water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

INKOMATI NWRCS

RESOURCE QUALITY OBJECTIVES: Priority Resource Units, subcomponents & indicators: Rivers and Wetlands

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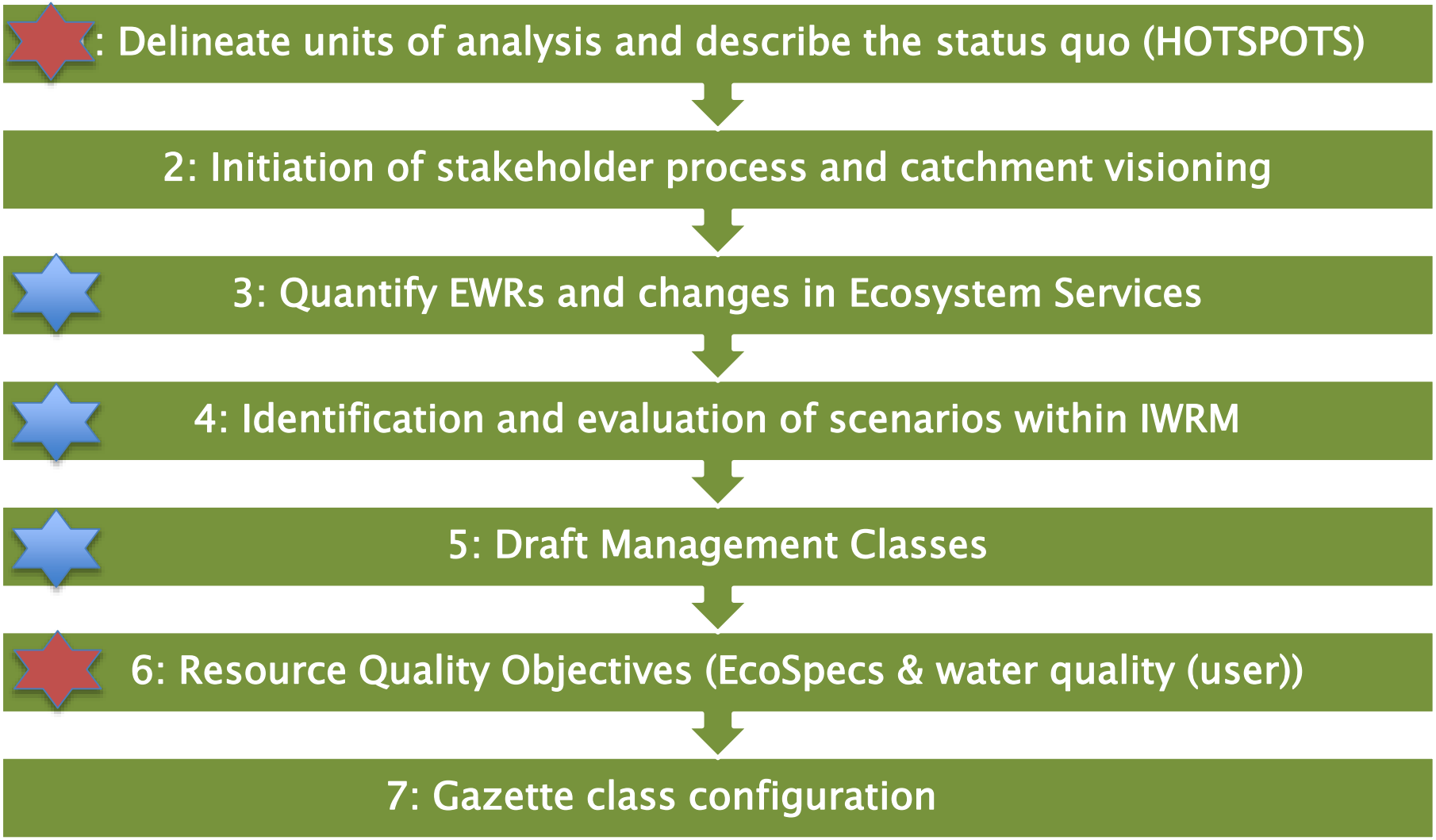
RESOURCE QUALITY OBJECTIVES



WHAT ARE RQOs?

RQOs capture the **Management Class** of the Classification System and the **ecological needs determined in the Reserve** into **measurable management goals** that give direction to resource managers as to how the resource needs to be managed.

*RQOs for a water resource are a numerical or descriptive statement of the conditions which should be met in the receiving water resource, in terms of resource quality, in order to ensure that the **water resource is protected**."*

RQOs and WATER RESOURCE CLASSES

RQO STEPS COMPLETED

RQO STEPS	ACTIONS
Prioritise RUs	Test and modify the RUs as selected during hotspot assessments. Combine high priority SQs in high priority RU.
Sub-components for RQO determination – indicators & driving variables	Use the PES-EIS spreadsheets to check and verify the current pressures and agree on high priority components and indicators.
Determine RQO	Describe the narrative and numerical RQOs for each high priority RU and moderate where possible.

