region- L Catchment*): thus high tourism (economic gain)

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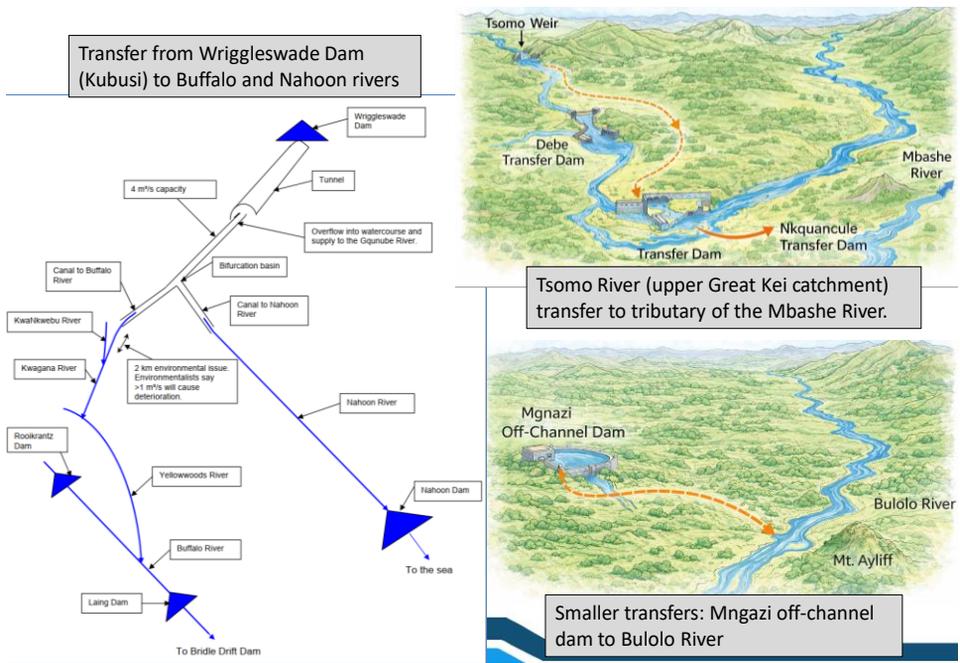
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MAJOR TRANSFER SCHEMES



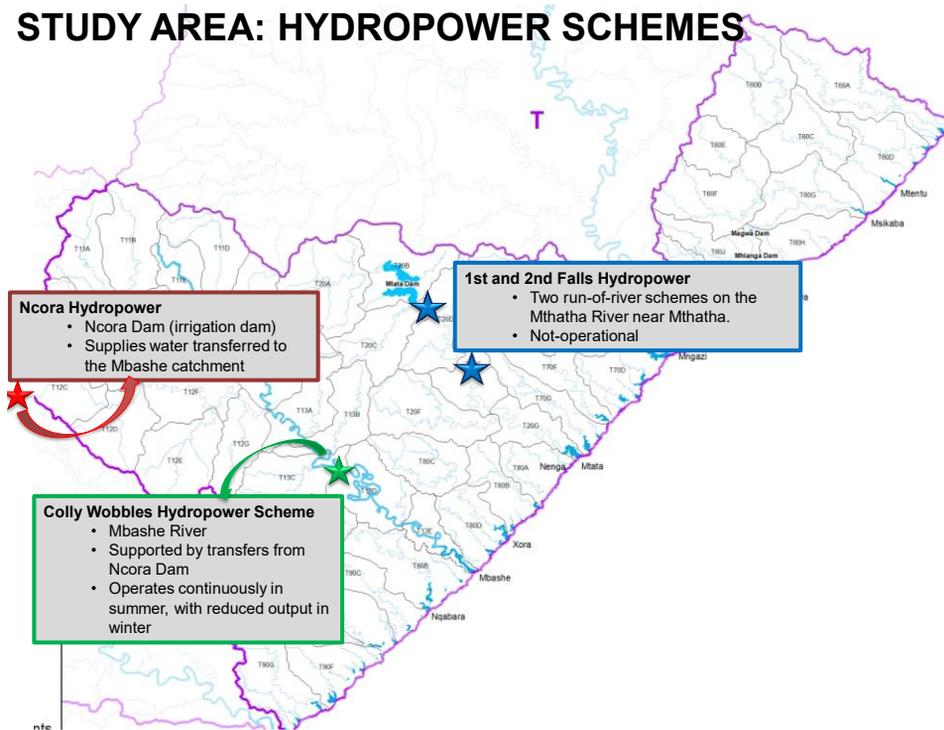
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MAJOR TRANSFER SCHEMES



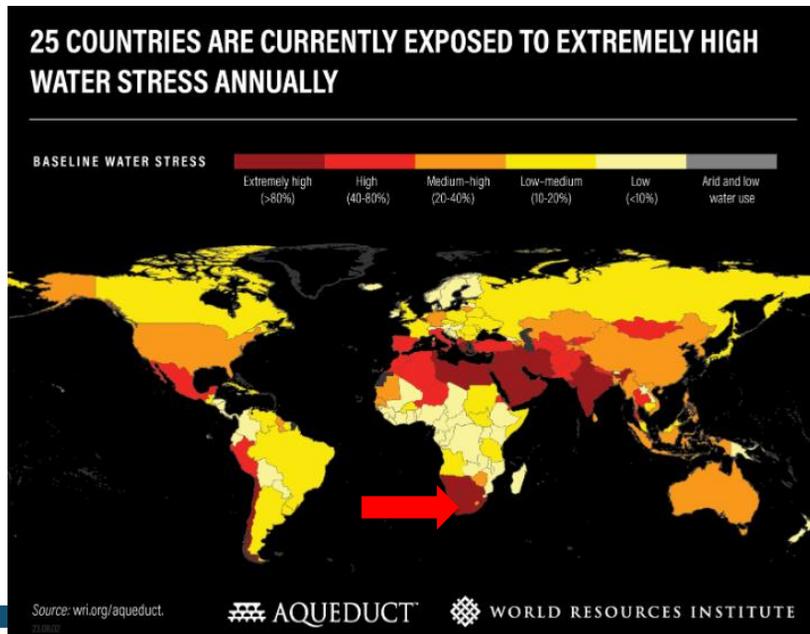
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STUDY AREA: HYDROPOWER SCHEMES



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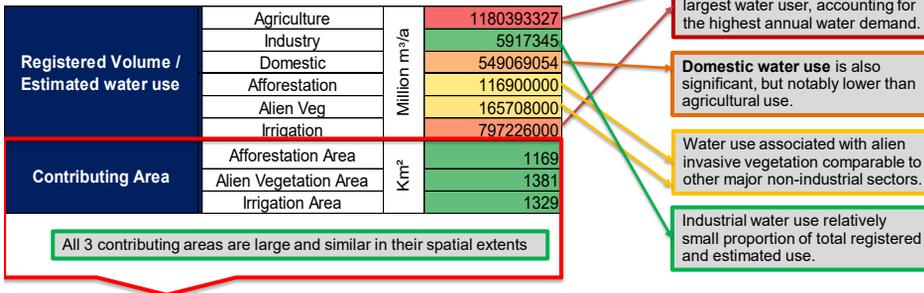
PRIMARY WATER DEMAND AND USERS



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PRIMARY WATER DEMAND AND USERS

- Assessed the primary water demand and users in the study area
- Registered and estimated water use by sector, using data from the WARMS and WR2012 databases



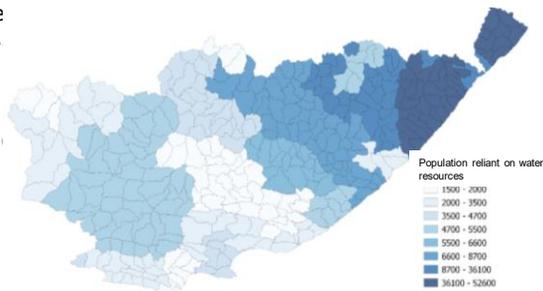
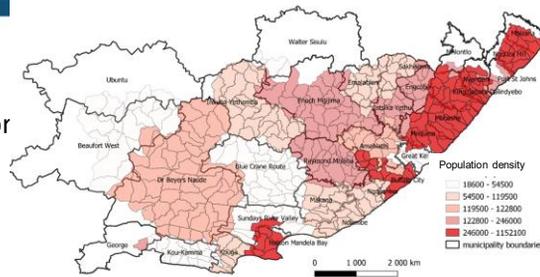
- Overall, water demand is primarily driven by agricultural and land-use-related activities rather than industrial use.

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SOCIO-ECONOMICS

- The study area supports major urban, rural, and communal populations - strong dependence on surface and groundwater resources.
 - Livelihoods strongly linked to water-dependent activities
 - Subsistence farming, small-scale agriculture, informal economies
- The province has the highest households with no access to piped water (24.9%) compare to nationally (10.1%).
- High socio-economic vulnerability: unemployment ~42% out of a population of ~5.9 million

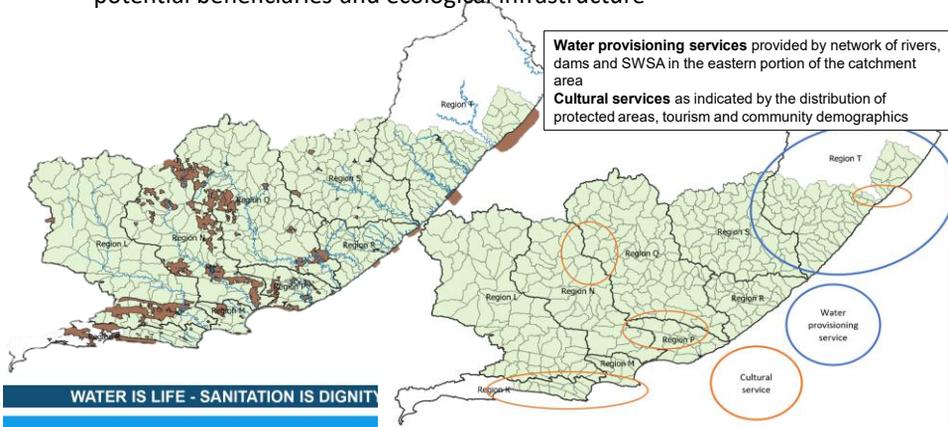


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ECOLOGICAL INFRASTRUCTURE AND ECOSYSTEM SERVICE SENSITIVITY

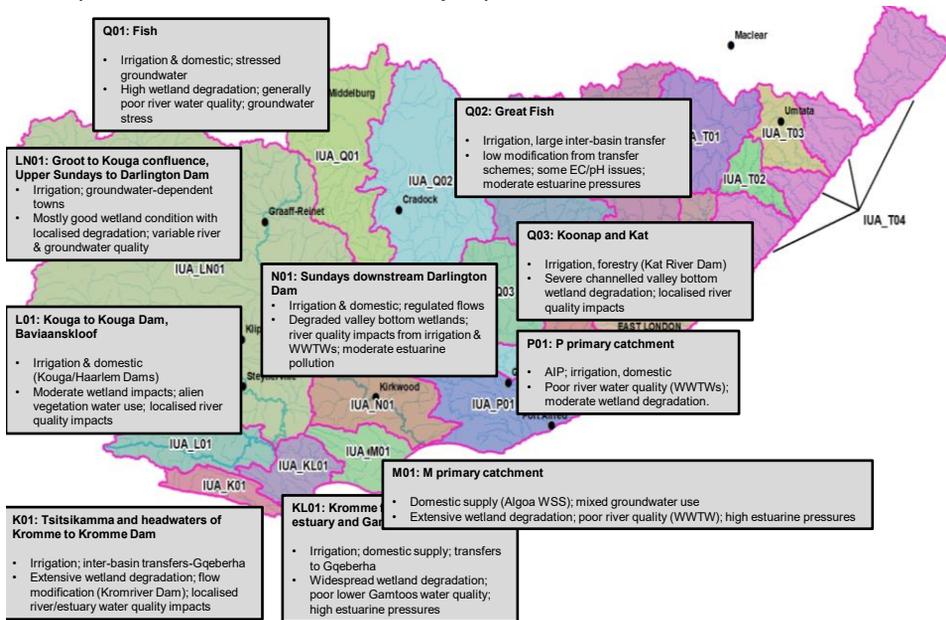
- Ecosystem Service Sensitivity areas are identified at a high level through:
 - Knowledge of benefits received through ecological infrastructure
 - Extensive water resources (major river/dam systems) and high conservation value/protected landscapes
 - Inferring the flow of ecosystem service through the spatial relationship of potential beneficiaries and ecological infrastructure



