

RESERVE DETERMINATION STUDY FOR SELECTED SURFACE WATER, GROUNDWATER, ESTUARIES AND WETLANDS IN THE F60 AND G30 CATCHMENTS WITHIN THE BERG-OLIFANTS WATER MANAGEMENT AREA (WMA 9)

Implementation Workshop

Presented by: Toni Belcher and Dana Grobler,
BlueScience

Date: 26 July 2023

WATER IS LIFE - SANITATION IS DIGNITY

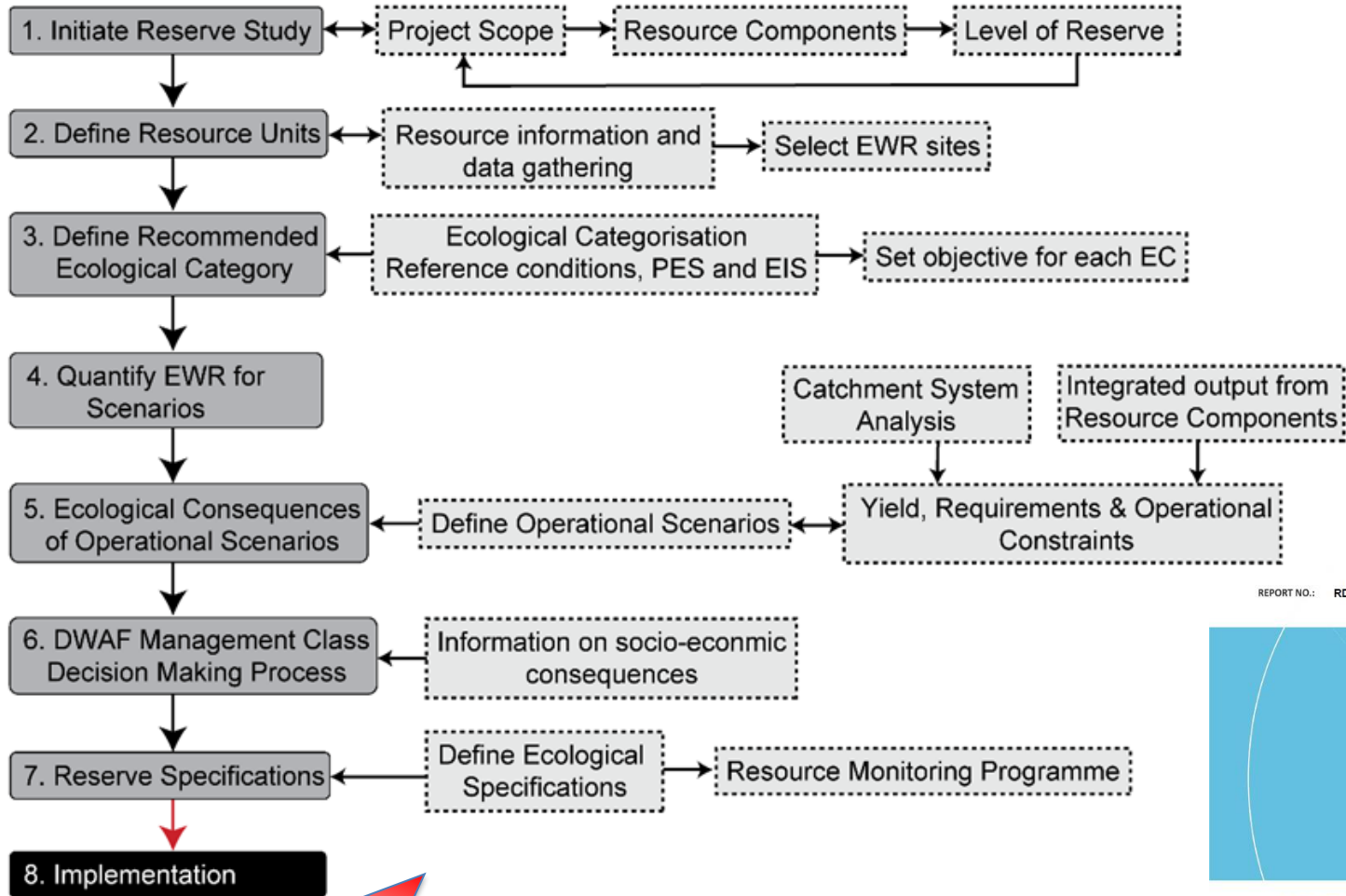


water & sanitation

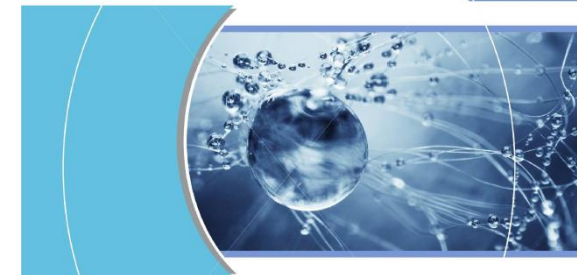
Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA



The Reserve Determination Process



REPORT NO.: RDM/WE/00/CON/ORDM/0117



DEVELOPMENT OF PROCEDURES TO OPERATIONALISE RESOURCE DIRECTED MEASURES

PROJECT NO: WP 10951

MAIN REPORT

FEBRUARY 2017

List of Project Reports compiled in the Study

REPORT INDEX	REPORT NUMBER	REPORT TITLE
1.0	RDM/WMA09/00/CON/0121	Inception Report
2.0	RDM/WMA09/00/CON/0122	Gap Analysis Report
3.0	RDM/WMA09/00/CON/0123	Groundwater Delineation Report
4.0	RDM/WMA09/00/CON/0124	Surface Water Delineation Report
5.0	RDM/WMA09/00/CON/0125	EcoClassification Report
6.0	RDM/WMA09/00/CON/0126	Ecological Water Requirements Report
7.0	RDM/WMA09/00/CON/0127	Scenario Report
8.0	RDM/WMA09/00/CON/0128	EcoSpecifications Report
8.0	RDM/WMA09/00/CON/0129	Groundwater Report
9.0	RDM/WMA09/00/CON/0130	Capacity Building Report
10.0	RDM/WMA09/00/CON/0131	Main Integrated Report and Implementation Plan
11.0	RDM/WMA09/00/CON/0132	Ecological Reserve Implementation Plan
12.0	RDM/WMA09/00/CON/0133	Project Close-Out Report

Study Area

The study area comprises of two Tertiary Catchments:

- The G30 Tertiary Catchment (Sandveld) comprises the seasonal Papkuil, Verlorenvlei, Langvlei, Jakkals and Sandlaagte rivers which flow to the south of the Olifants River Estuary;
- The F60 Tertiary Catchment lies immediately north of the Olifants River Estuary and comprises of the Groot-Goerap/Sout and Brak Rivers.