For which components/indicators are RQOs set?

- Quantity, pattern and timing of instream flow (**hydrology**) (time series, FDC). Defined by the recommended scenario
- **Water quality** (limits of driving variables, e.g. precentiles, bacterial counts)
- Characteristics and condition of **riparian habitat and biota** (% alien vegetation, cover, species)
- Characteristics and condition of **instream habitat and biota** (frequency of occurence, species/taxa, abundance, habitat)

NOTE: Not all RQOs are set for all RUs – depends on priority and indicators selected.

Where do you set the RQOs?

IN RESOURCE UNITS:

- RQOs can be set for each Resource Unit (a reach of river) – at a minimum at high priority RUs.
- Resource Units must be prioritised, **high priority Resource Units must have detailed RQOs.**
- Three Resource Unit priority level of RQOs have been determined – links to hotspots
- Different levels of RQOs are set for each priority level

NB: Provide some level of RQO for each

RU PRIORITY LEVEL & RQO (RIVERS)

RU PRIORITY LEVEL		ASSOCIATED RQO
Low	**1**	**Habitat RQO (**target Ecological Category (EcoStatus)). **Flow RQO (**if relevant)
Moderate	**2**	**Flow RQO.** **Habitat and biota RQO** (broad). **WQ RQO** (broad & if relevant)
High	**3 WQ**	**WQ RQO**
	3a	Forms part of RU represented by an EWR site.
	3b	**Full suite of RQOs**. Detailed habitat & biota EcoSpecs.

PRIORITY COMPONENTS & SUBCOMPONENTS (RIVERS)

Example only:

IUA	RU	Node name	Component indicator
U1-1	RU 1	U32F-04115	1. Rip veg 2. Instream biota
		U32F-02765	1. Rip veg
	RU 2	U32F-04134	1. Rip veg 1. Water quality 2. Instream biota