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DELINEATED INTEGRATED UNITS OF ANALYSIS

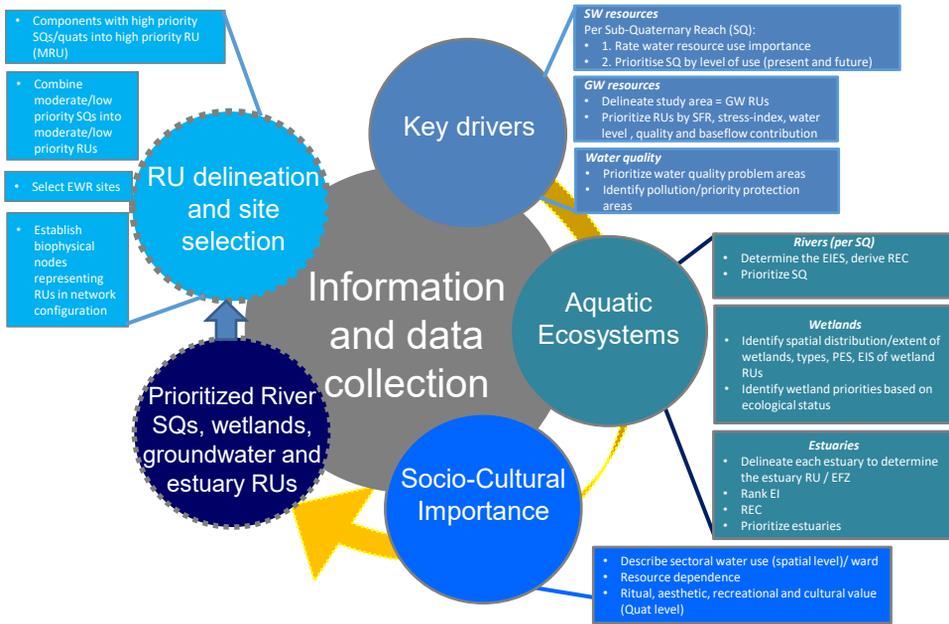
Description, dominant water uses and key impacts



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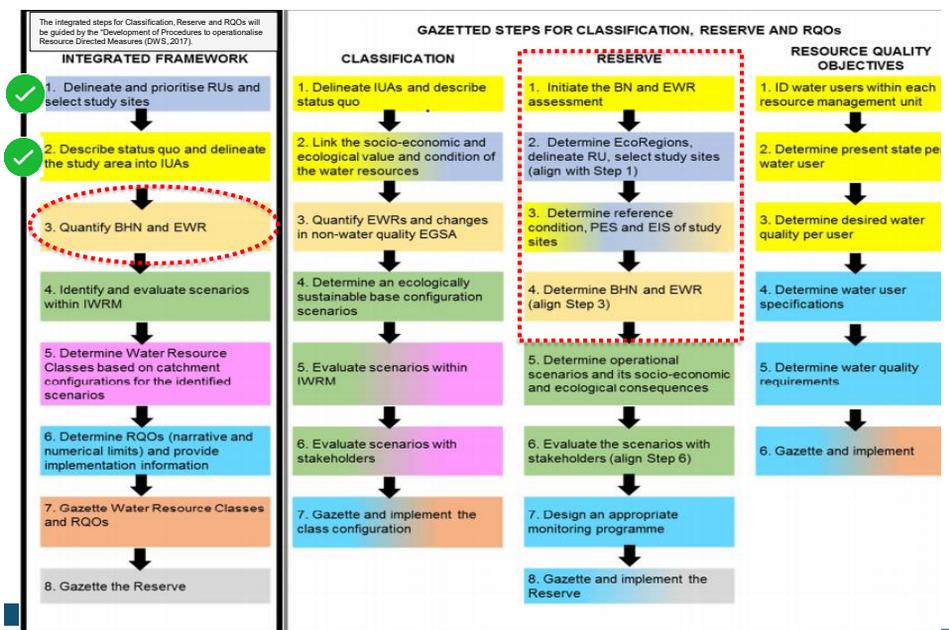
RESOURCE UNITS

DELINEATION AND PRIORITISATION



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THE RESERVE



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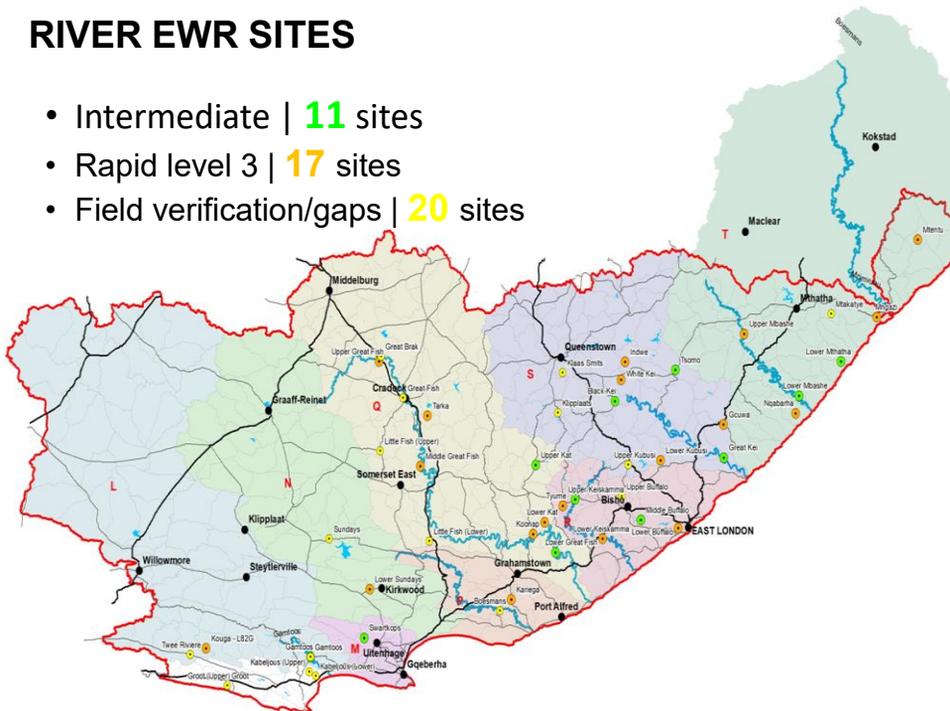


**SUMMARY OF RIVER RESERVE
(Eg. Swartkops River)**

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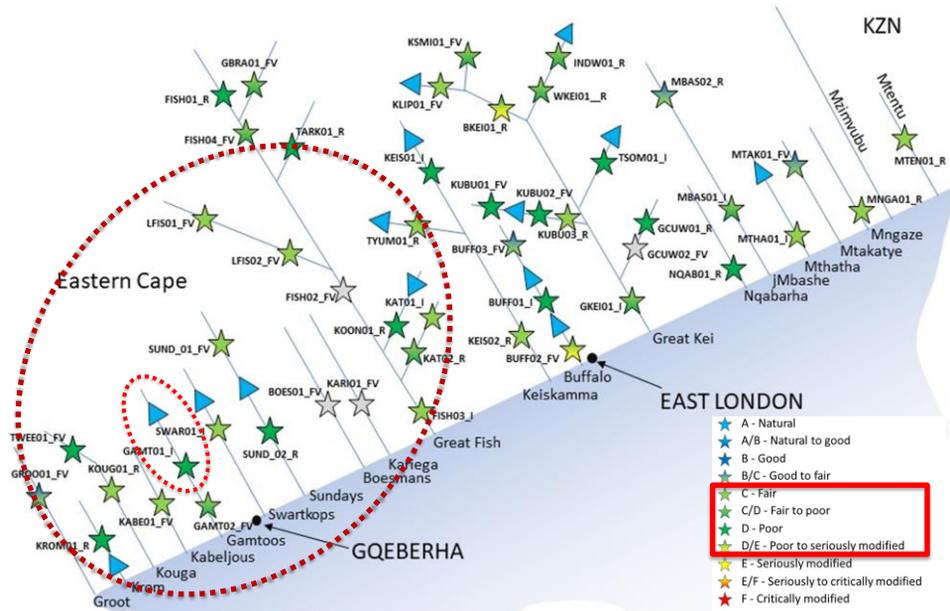
RIVER EWR SITES

- Intermediate | **11** sites
- Rapid level 3 | **17** sites
- Field verification/gaps | **20** sites