Key Issues and Challenges

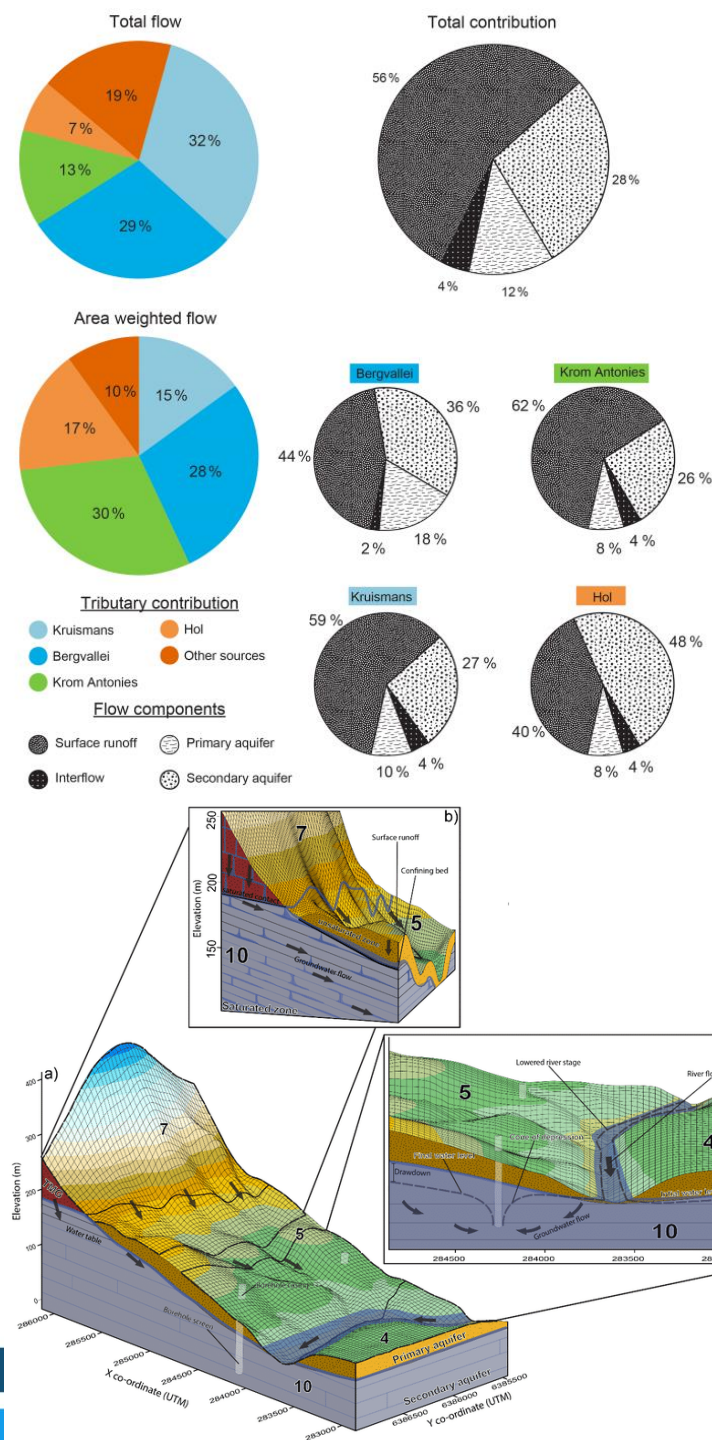
- Lack of data
- Undertaking EcoStatus Assessments during an Extended Dry Period
- Aquatic ecosystems (rivers, wetlands and estuarine habitats) strongly dependent on groundwater
- Highly variable flow and water quality



Project Approach

An adapted approach for the EWR determination to address:

- Surface water features are mostly non-perennial with a highly variable hydrological regime
 - Aquatic biota generally hardy species with low diversity;
 - Very close integration occurs between the surface water ecosystems (rivers, wetlands and estuarine habitats) as well as with the groundwater.
 - Very data poor area – particularly long term data for surface waters and for reference conditions.
- Demands an approach that is strongly reliant on modeling of flows and strong understanding & integration between disciplines
- Needs to link to Water Resource Classes and RQOs



EWR sites

EWR Formal site names	Resource Unit
EWR1 RW-F60A BRAK STRAN	Brak River RU; Lower Brak River VB Wetland RU
EWR2 W-F60A DEPR NUWEB	NW Fynbos depression Wetland RU
EWR3 RW-F60B GRGO KOMKA	Sout/Groot-Goerap River RU
EWR4 W-F60C DEPR ADOON	Knersvlakte depression Wetland RU
EWR5 W-F60E DEPR ELSIE	Sandveld depression Wetland RU
EWR6 RW-G30H SAND HOLLE	Sandlaagte River RU
EWR7 RW-G30G JAKK KOOKF	Jakkals River RU; Lower Jakkals River VB Wetland RU
EWR8 RW-G30F LANG BRAND	Langvlei River RU; Lower Langvlei VB Wetland RU
EWR9 W-G30F WADR WAGEN	Wadrift VB Wetland RU
EWR10 RW-G30D VERL EENHE	Upper Verlorenvlei River RU; Upper Verlorenvlei River VB Wetland RU
EWR11 RW-G30D KROM GOERG	Krom Antonies River RU; Krom-Antonies River FP Wetland RU
EWR12 RW-G30E VERL WITTE	Lower Verlorenvlei River RU; Lower Verlorenvlei River FP Wetland RU
EWR13 W-G30A DUNE FA277	West Strandveld duneslack Wetland RU
EWR14 W-G30A ROSH FA272	Rocherpan Wetland RU
EWR15 RW-G30A PAPK BOOKR	Papkuils River RU; Lower Papkuils FP Wetland RU
EWR16 W-G30A PAPK RIETF	Upper Papkuils seep Wetland RU