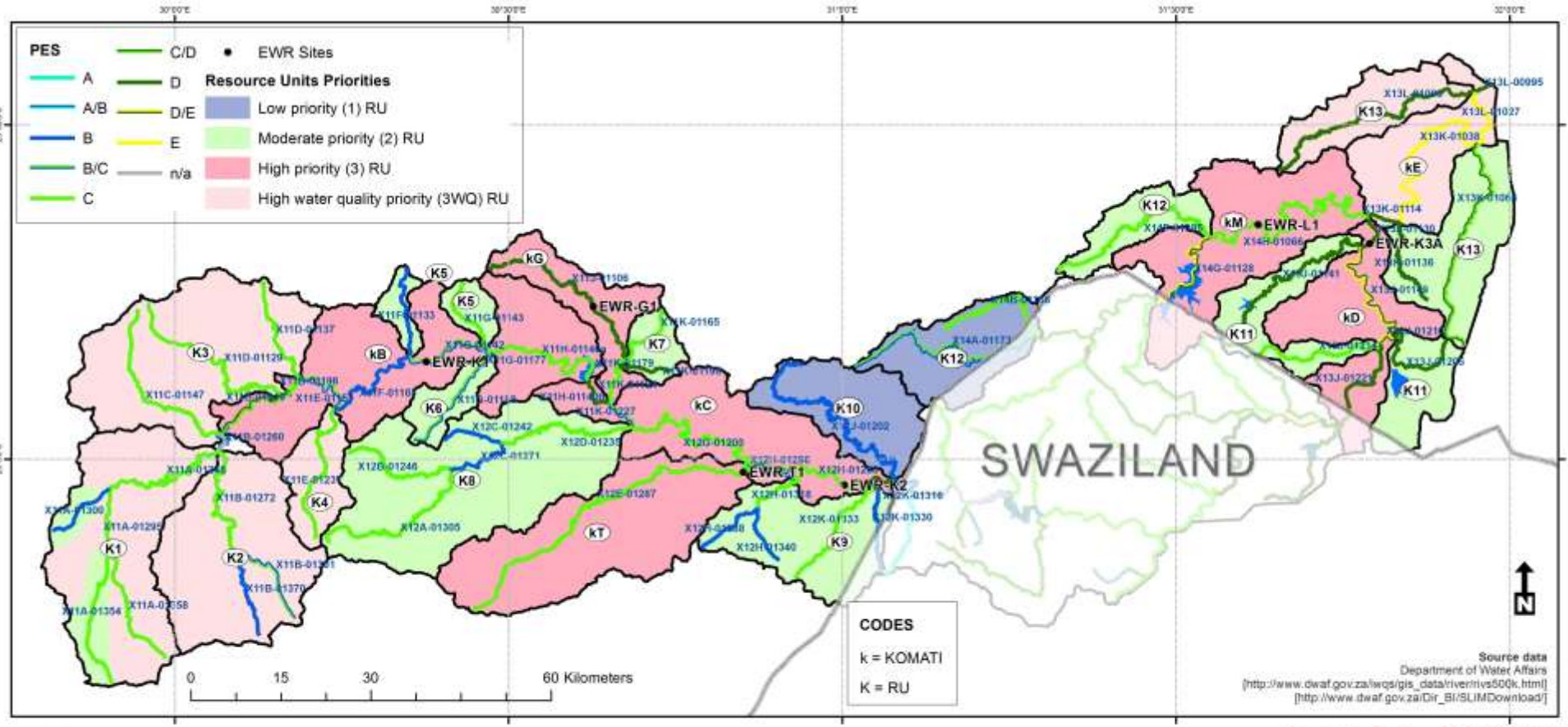
Examples of subcomponents indicator

Riparian EC
Aerial cover
% aliens

Fish EC
Sp
Sp richness
FROC

Nutrient levels
Conductivity
Toxics

PRIORITY RESOURCE UNIT RESULTS: KOMATI (X1)



RESOURCE UNIT PRIORITIES FOR RESOURCE QUALITY OBJECTIVES DETERMINATION

BioGIS
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Coordinate System: GCS WGS 1984
Datum: WGS 1984
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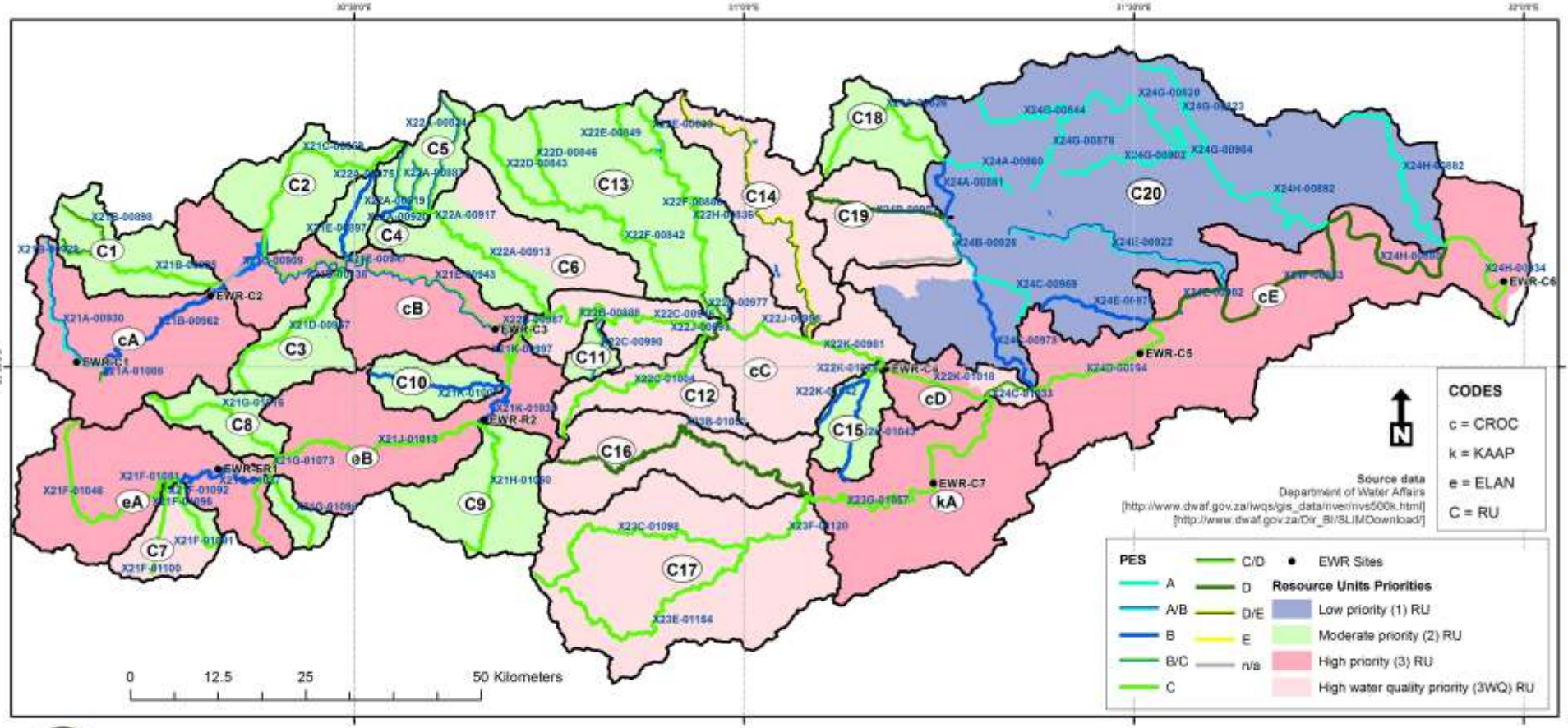
PRIORITY RU RESULTS: CROCODILE (X2)