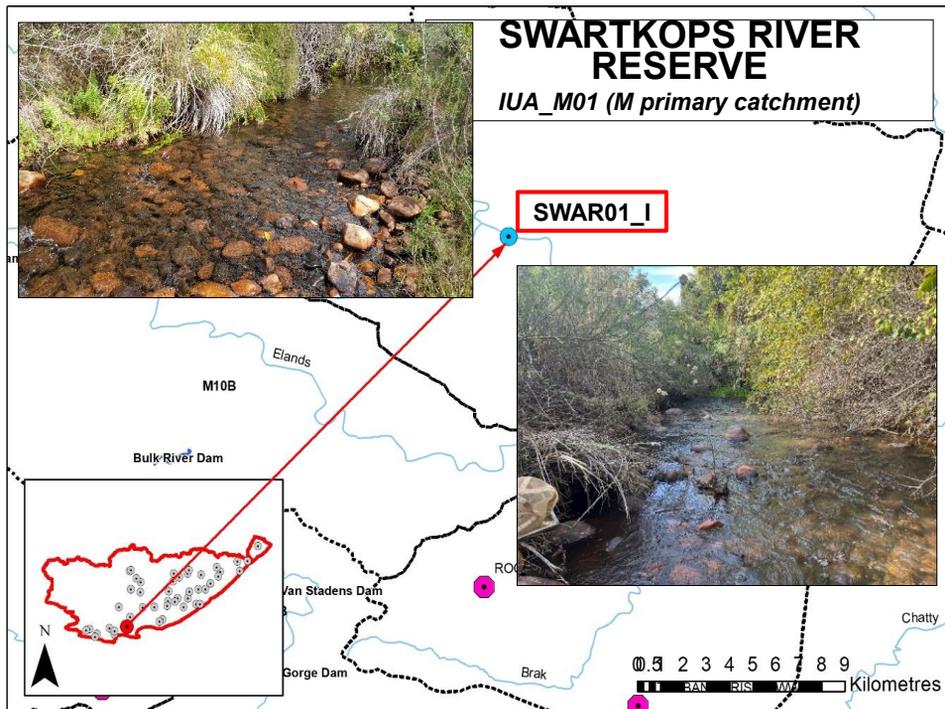


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PRESENT ECOLOGICAL STATUS



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SWARTKOPS RIVER RESERVE

SWAR01_I (M10C)

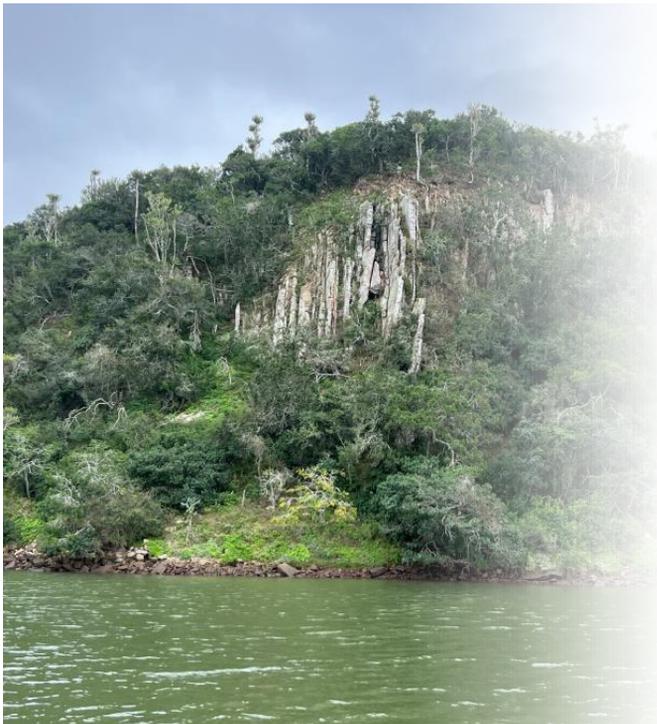
The final step was the quantification of the EWR (habitat-flow-stressor-response model) and include the conversion of the EWR flow data for a REC of a B/C to hydraulic conditions at the EWR site (i.e. depth and flow velocities at discharges measured at the site in m³/s) using a hydraulic model.

Driver component	PES
HAI	D
Diatoms	B
GAI	C
Response component	PES
FRAI	D/E
MIRAI	C
VEGRAI	B
Ecstatus	C
EI	Moderate
ES	High
Key pressures:	
*Loss and alteration of natural habitats and biota, with changes in species occurrence and abundances.	
*Altered sediment dynamics:	
*Groendal Dam traps a significant proportion of coarse bedload.	
*Reduced formation of gravel and cobble bars.	
*Increased channel incision downstream.	
*Modified flow regime:	
*Reduction in flood flows.	
*Fewer channel reset events needed to renew and maintain instream habitats.	
*Catchment-scale pressures:	
*Instream and downstream impacts:	
*Gravel mining downstream likely contributing to channel incision.	
*Associated bank erosion and further habitat degradation.	
REC	B/C
TEC	B

Recommended Ecological Category	B/C
nMAR at EWR site	27.3
Total EWR	10.919 (39.97 %MAR)
Maintenance Low flows	4.327 (15.84 %MAR)
Drought Low flows	0.484 (1.77 %MAR)
Maintenance High flows	6.592 (24.13 %MAR)
Overall confidence	High

Floods	Flood size (range)	FINAL
Class 1 (0-5.5 m ³ /s)	m ³ /s	1.5
	# days	2
	Months	Aug, Oct, Nov
	Type	Daily average
Class 2 (10-30 m ³ /s)	m ³ /s	6
	# days	2
	Months	Aug, Nov, Mar, Apr, May
	Type	Daily average
Class 3 (80-100 m ³ /s)	m ³ /s	20
	# days	2
	Months	Sep
	Type	Peak

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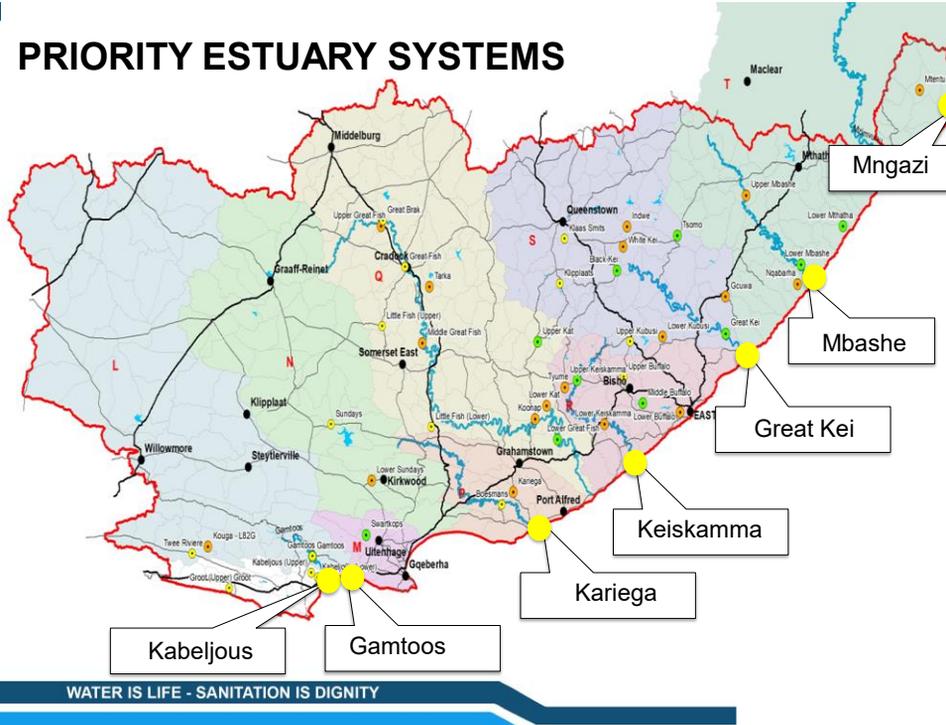


SUMMARY OF ESTUARY RESERVE

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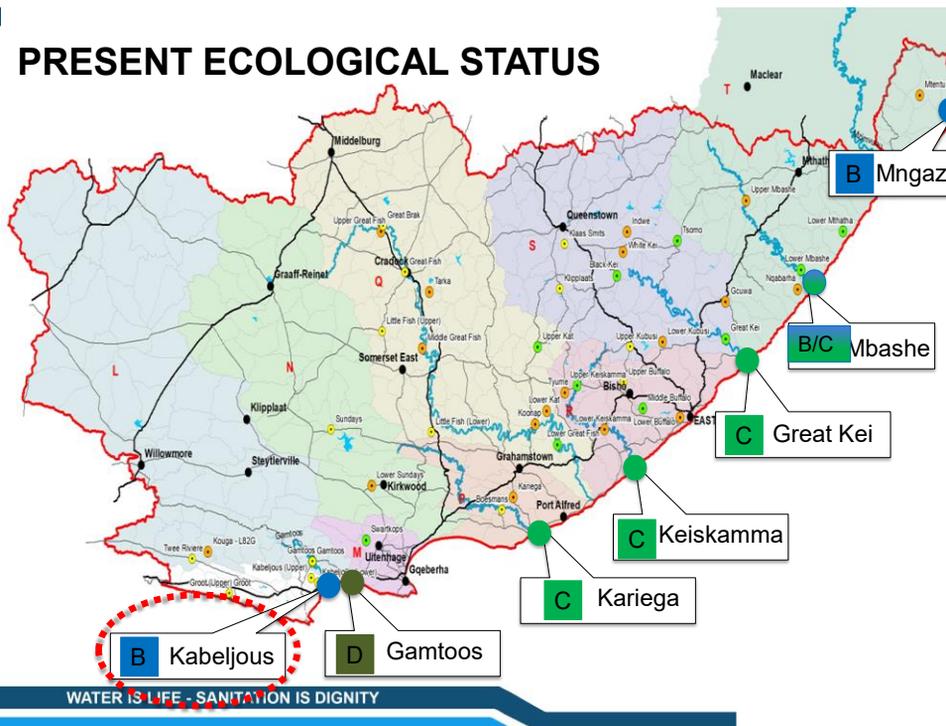
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PRIORITY ESTUARY SYSTEMS



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PRESENT ECOLOGICAL STATUS



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Kabeljous Estuarine health score			
Variable	Score	% attributed to non-flow related impacts	Explanations
Hydrology	80	-*	<ul style="list-style-type: none"> A reduction in groundwater input that assists in moderating hypersalinity and estuary water levels Flow reduction with a focus on baseflow reduction resulting in an increase in salinity and a decrease in water levels
Hydrodynamics and mouth condition	84	0%	<ul style="list-style-type: none"> Agricultural activities/development (including bridges) in the EFZ cause loss of estuarine habitat
Water quality	87	90%	<ul style="list-style-type: none"> Water quality decline due to agricultural activities in the catchment
Physical habitat alteration	76	90%	
Habitat health score	82		
Microalgae	76	50%	<ul style="list-style-type: none"> Trampling and footpaths through saltmarshes
Macrophytes	80	40%	<ul style="list-style-type: none"> Land invasion in the freshwater wetland east of the river mouth is causing habitat loss and pollution, threatening the last viable Humansdorp Shale Renosterveld, remnant Khoisan middens, and critical breeding and roosting habitat for the endangered Black Harrier.
Invertebrates	71	24%	
Fish	70	20%	<ul style="list-style-type: none"> Over-exploitation of living resources (i.e., illegal gillnetting and line fishing) – effectively mining fish in a closed small estuary
Birds	77	14%	<ul style="list-style-type: none"> Recreational activities in the lower reaches affect bird abundance
Biotic health score	75		
ESTUARY HEALTH SCORE	78		
PES	B		~78% similar to natural condition



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PES	Biodiversity	REC	TEC	nMAR (X10 ⁶ m ³)	EWR (% NMAR)
B	High	B	B	5	89.3

