

**Determination of Ecological Water Requirements
for Surface Water (Rivers, Estuaries and
Wetlands) and Groundwater in the Lower Orange
WMA: WP10974**

7 June 2017

**SCENARIO EVALUATION AND
RECOMMENDATIONS:
7.1 DESCRIPTION OF SCENARIOS**

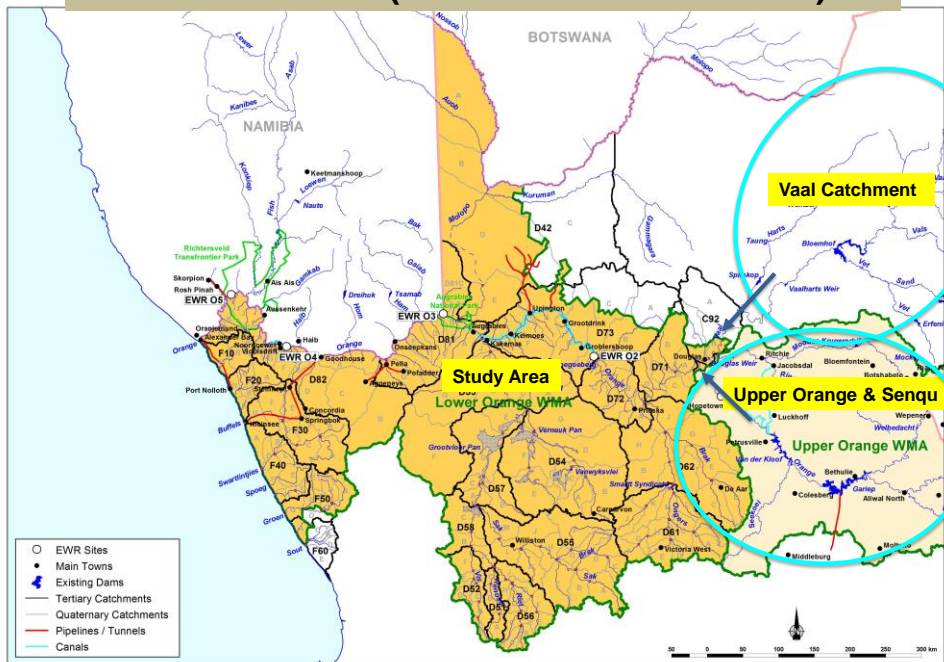
Manie Maré: WRP

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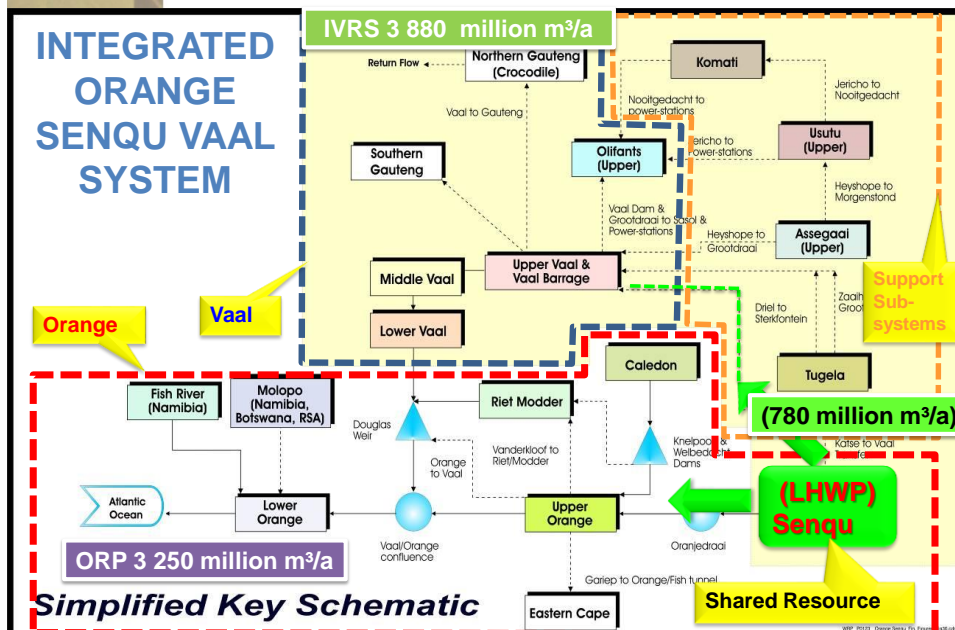
**SCENARIO DEFINITION – WATER
RESOURCE MANAGEMENT AND
PLANNING CONTEXT**