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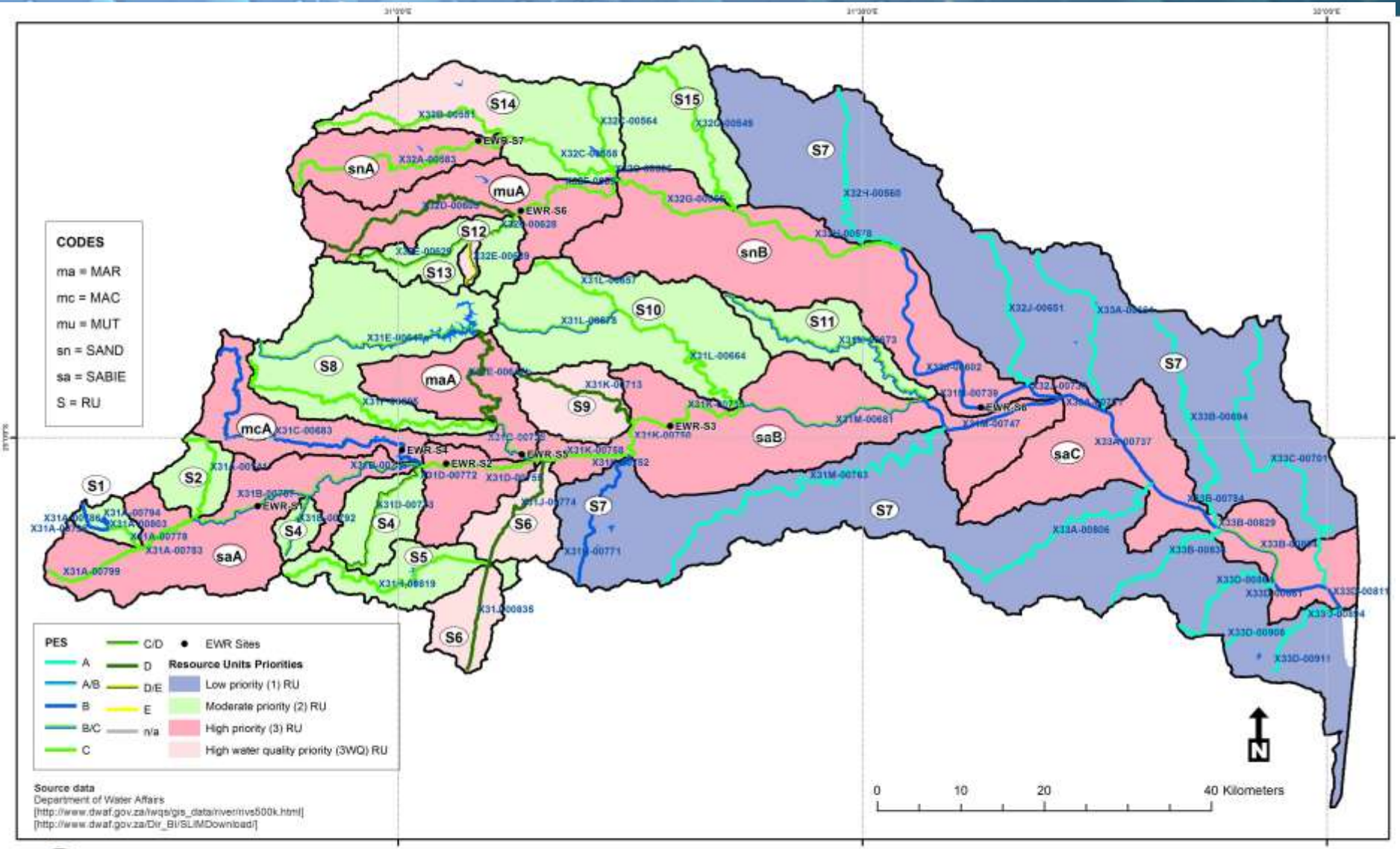
PRIORITY RU RESULTS: SABIE-SAND (X3)



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RQO PRIORITY AND INDICATOR SPREADSHEETS (RIVERS)