- Given the degree of agriculture and development in the catchment and estuary environs; concerns regarding SW/GW abstractions, declining water quality; high level of fishing effort - the REC remain a B Category.
- Key interventions to achieve REC:
 - Develop an Estuary Management Plan to guide restoration and management
 - Maintain low flows and groundwater inputs to prevent mouth closure and hypersalinity
 - Increase base flows by removing alien vegetation and unauthorised abstractions
 - Reduce nutrient inputs through improved agricultural practices and riparian restoration
 - Manage fishing pressure and access to restore nursery function
 - Protect riparian vegetation and prevent artificial mouth breaching



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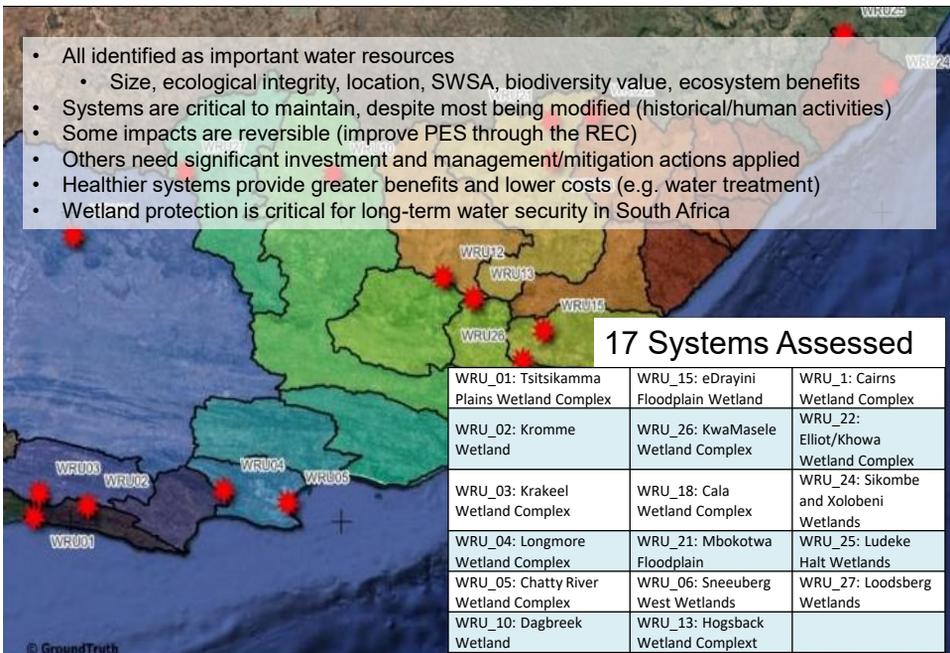


SUMMARY OF WETLAND RESERVE

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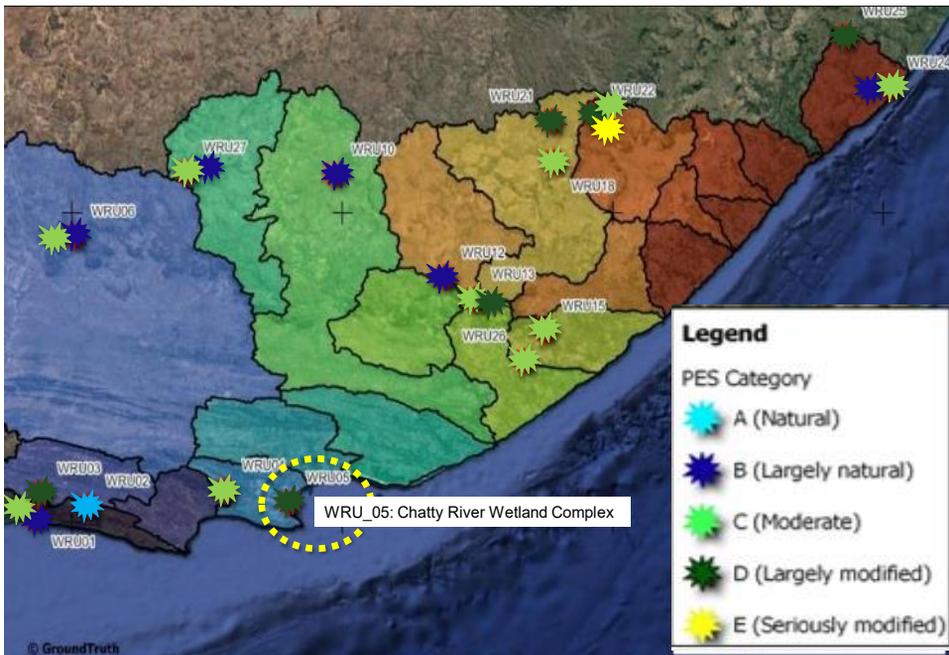
PRIORITISED WETLAND SYSTEMS

- All identified as important water resources
 - Size, ecological integrity, location, SWSA, biodiversity value, ecosystem benefits
- Systems are critical to maintain, despite most being modified (historical/human activities)
- Some impacts are reversible (improve PES through the REC)
- Others need significant investment and management/mitigation actions applied
- Healthier systems provide greater benefits and lower costs (e.g. water treatment)
- Wetland protection is critical for long-term water security in South Africa



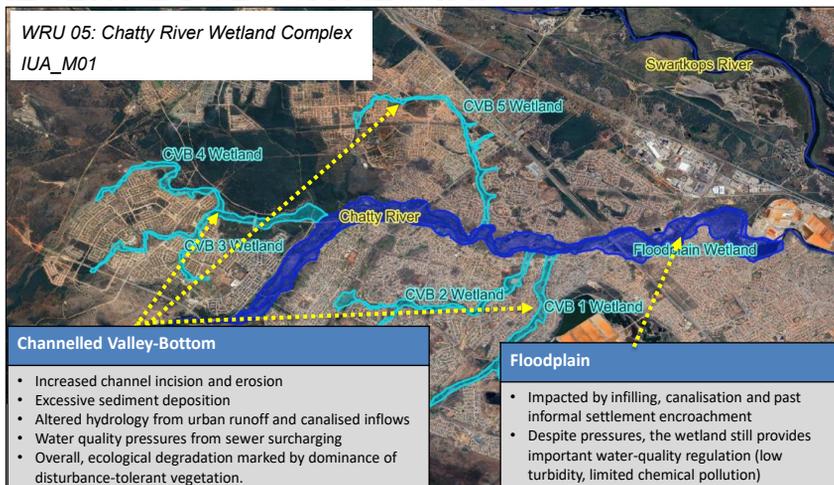
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PRIORITISED WETLAND SYSTEMS



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PRESENT ECOLOGICAL STATUS



- Large interconnected wetland complex – highly urbanized
- 2 HGM units (CVB and Floodplain)
- Receive inflows from multiple upstream valley-bottom systems
- Hydrologically vulnerable (low rainfall, high evapotranspiration)
- Urban development - stream canalisation increase runoff, sediment inputs
- Widespread channel incision. erosion and sediment deposition across wetland units

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PRESENT ECOLOGICAL STATUS

IUA_M01: WRU_05: Chatty River Wetland Complex

Floodplain-wetland

PES-Assessment	Hydrology	Geomorphology	Water-Quality	Vegetation
Impact Score	4.0	3.4	7.3	5.7
PES Score (%)	60%	66%	27%	43%
Ecological-Category	D-1	C-1	E-1	D-1
Combined Impact Score	5.0			
Combined PES Score (%)	50%			
Combined-Present Ecological-Category	D-1			

Blocked stormwater canals cause overtopping and health risks to nearby residents, while unblocked canals drive erosion and scour in downstream wetlands.



Large scale canalization of the channel (right)



surcharging sewer manhole pictured centrally, and a newly incising channel (right)



Approach applied to both wetland HGM units separately to reflect differences in impacts and ecological integrity

HGM Type	PES	EIS	Improvement of the REC	REC	BAS
Floodplain	D	High	Significant PES improvement is not feasible due to high costs and social constraints. Maintaining and slightly improving the current PES is achievable. Sewage overflows are the main driver of poor wetland condition. Addressing sewage would allow improvement from low D to high D.	C/D	C/D
Channelled Valley-Bottom	D	High	BAS set to maintain current PES and prevent further decline.	C/D	C/D

Determining the REC: PES, EIS, land use/landcover (all wetlands detrimentally affected by water quality (i.e. raw sewage discharge))

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SUMMARY OF GROUNDWATER RESERVE

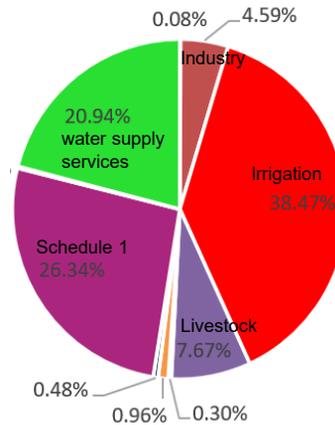




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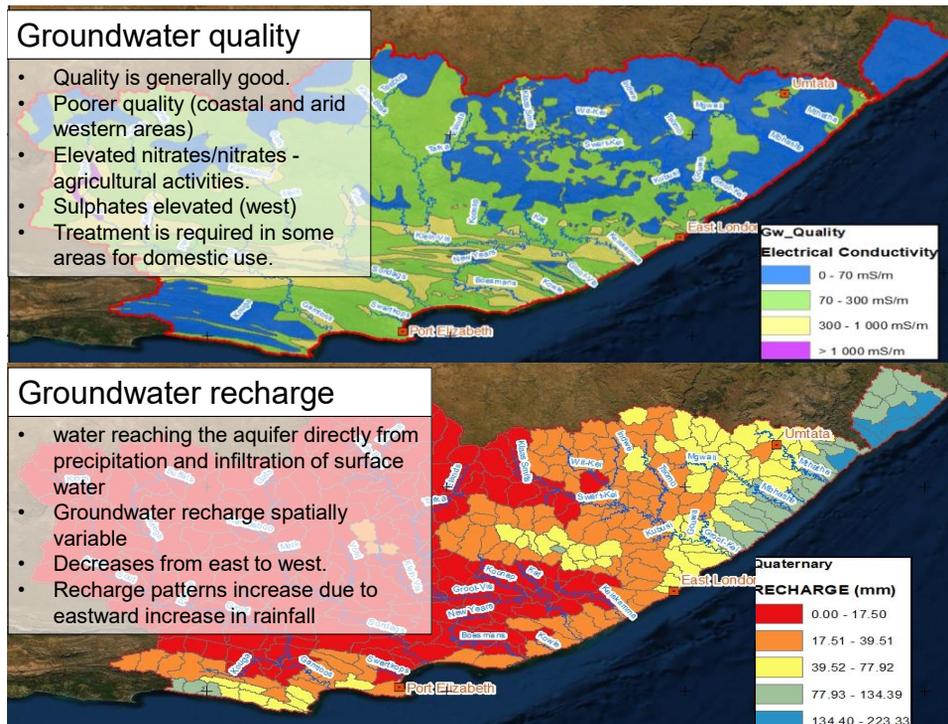
GROUNDWATER USE

- Registered groundwater resources: 4,266
 - 3,727 boreholes
 - 539 springs
- Total registered groundwater use: 154.52 Mm³/annum
- Groundwater use by sector:
 - Irrigation: 38% (largest user)
 - Schedule 1: 26%
 - Water supply services (mainly municipalities): 21%
 - Other sectors (aquaculture, livestock, industry, mining, power generation and recreation): ~15%