- Scenarios in this context are:
 - Plausible definitions of all factors that influence Water Balance and Water Quality in catchment & system as a whole
- The scale of the analysis
 - Requires the aggregation of land use effects
 - Individual & localised small scale developments will not significantly influence the study results

STUDY AREA (LOWER ORANGE WMA)



LOWER ORANGE UPSTREAM RESOURCES



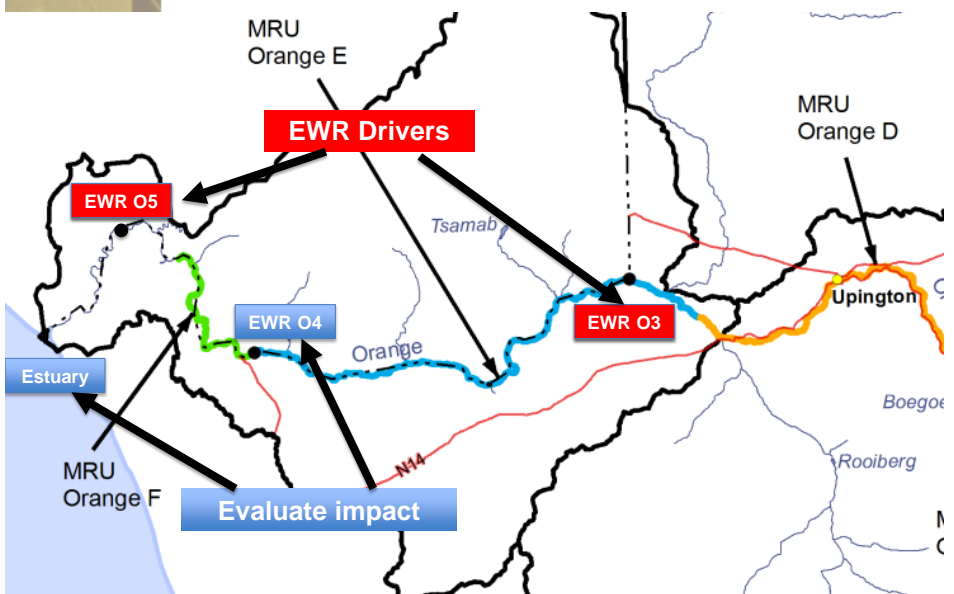
SCENARIO MATRIX

Sc	Scenario Variables						Ecological Water Requirements			Comment
	Development Horizon (year)	Limit operational losses	Adjust VanderKloof Dam's storage capacity	Poihlali Dam	Vlootsdriif/Noordoever Dam	Verbeedingskraal Dam	EWRO3 Augrabies	EWRO5 Sendelingsdriif	Estuary	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)		
A	2016 ⁷	N	N	N	N	N	-	-	Current (ORRS)	←
A2	2016 ⁷	N	N	N	N	N	Monitor	ORRS/REC 3 scaled ¹	Monitor	Rec at EWR 5 scaled according to ORRS
A3	2016 ⁷	N	N	N	N	N	Monitor	ORRS/REC 3 scaled ¹	Monitor	Scen A2 with current Namibian allocations resulting in an increase of 92.9 million m ³ /a (A2 was with current Namibian use)
B	2035	Y	Y	Y	Y	Y	-	←	Current (ORRS)	With Namibia 2035 ⁵ demand
C1b	2035	Y	Y	Y	Y	Y	REC (summer low flows only, no winter flows)	REC (excluding high flows)	Monitor	With Namibia 2035 ⁵ demand (ORP System yield reduced by 425 million m ³ /a in comparison with Scenario B)
C2b	2035	Y	Y	Y	Y	Y	REC (excluding high flows)	REC (excluding high flows)	Monitor	With Namibia 2035 ⁵ demand (ORP System yield reduced by 825 million m ³ /a in comparison with Scenario B)
D2	2035	Y	Y	Y	Y (smaller)	Y	REC (excluding high flows)	REC (excluding high flows)	Monitor	With Namibia 2035 ⁵ demand
D2i	2035	Y	Y	Y	Y (smaller)	Y	REC (excluding high flows)	REC (excluding high flows) increase December EWR	Monitor & Improve	With Namibia 2035 ⁵ demand
D2ii	2035	Y	Y	Y	Y (smaller)	Y	REC (excluding high flows)	REC (excluding high flows) increase December and January EWR	Monitor & Improve	With Namibia 2035 ⁵ demand
D3	2035	Y	Y	Y	Y (smaller)	Y	REC (excluding high flows)	REC (excluding high flows) with Class I flood (60m ³ /s releases)	Monitor	With Namibia 2035 ⁵ demand