RUs	SQ number	River	PES	REC	RU priority rating
IUA 1 AND 2					
RU S2	X31A-00741	Klein Sabie	**C**	**B/C**	**2**
MRU Sabie A	X31A-00778	Sabie			**3**
	X31A-00799	Sabie			
	X31B-00756	Sabie			
	EWR S1	Sabie	**B/C**	**B**	
	EWR S2	Sabie	**C**	**B**	
	X31D-00772	Sabie			
RU S1	X31A-00783		**C**	**C**	**2**
	X31A-00786		**B**	**B**	
	X31A-00794		**B**	**B**	
	X31A-00796		**B**	**B**	
	X31A-00803		**B/C**	**B/C**	

RQO PRIORITY AND INDICATOR SPREADSHEETS (RIVERS)

COMMENTS	Botia, habitat and WQ component indicators	WQ Users	WQ Variables
SERIOUS/ABUNDANT: Forestry. LARGE: Alien vegetation.	1 Riparian vegetation 2. Instream biota 3. water quality	Sabie Town	Nutrients
CRITICAL:Forestry, Roads, Irrigation LARGE: Urbanization, Bed and Channel disturbance, Alien vegetation	All	Sabie Town, irrigation return flows	Nutrients, salts, E coli, toxics
SERIOUS/ABUNDANT: Forestry, MODERATE: Bed and Channel disturbance, Natural areas/nature reserves, Roads	1 Riparian vegetation 2. Instream biota		

These spreadsheets were set up, workshopped with stakeholders, provided to all stakeholders for comments.

Next step was to determine the RQOs

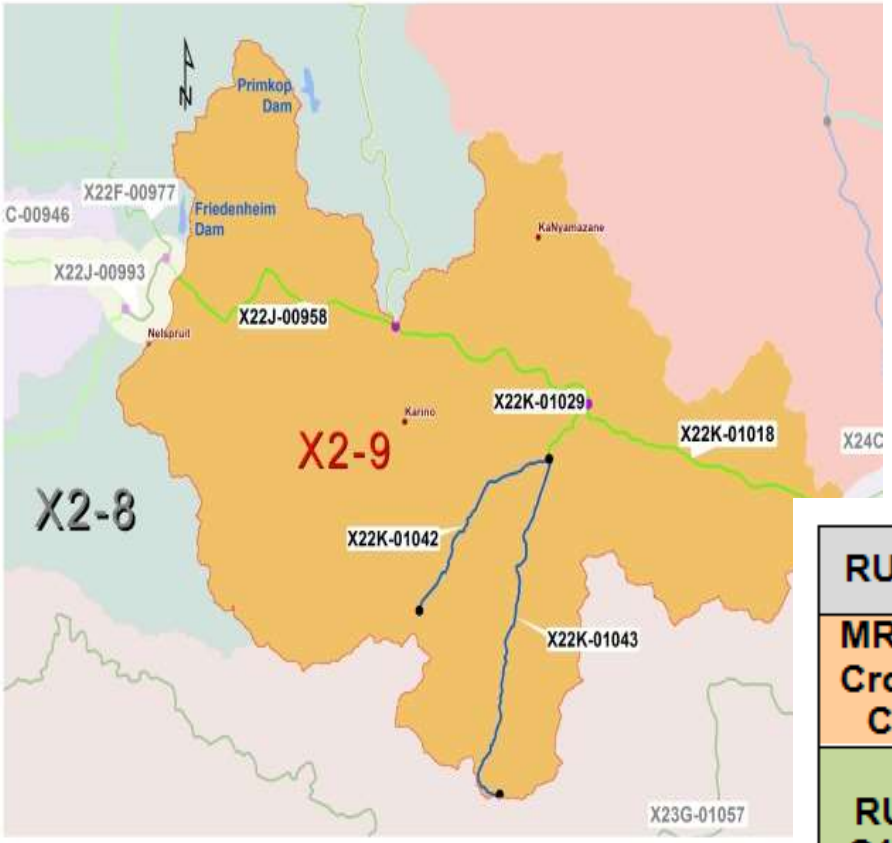
RQO: TECHNICAL INFORMATION (RIVERS)

Draft RQOs provided as a range of tables as part of the infopack. Rivers:

- Hydrology RQOs (Table 1 to 3 (numerical))
- Moderate RUs: Biota, habitat and water quality RQOs (Table 4 to 9) (narrative and numerical).
- High RUs: EcoSpecs (Biota, habitat and water quality) (Table 10 to 12) (narrative and numerical

Detailed numerical RQOs will be provided in a technical report and provided to the PSC for comment.