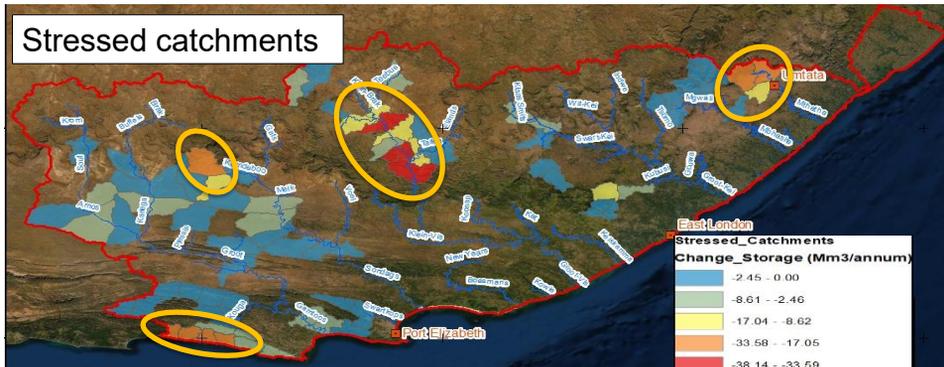


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- Several stressed quaternary catchments have been identified in the area where the estimated groundwater use exceeds the estimated groundwater recharge
 - Ultimately has an effect on basic human needs and baseflow requirements
- Most stressed quaternaries are low to moderately stressed
- The highly stressed areas are parts of the Karoo, southern coast and Mthatha area.

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GROUNDWATER PRESENT ECOLOGICAL STATUS

- Available groundwater and other relevant data from DWS
 - Time series groundwater levels (Hydstra)
 - Time series groundwater quality (mainly WMS) – limited
 - Groundwater Abstraction (mainly WARMS)
 - Flow data (WR, 2012)
- The available Groundwater Recharge and Use data were used to quantify the Stress Index (WRC. 2012)

$$\text{Stress Index (SI)} = \text{GW}_{\text{use}}/\text{Re}$$

SI index expressed as either a **surplus** or **deficit** per quaternary catchment

Where:

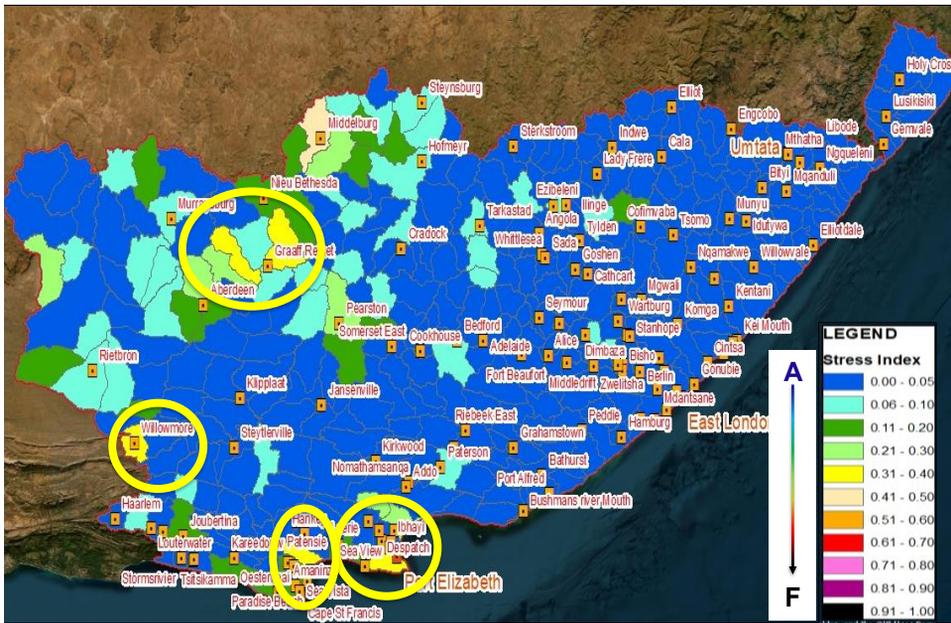
Re = Recharge

GW_{use} = Groundwater Use

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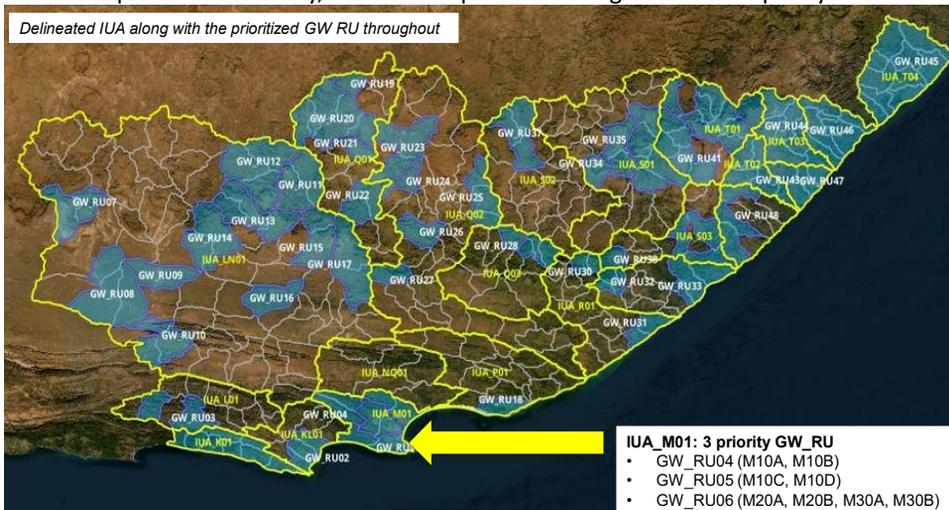
STRESS INDEX DISTRIBUTION IN THE CATCHMENT



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GROUNDWATER RESERVE

- 17 prioritised groundwater systems selected on:
 - Over-extraction risks and pollution pressures
 - Aquifer sustainability, baseflow importance and groundwater quality



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GW QUANTITY RESERVE (GW_RU06)

Quat ^α	Total Population ^α	Recharge ¹ (Mm ³ /a) ^α	BHN2 (Mm ³ /a) ^α	Groundwater Component of Baseflow ^{3,4} (Mm ³ /a) ^α	Reserve ⁵ (Mm ³ /a) ^α	GW-Use (Mm ³ /annum) ^α	Stress-Index ^α Value ^α	Stress-Index ^α Category ^α
M20A ^α	403409 ^α	22.56 ^α	0.0188 ^α	0.00 ^α	0.02 ^α	9735892.2 ^α	0.4316 ^α	C ^α
M20B ^α	56410 ^α	18.36 ^α	0.0243 ^α	4.25 ^α	4.27 ^α	1271117 ^α	0.0692 ^α	B ^α
M30A ^α	40008 ^α	9.38 ^α	0.0074 ^α	0.00 ^α	0.01 ^α	1362355.5 ^α	0.1452 ^α	B/C ^α
M30B ^α	95628 ^α	8.30 ^α	0.0013 ^α	0.00 ^α	0.00 ^α	4008516 ^α	0.4830 ^α	B/C ^α

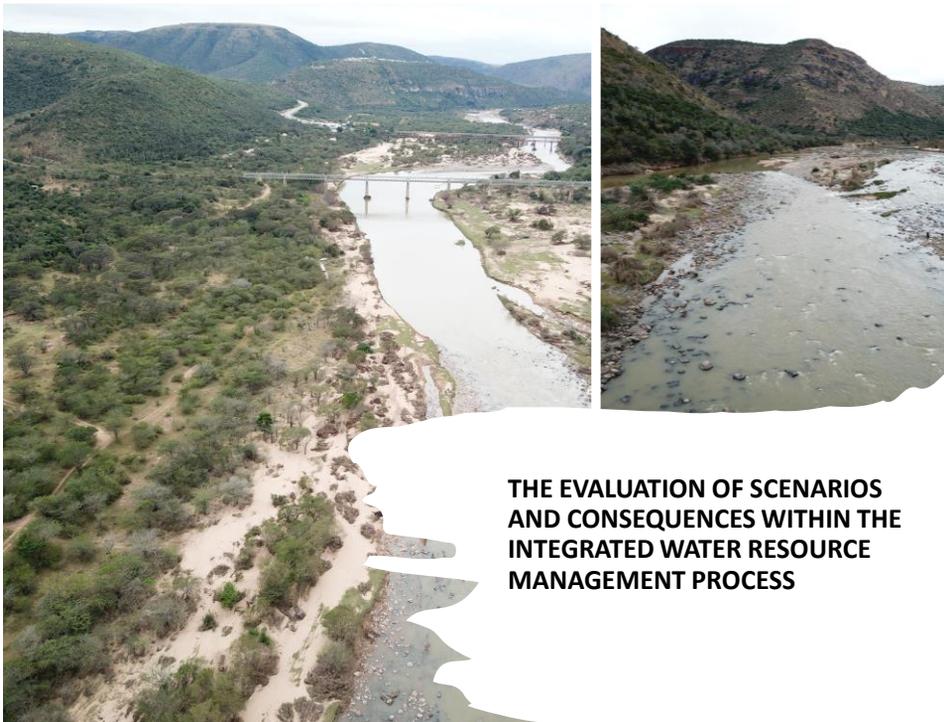
¹Recharge: water reaching the aquifer directly from precipitation and infiltration of surface water.
²Basic Human Needs: The minimum water supply standard necessary for household life and hygiene, currently set at 25 l/p/d for persons with informal supply.
³Baseflow (streamflow sustained by GW) and so the ⁴Groundwater component of baseflow is the contribution from the adjacent aquifer, excluding short-term subsurface flows.
⁵The Reserve: constitutes the sum of the groundwater baseflow required by EWR plus the Basic Human Needs (BHN) Reserve.