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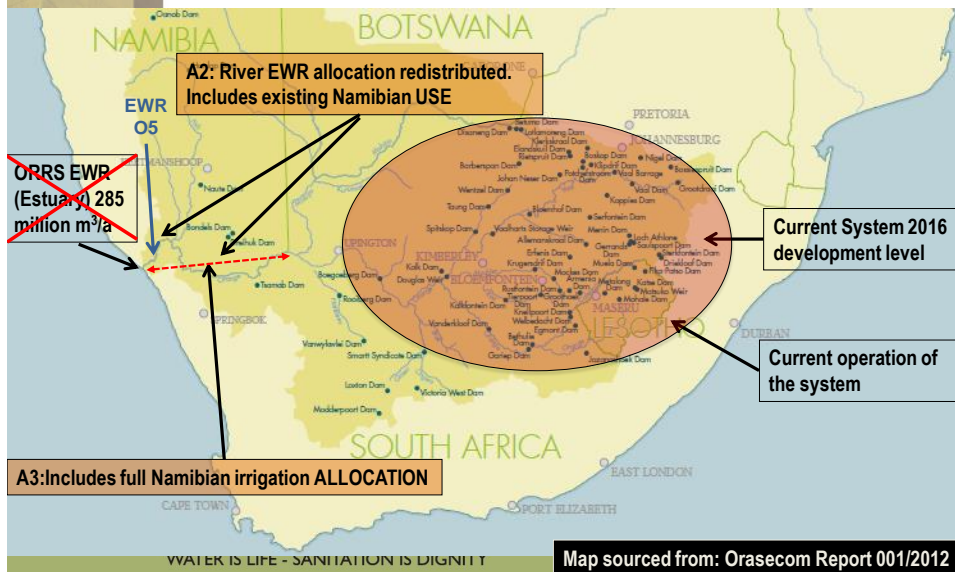
ORANGE RIVER EWR SITE DRIVERS



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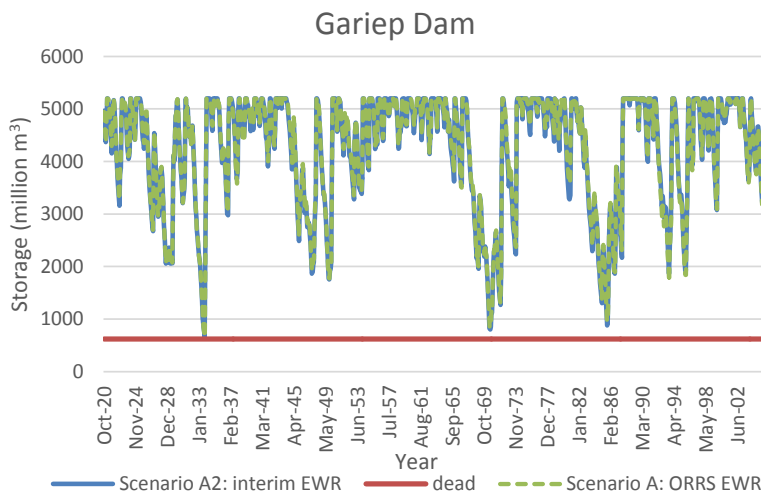
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BASE SCENARIO A & SCENARIOS A2 & A3