IUA X2–9, CRODODILE FROM NELS TO KAAP INCLUDING BLINKWATER AND EWR C4 (CROCODILE)



PRIORITY RATINGS

RUs	SQ number	River	PES	REC	RU PR
MRU Croc C	X22J-00958	Crocodile	C	B	3WQ
	X22K-00981	Crocodile	C	B	
RU C15	X22K-01042	Mbuzulwane	B	B	2
	X22K-01043	Blinkwater	B	B	
	X22K-01029	Blinkwater	C	C	
MRU Croc D	X22K-01018 EWR C4	Crocodile	C	B	3WQ 3

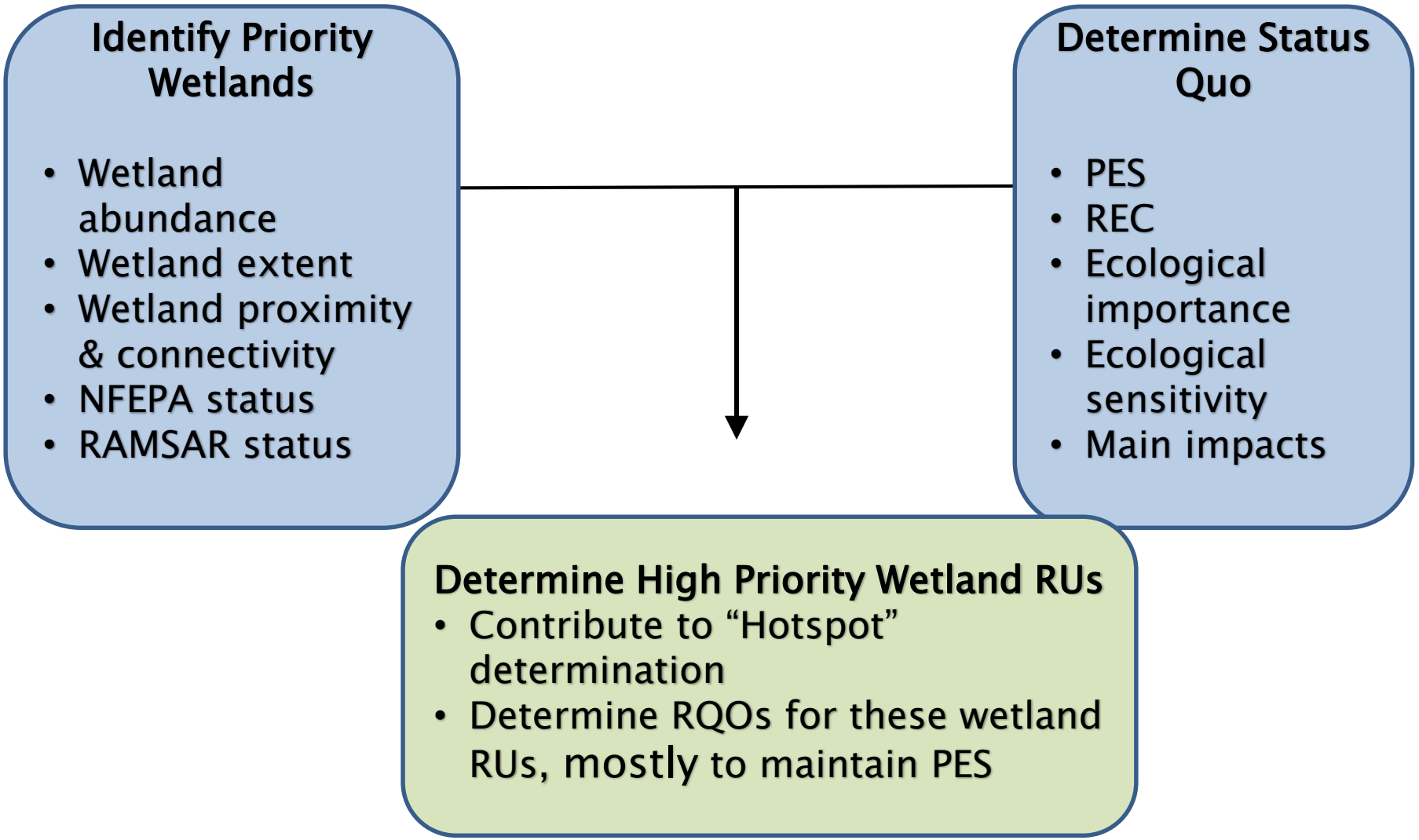
IUA X2-9, RU EWR C4 (CROCODILE)
High priority RU: Water quality RQOs

Comp	Target	Narrative RQO
Geomorph	B/C	Maintain the bed material size distribution & channel/reach type. PES score from the GAI level IV should equal or exceed 81%.
Fish	B	Maintain target EC of B and fish species richness of 20 species. Suitable habitats for shortspine suckermouth (CPRE) and the large semi-rheophilic largescale yellowfish (BMAR).
Inverts	C	Maintain the EC, good SIC, sand and gravel habitat, and marginal vegetation, 1 high flow velocity species
Veg	C	Maintain EC. Maintain woody vegetation cover between 20 - 70%. Maintain non-woody cover above 30%. Maintain reed cover between 10 - 20%. Perennial invasive alien species kept in check (less than 20%). No increase of riparian zone fragmentation. Maintain riparian taxon richness.