GW QUALITY RESERVE

Chemical Parameter ^α	Unit ^α	Quaternary M30B ^α				Assigned Water Quality Class Based on the South African Water Quality Guideline Domestic Use Limits ¹					
		No. of Samples ^α	Ambient GW-quality or median ^α	BHN-Threshold ² ^α	Groundwater Quality Reserve ³ ^α		Class I	Class II	Class III		
pH ^α	—	51 ^α	8.01 ^α	5.0 – 9.5 ^α	7.21 – 8.81 ^α	pH Units	6 - 9	5 - 6 & 9 - 9.5	4 - 5 & > 9.5	< 4 or > 10	
Electrical Conductivity ^α	mS/cm ^α	51 ^α	1340.00 ^α	<150 ^α	1340.00 ^α	Total Dissolved Solids	0 - 450	450 - 1000	1000 - 2450	> 2450	
Calcium as Ca ^α	mg/l ^α	51 ^α	211.17 ^α	<150 ^α	211.17 ^α	Electrical Conductivity	0 - 70	70 - 150	150 - 300	> 300	
Magnesium as Mg ^α	mg/l ^α	51 ^α	146.49 ^α	<100 ^α	146.49 ^α	Calcium as Ca	0 - 80	80 - 150	150 - 300	> 300	
Sodium as Na ^α	mg/l ^α	51 ^α	2677.80 ^α	<200 ^α	2677.80 ^α	Magnesium as Mg	0 - 30	30 - 70	70 - 100	> 100	
Potassium as K ^α	mg/l ^α	51 ^α	10.81 ^α	<50 ^α	10.81 ^α	Sodium as Na	0 - 100	100 - 200	200 - 400	> 400	
Chloride as Cl ^α	mg/l ^α	51 ^α	4230.50 ^α	<200 ^α	4230.50 ^α	Chloride as Cl	0 - 100	100 - 200	200 - 600	> 600	
Sulphate as SO ₄ ^α	mg/l ^α	51 ^α	763.97 ^α	<400 ^α	763.97 ^α	Sulphate as SO ₄	0 - 200	200 - 400	400 - 600	> 600	
Nitrate and Nitrite as N ^α	mg/l ^α	51 ^α	0.05 ^α	< 10 ^α	0.05 ^α	Nitrate as N	<6	6 - 10	10 - 20	> 20	
Fluoride as F ^α	mg/l ^α	51 ^α	0.65 ^α	<1.5 ^α	0.65 ^α	Fluoride as F	0 - 1	1 - 1.5	1.5 - 3	> 3.5	
						Faecal coliforms	counts/100ml	0	0 - 1	1 - 10	> 10

¹Median value (calculated from population of samples in QC)
²Upper limit of Class I water quality (DWAf et al 1998)
³The median plus 10% for the Groundwater Quality Reserve^α

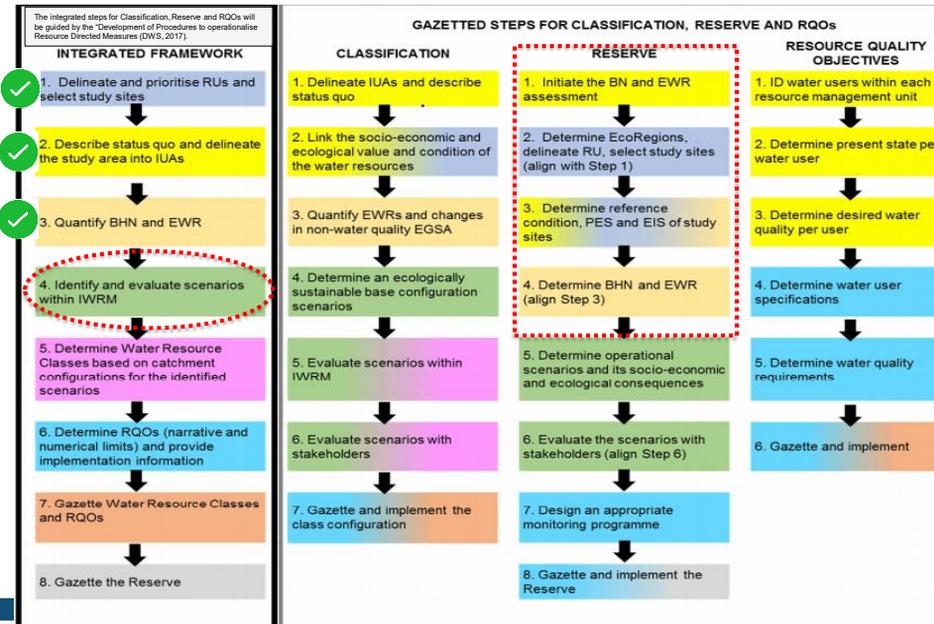
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THE EVALUATION OF SCENARIOS AND CONSEQUENCES WITHIN THE INTEGRATED WATER RESOURCE MANAGEMENT PROCESS

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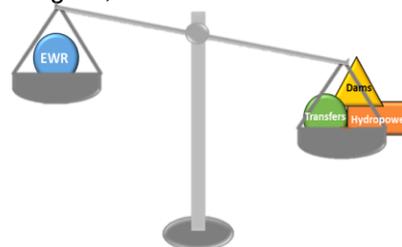
SCENARIOS AND CONSEQUENCES



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SCENARIOS AND CONSEQUENCES

- Scenarios, in context of water resource management and planning, are plausible definitions (settings) of all the factors (variables) that influence the water balance and water quality in a catchment and the system as a whole;
- Each scenario represents an alternative future condition;
- Generally, reflects a change to the present condition;
- Such analysis enables a comparison of different scenarios, helping to choose the preferred one (where REC is met);
- Various models to predict changes in all ecological, social and economical components are assessed
- The process requires a wide range of trade-offs to be evaluated
- Final outcome: set of desired characteristics for use and ecological condition for each of the water resources
- Aids in the recommended classes/IUA for ministers' consideration.



REC not met – lower the TEC or trade-off?

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OPERATIONAL SCENARIOS

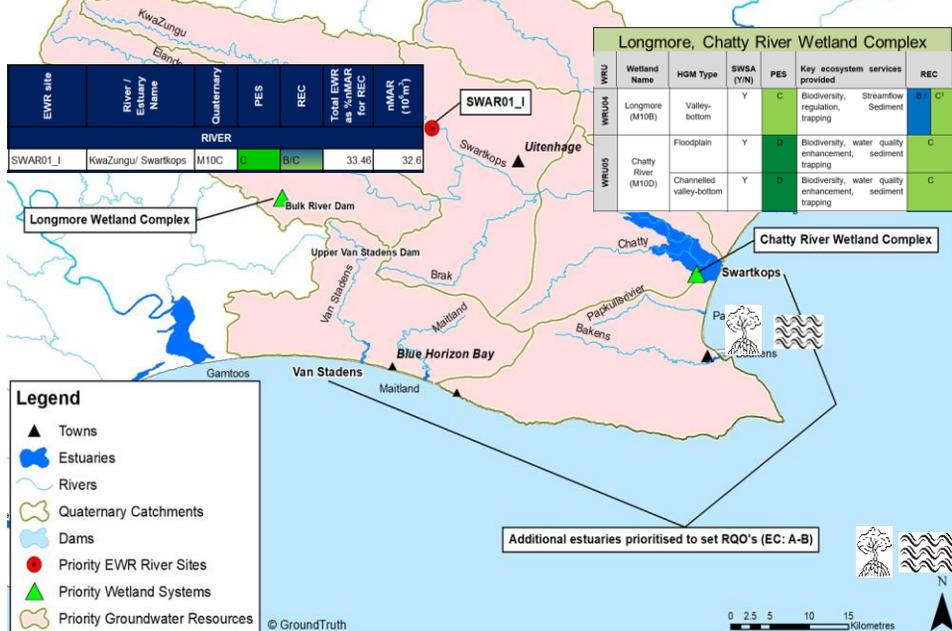
- Scenario 1 (Sc1) Present Day Demands**
 - Sc1a (without EWR): modelled flows in water resource and supply to users without EWR
 - Sc2b (with EWR): where the EWR for REC for water resource is included into the models and prioritised to ensure the flows are provided to meet ecological needs
- Scenario 2 (Sc2) Medium Term (2030)**
 - Sc2a (without EWR)
 - Sc2b (with EWR)
- Scenario 3 (Sc3) Long Term (2050)**
 - Sc3a (without EWR)
 - Sc3.1a (intervention alternative scenario without EWR)
 - Sc3b (with EWR)
 - Sc3.1b (intervention alternative scenario with EWR)
- Scenario 4 (Sc4)**
 - Water quality considered and predicted. Only selected IUAs where water quality was identified to be of concern and/or the driver of the ecological state
- Scenario 5 (Sc5)**
 - Climate change considered and predicted (Algoa)

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M - CATCHMENT

IUA_M01 and its priority water resources



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Scenario's and consequences for IUA_M01

Sc.	Scenario descriptions	code	Description
Sc1	Present Day Demands <i>(Forestry, irrigation, domestic growth at Nelson Mandela Bay Metro)</i>	Sc1a	Sc1a (without EWR)
		Sc1b	Sc1b (with EWR - rivers)
Sc2	Medium Term (2030) <i>(Further domestic growth)</i>	Sc2a	Sc2a (without EWR)
		Sc2b	Sc2b (with EWR - rivers)
Sc3	Long Term (2050) <i>(Further domestic growth)</i>	Sc3a	Sc3a (without EWR)
		Sc3b	Sc3b (with EWR - rivers)
Sc4	Water quality	Sc4	The future water quality depends on Sc1b (current status)

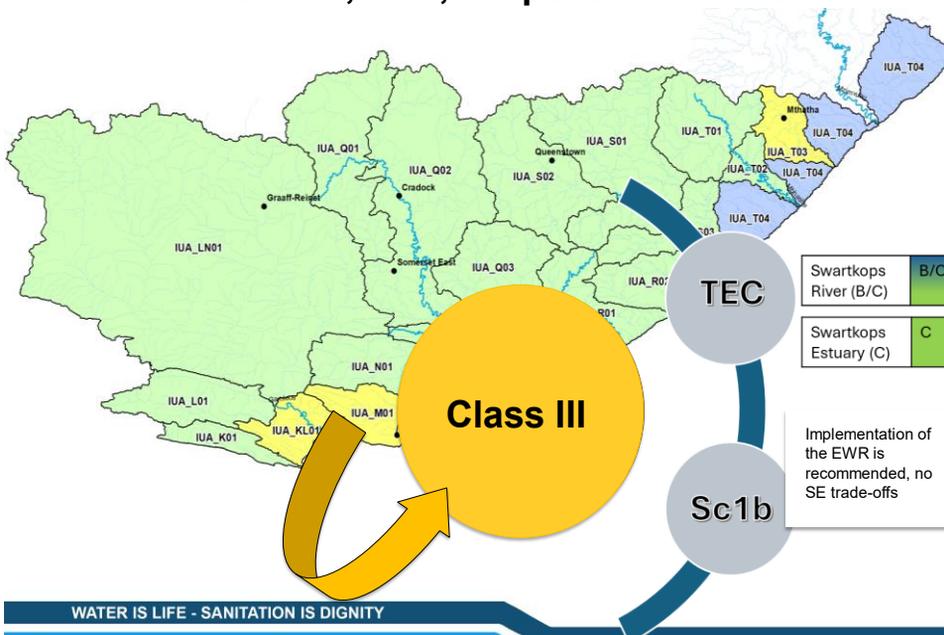


No.	IUA Code	Resource	EWR site	REC	Ecology	Socio-economics
					Motivation	Motivation
4	IUA_M01	River	SWAR01_I (KwaZungu/ Swartkops)	B/C	Implementation of EWR will provide the necessary flows and habitats for the aquatic biota, especially as the river supports indigenous fish species such as the Cape Kurper, is part of a protected area (Groendal Nature Reserve) and also forms part of a SWSA for groundwater.	No economic trade-offs associated with EWR implementation for the irrigation users.
		Estuary	Swartkops	C		