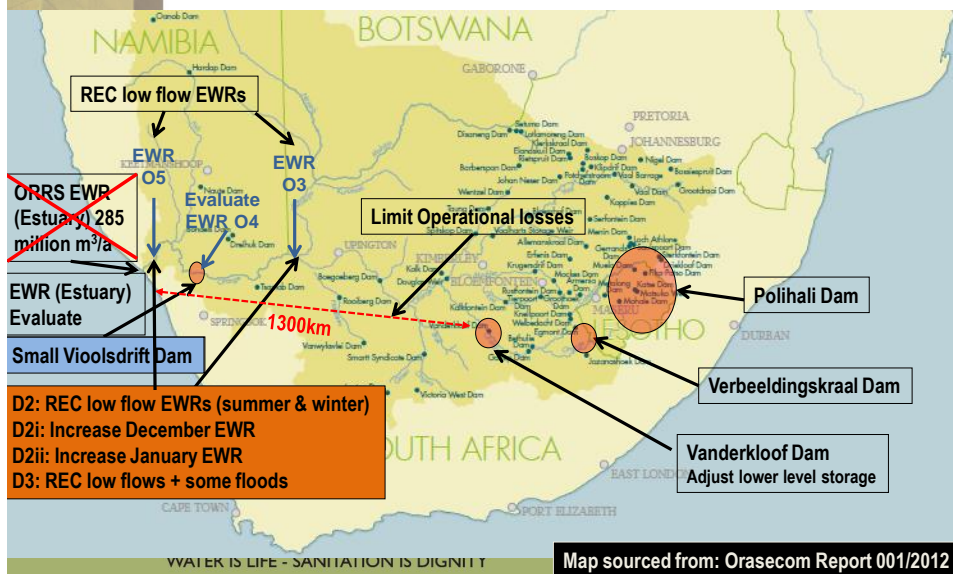
RESULTS

A2: Interim EWR Improvement on ORRS without effect on yield



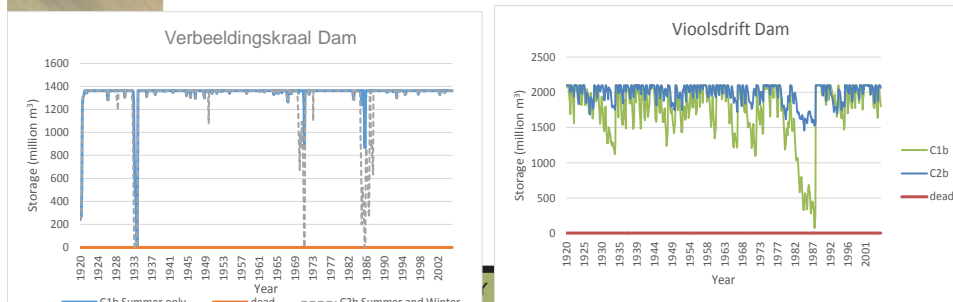
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SCENARIO D2 & D3 2035 Development Level



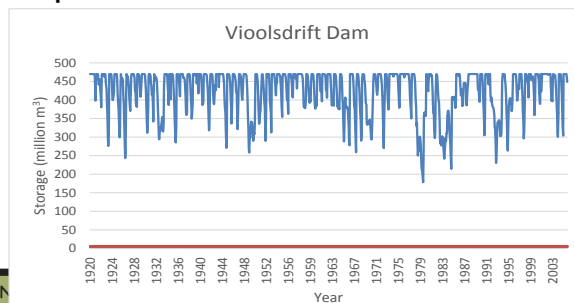
Scenario C : RESULTS

- C1b: EWR 3 (Augrabies summer only) impacts yield of ORP by 425 million m³/a
- C2b: EWR 3 (Augrabies summer and winter) impacts yield of ORP by 825 million m³/a
- EWR 3 (Augrabies summer and winter) places more water into Vioolsdrift which runs fuller and is not sufficiently utilised



Scenario D : RESULTS

- D: A smaller Violsdrift can be used if Augrabies Summer and Winter flows included
- The small additional requests on the dam by the estuary and flood requirements did not make a difference
- Optimization of the size and release rules needs to take place.



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QUESTIONS FOR CLARIFICATION

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