IUA X2-9, MRU Croc C (CROCODILE)
High priority WQ: Water quality RQOs

Comp	RQO
Veg	Dominant veg remian woody. No encroachment of agriculture. Alien species invations – small or decrease Longitudinal fragmentation should not increase, plant endemism and taxon richness to be maintained. Viable population of threatened plant species
Fish	Maintain PES, sp richness of 12 sp, and adequate flow during wet season for large semi rheophilic indicator species (BMAR)

WETLAND PROCESS TO DETERMINE HIGH PRIORITY WETLANDS

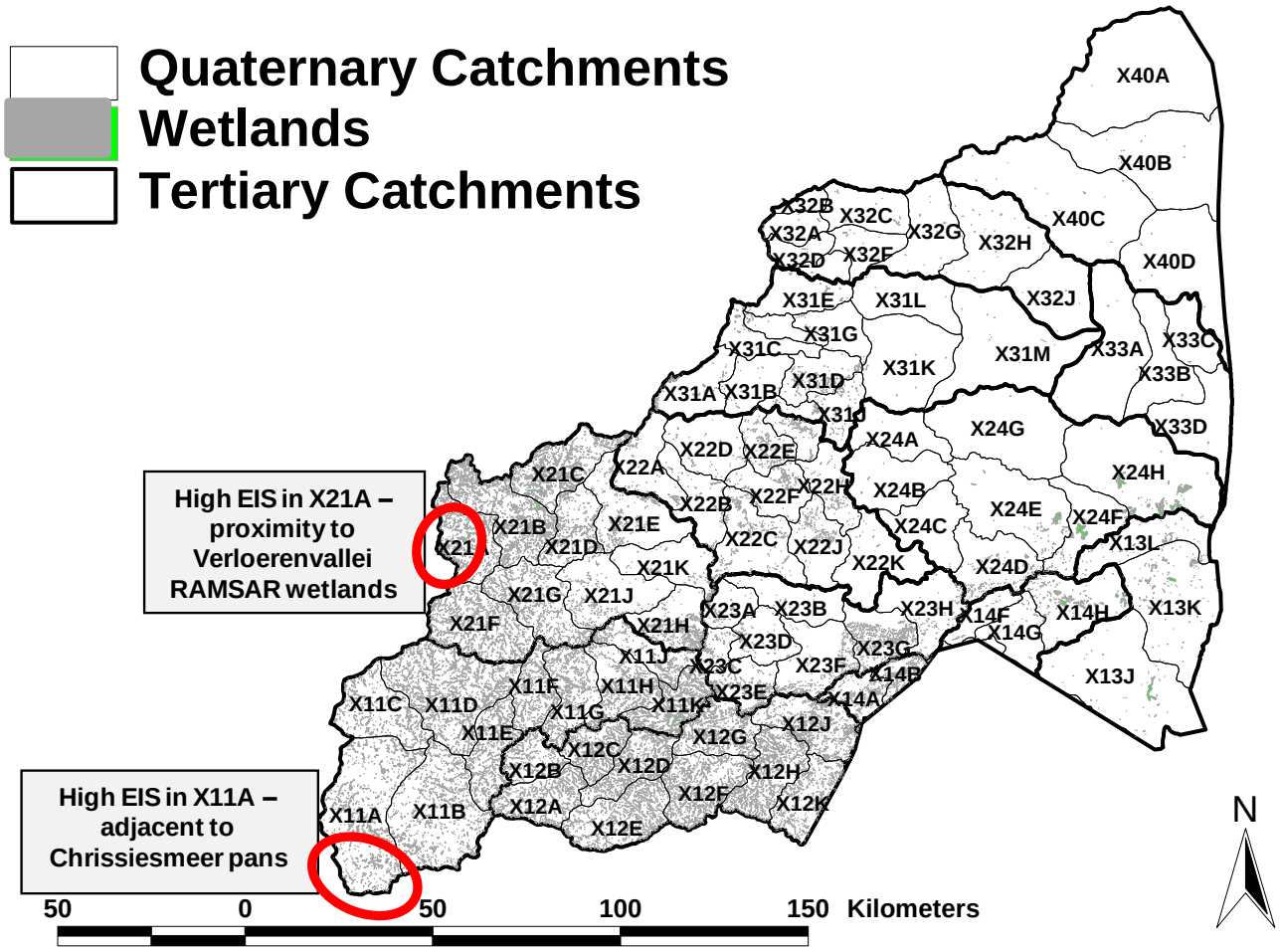


AREAS OF PRIORITY WETLANDSWETLANDS

Two areas of priority wetlands were identified in this study:

- The wetlands around Dullstroom (quaternary catchments X21A, X21B, X21C and X21F) all have High EIS scores and relatively high PES scores. These catchments are part of the Escarpment WRU and are located close to the RAMSAR Verloeren Vallei wetland complex.
- Wetlands of the Highveld WRU (X11A, X11B, X11C, X12A, X12B and X12E) generally have High EIS and Moderate PES scores. Of particular importance are the wetlands near the Chrissiesmeer Lake system – a dense grouping of pans in the headwaters of the Inkomati, Vaal and Usutu Rivers provides unique wetland habitats for birds and other fauna, and has a strong recreational and conservation value.

AREAS OF PRIORITY WETLANDSWETLANDS



WETLANDS GENERIC RQOs

- No increase in wetland fragmentation.
- Maintain species composition and vegetative cover.
- No increase in the cover or abundance of woody invasive alien species.

Narrative RQOs for priority wetlands:

RUs	SQ number	Target EC	Wetland RQO
			X1-3
RU K1	**X11A-01354**	**C**	Maintain C EC
	X11A-01248	**C**	Cessation of land use encroachment on pans, seeps and channelled valley bottom wetland
RU K2	**X11B-01272**	**B/C**	**Improve to B/C by increasing buffer zones where wetlands are not artificial.** Cessation of land use encroachment on non-artificial channelled valley bottom wetlands.
			X1-3
RU K3	**X11C-01147**	**C**	Maintain C EC.
	X11D-01129	**C**	Cessation of land use encroachment on pans, seeps and non-artificial channelled valley bottom wetlands.
RU K4	**X11E-01237**	**B**	Maintain wetland EC of B/C. Cessation of land use encroachment on channelled valley bottom wetlands.
RU K5	**X11G-01143**	**C**	Maintain wetland EC of C. Cessation of land use encroachment on seeps.

Narrative RQOs for priority wetlands:

RUs	SQ number	Target EC	Wetland RQO
X1-6			
RU K8	X12A-01305 X12C-01271	B B	Improve the first SQ to a B by removing alien species in the riparian zone.
	X12D-01235	B/C	Cessation of land use, urban and forestry encroachment on seeps and channelled valley bottom wetlands
X1-9			
RU K11	X13J-01205	D	Maintain wetland EC of D. Cessation of land use and agricultural encroachment on floodplain and non-artificial channelled valley bottom wetlands.

Narrative RQOs for priority wetlands: Crocodile

RUs	SQ number	REC	Wetland RQO
			IUA 1
MRU Croc A	X21A-	B/C	Off-channel wetlands generally in better well as those in Verloren Valei Nature Reserve. wetlands, improve to a B by improving wetland buffers, remove alien woody species in wetlands, no more dams and rehabilitate those not in use, reduce amount of dams if possible. Cessation of land use and forestry encroachment on wetlands
RU C1	X21B- X21B-	C C	See above
RU C2	X21C-	C	Improve to a C by improving buffer zones for wetlands especially with reference to agriculture. Cessation of land use and forestry encroachment natural wetlands.

Narrative RQOs for priority wetlands: Crocodile

RUs	SQ number	REC	Wetland RQO
IUA 3			
MRU Elan A	X21F-01046	B/C	**Improve to a B/C by removing agriculture from wetland areas.** Cessation of land use and agricultural on natural wetlands (seeps and channelled valley bottom).
IUA 8			
RU C12	X22C-	B/C	**Improve to a B/C by removing agriculture from wetland areas.** Cessation of land use and forestry encroachment natural wetlands (seeps and channelled valley bottom).
RU C14	X22H-	D	Maintain EC of a D. Cessation of farm dam construction
IUA 10			
RU C17	X23E-	B/C	Maintain EC of a B/C. Cessation of forestry encroachment on seeps.

Narrative RQOs for priority wetlands: Sabie-Sand

RUs	SQ number	REC	Wetland RQO
IUA 7			
MRU Mut A	X32D-00605 (EWR S6)	**C**	**Improve to a C by improving wetland buffers and reduce overgrazing**
IUA 8			
MRU Sand A	X32A-00583 (EWR S7)	**C**	**Improve to a C by improving wetland buffers and reduce overgrazing**
RU S14	X32B-00551	**C**	Maintain wetland EC of C. Cessation of land use encroachment on channelled valley bottom wetlands.

END