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Preferred Scenario, TEC, Proposed WR Class



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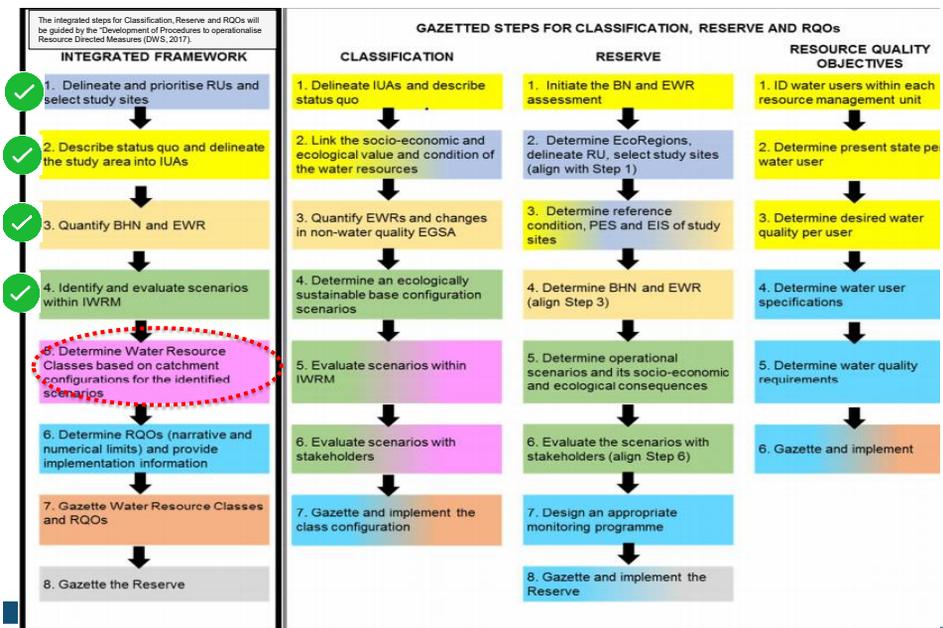
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PROPOSED WATER RESOURCES CLASS PER INTEGRATED UNIT OF ANALYSIS (IUA)

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WATER RESOURCE CLASSES



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PROPOSED WATER RESOURCE CLASSES



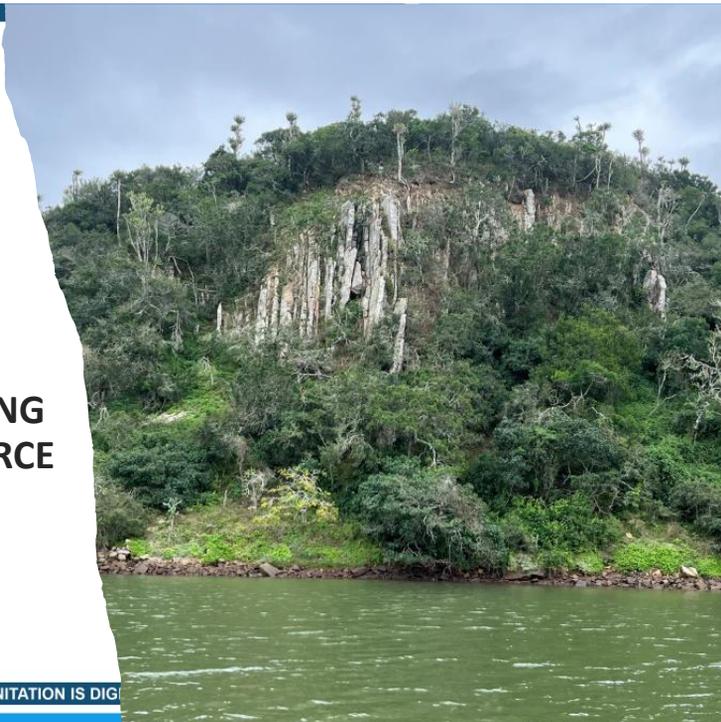
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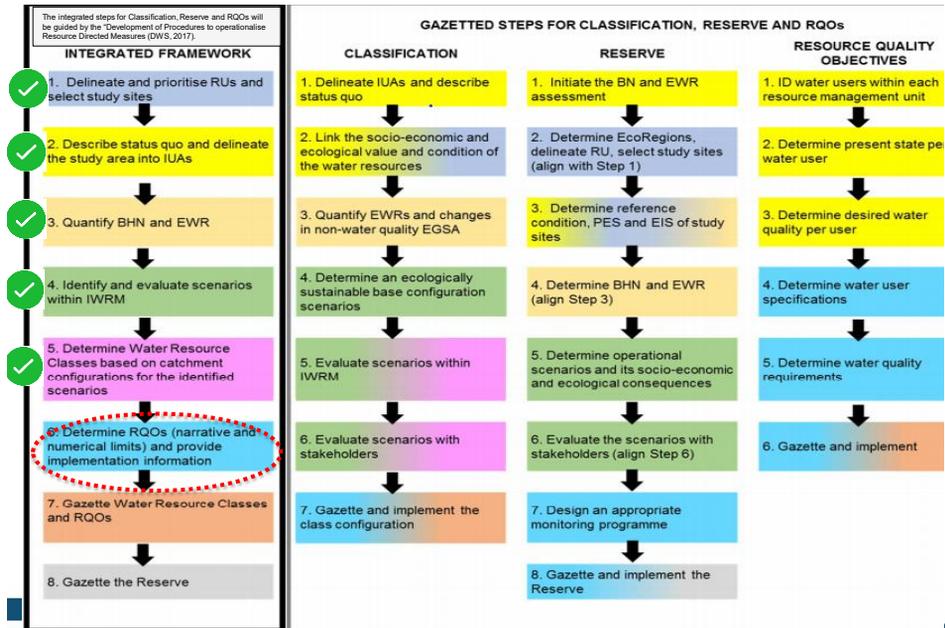
DETERMINING THE RESOURCE QUALITY OBJECTIVES



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RESOURCE QUALITY OBJECTIVES



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RESOURCE QUALITY OBJECTIVES

- RQOs defines the desired condition for all water resources by setting measurable targets for water quantity, quality, habitat, and biota - ensuring sustainable use and protection of the resources.



RQOs closely aligned with Sustainable Development Goals (SDG)

- Particularly, SDG 6
- Aims to ensure the availability and sustainable management of water and sanitation for all
- The alignment can be summarised as follows:
 - **Water Quality (SDG 6.3):** Sets benchmarks to reduce pollution, manage chemicals, and reuse treated wastewater.
 - **Water Quantity (SDG 6.4):** Supports sustainable withdrawals and prevents water scarcity.
 - **Ecosystem Protection (SDG 6.6):** Safeguards and restores aquatic ecosystems.
 - **Integrated Management (SDG 6.5):** Central to Integrated Water Resource Management (IWRM).
 - **Monitoring & Accountability (SDG 6.1, 6.2, 6.a):** Provides measurable targets to enhance governance and ensure equitable access.

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Criteria for setting Resource Quality Objectives

- Simple, easily measured, understood, applied
- Use existing information where possible
- At appropriate scale and must detect change
- Comparable, repeatable, defensible
- May be drivers or response indicators
- Narrative and/or numeric
- Meaningful in terms of the Act



RQOs cannot/do not:

- Be applied to an individual licence
- Replace the need for other monitoring programmes
- Include every available indicator of resource quality
- Be considered as absolute “truths”



Image source: MS Stock

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COMPLETED PRIORITISED RESOURCE UNITS

- Presented in detail to stakeholders at the June 2026 TTG meetings
- Overall, 229 priority Resource Units (RUs) were identified across the study area
 - Initial identification following the delineation of the IUAs
 - Revised and refined during the Resource Quality Objectives (RQOs) phase
 - RQOs were developed for these priority RUS for rivers, dams, wetlands, estuaries, GW

Priority Rivers

- 145 river RUs
 - Prioritised using the DWS evaluation tool that assessed key land-use activities and their impacts on water resources.
 - This informed the targeted selection of indicators and the development of practical, implementable RQOs.

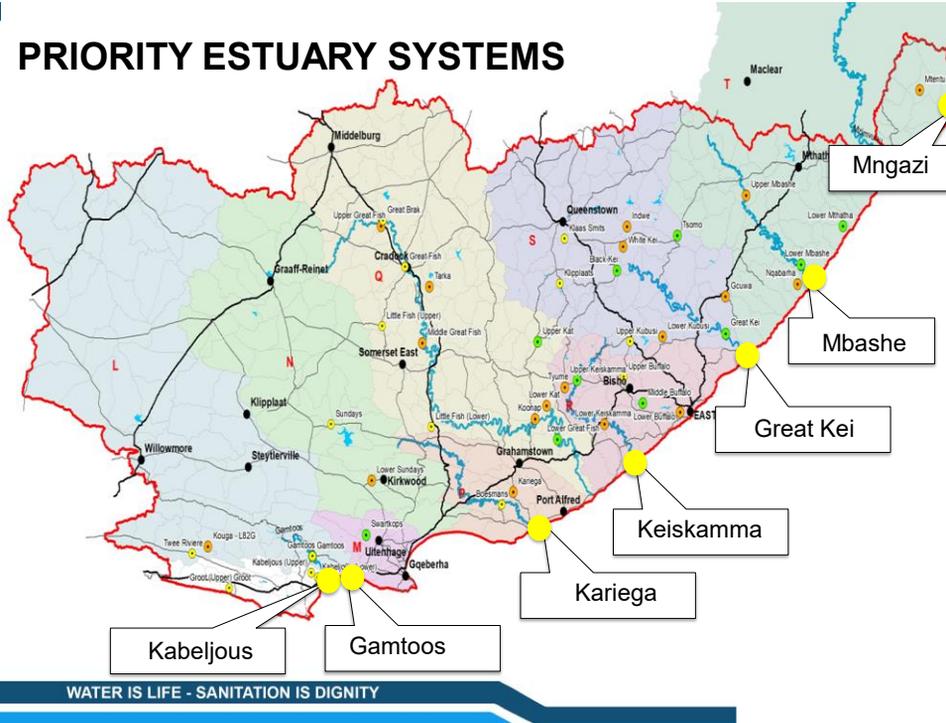
Priority Dams

- 24 key dams prioritized
 - Significant landscape, dependency or water quality importance
 - Focusing on dams influenced by surrounding activities, critical to water resource management.

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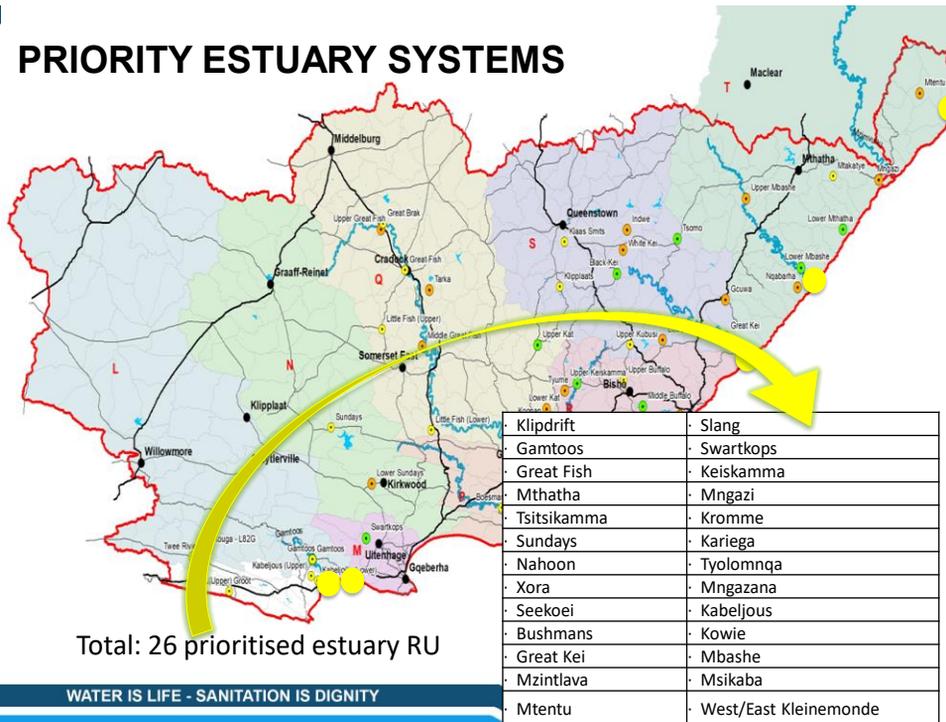
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PRIORITY ESTUARY SYSTEMS



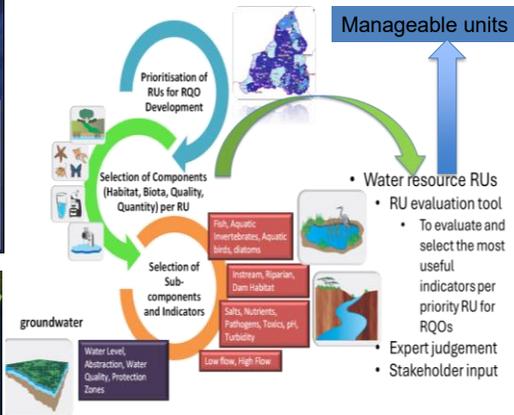
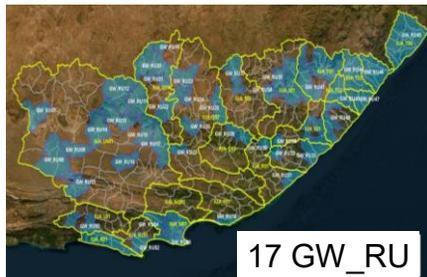
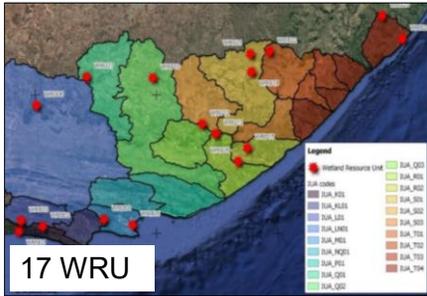
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PRIORITY ESTUARY SYSTEMS



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PRIORITISED WETLAND AND GW

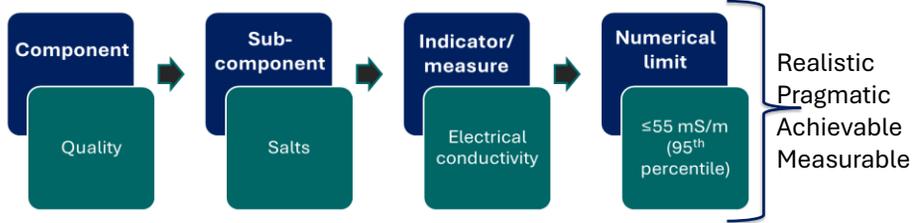


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RESOURCE QUALITY OBJECTIVES PER RU

- For setting the RQOs:
 - Components – sub-components – indicators – numerical limits



- Based on:
 - Activities that impact on water resources
 - User requirements
- Protection of the resource

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SUB-COMPONENTS FOR WHICH RQOs HAVE BEEN SET

Dams	
	Dam level
	Dam operating rules
Quantity	Reduction in live storage
	Clarity/ Secchi Disc Indication
Quality	Cyanobacteria
	Alien aquatic plant species
Vegetation	In-channel Phragmites sp./reeds

Rivers	
Component	Sub-component
Quantity	Low Flows
	High Flows
	Nutrients
Quality	Salts
	System variables
	Toxics
	Pathogens
Habitat	Geomorphology
	Riparian vegetation
	Integrated Habitat (instream and riparian)
Biota	Fish
	Macroinvertebrates
	Diatoms

Estuaries	
Component	Sub-component
Hydrodynamics	Mouth condition
	Abiotic states
Quality	Salinity
	Dissolved inorganic nitrogen
	Dissolved inorganic phosphate
	Water clarity
	Dissolved oxygen
	Toxic substances
Habitat	Pathogens
	Intertidal
	Subtidal
Biota	Substrate type
	Microalgae
	Macrophytes
	Macroinvertebrates
	Fish
	Birds

Groundwater	
Quantity	(abstraction)
	Aquifer water level
	Water quality
	Protection zones

Wetlands	
Components	Sub-components
Quantity	Water inputs
	Water distribution and retention
Quality	Nutrients
	Salts
	System variables
	Toxics
Habitat	Microbial determinants
	Present Ecological State (PES)
	Geomorphology
Biota	Wetland vegetation
	Fish
	Plant species
	Mammals
	Birds
	Amphibians & reptiles
	Periphyton
	Aquatic invertebrates
Diatoms	

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RESOURCE QUALITY OBJECTIVES

ALL WATER RESOURCES

M CATCHMENT



IUA Code	River	Dams	Estuary	Groundwater	Wetlands
IUA_M01	✔	✔	✔	✔	✔

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74 RESOURCE QUALITY OBJECTIVES

PRIORITY RESOURCES UNITS FOR ALL WATER RESOURCES													
Rivers				Dams			Estuaries		Groundwater			Wetlands	
Class	RU No.	SQ Reach	Quat	River	RU No.	Dams	DWS Dam No.	Estuaries	RU No.	Quaternary catchment	RU No.	Quats	Wetlands
III	4.1	M10B-08921	M10B	Elands	4.4	Groendal	M1R001	Van Stadens, Swartkops	SW_RU04	M10A, M10B	WRU04	M10B	Longmore Wetland Complex
	4.2	M10C-08897	M10C	Swartkops (SWAR01_I)					SW_RU05	M10C, M10D	WRU05	M10D	Chatty River Wetland Complex
	4.3	M10C-08879	M10C	Swartkops					SW_RU06	M20A, M20B, M30A, M30B			

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
4.1	M10B-08921	M10B	Elands	Selection driven from ecological (fish support area, free flowing) and SWSA. No data to set RQOs													
4.2	M10C-08897	M10C	Swartkops	All indicators. EWR site SWAR01_I	X	X	X	X	X	X	X	X	X		X	X	X
4.3	M10C-08879	M10C	Swartkops	Refer to Swartkops Estuary and Wetland (Chatty) RQOs (priority and driven), water quality owing to upstream WWTW.			X	X	X	X	X						

IUA	RU No.	Dams	Quantity			Quality			Vegetation		
			Dam operation and levels	System (dam) operating rules	Reduction in live storage	Clarity/ Secchi Disc Indication	Cyanobacteria	Alien aquatic plant species	In-channel Phragmites sp./reeds		
IUA_M01	4.4	Groendal Dam	X								X

IUA	Estuary	Hydrology	Hydrodynamics	Water Quality	Physical habitat	Microalgae	Macrophytes	Invertebrates	Fish	Birds
M01	Swartkops	X	X	X	X	X	X	X	X	X

Examples of RQOs

[RU 4.2 Swartkops River](#) | RU 4.4: Groendal Dam | Swartkops Estuary

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RESOURCE QUALITY OBJECTIVES: WETLANDS

WRU_05: Chatty River Wetland Complex
 CVB/Floodplain
 PES: D and REC/BAS: C/D

Component	Sub-Component	Indicator	Narrative RQO
Habitat	Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the Chatty River floodplain wetland.	The PES of the Chatty River floodplain wetland should not fall below the BAS of C/D.
Quality	Water Quality	Estuary indicators apply (see water quality related estuary indicators for the Swartkops Estuary)	Estuary RQOs apply (see Swartkops Estuary RQO).
Habitat	Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the Chatty River channelled valley-bottom wetlands.	The PES of the Chatty River channelled valley-bottom wetlands should not fall below the BAS of C/D.
Quality	Water Quality	Estuary indicators apply (see water quality related estuary indicators for the Swartkops Estuary)	Estuary RQOs apply (see Swartkops Estuary RQO).

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RESOURCE QUALITY OBJECTIVES: GROUNDWATER

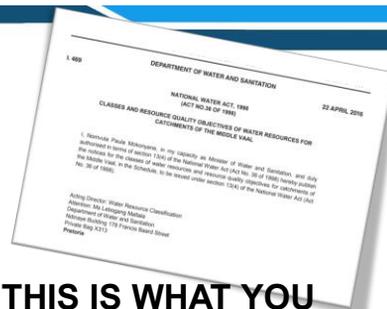
IUA_M01

GW_RU06 (M20A; M20B; M30A; M30B)

Component	Sub Component	Indicator/Measure	Narrative RQO	Numeric RQO
Quantity and Aquifer	Abstraction	Allocations	Existing users to comply with allocation schedules including GA, Schedule 1, and licence conditions. New users are to remain within the allocable groundwater volume.	Q < Average recharge per hectare
	Stress	Abstraction and allocation	Over allocated and currently stressed, requires detailed assessment for new allocations for recharge and reserve determination, or delineation of sub catchments.	Q < Current surplus
	Water Level	Time series drawdown in monitoring boreholes (monthly)	Drawdown in monitoring boreholes should not exceed peak drawdown or not exhibit declining trends over 5 years and exceed the 75th percentile drawdown.	peak drawdown <9.5 m 75th percentile drawdown <7.1 m
	Protection Zone	Other water users	The radius of influence should not intersect any other protection zone	-
Quality	Quality	Time series water quality (Quarterly / Biannual)	Identify suitable monitoring borehole. long term trend should not exceed the 75th percentile or the TWQR for domestic use (in brackets) if higher for Compounds of Concern	-
Ecological	Baseflow Component	Dry season flow	Protection zones for watercourses are required to protect the ecological reserve. Groundwater flow reversal to be prevented near water courses. Dry season flow not to exhibit declining trend for more than 5 years.	-

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IMPORTANT TO NOTE THAT THIS IS WHAT YOU WILL SEE TABULATED WITHIN THE DRAFT GAZETTE TEMPLATES THAT WILL GO ON PUBLIC REVIEW

- SW RESERVE
- GW RESERVE
- WATER RESOURCE CLASS AND RQO's

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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/>