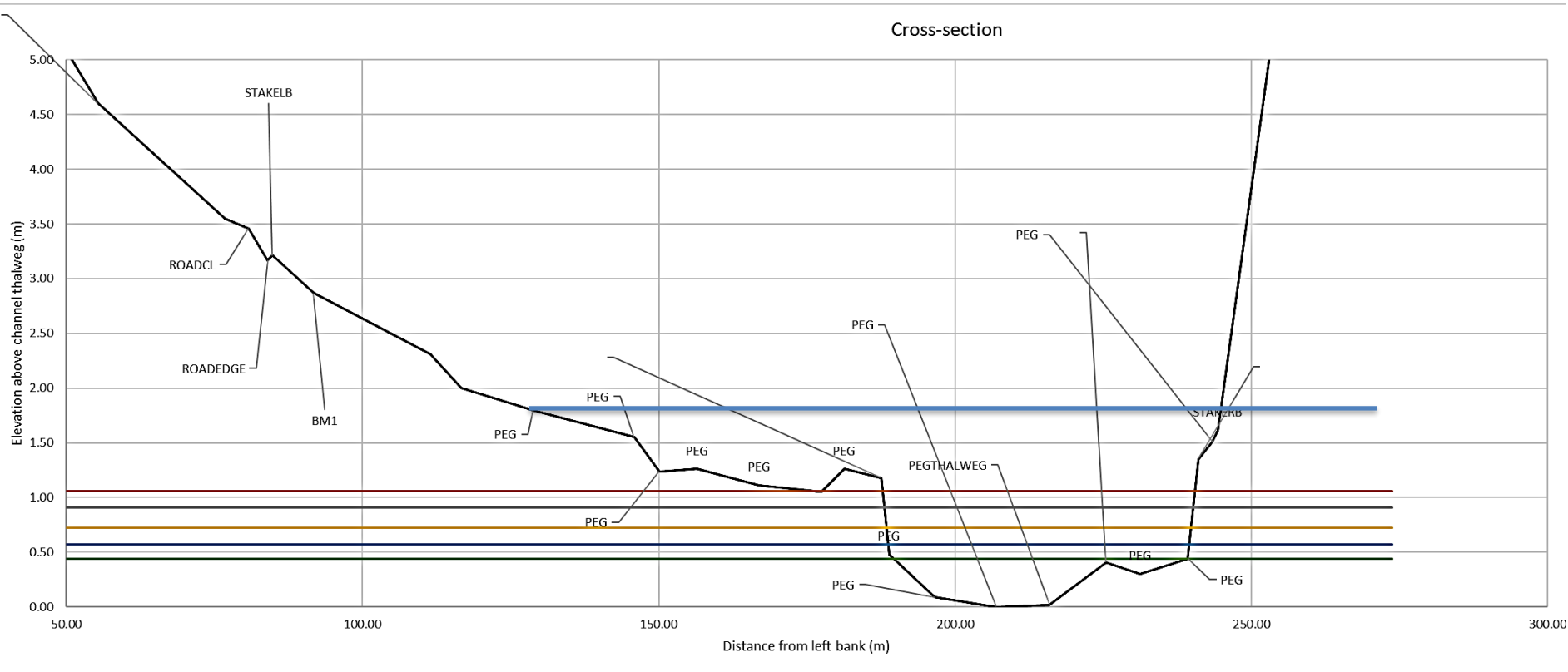
Wet and Dry Season Survey



- 3-7 April 2022
- 5-9 September 2022
- Surveys at selected EWR sites
- Hybrid river wetland assessments for 6 sites
- Wetland assessments at 3 additional sites

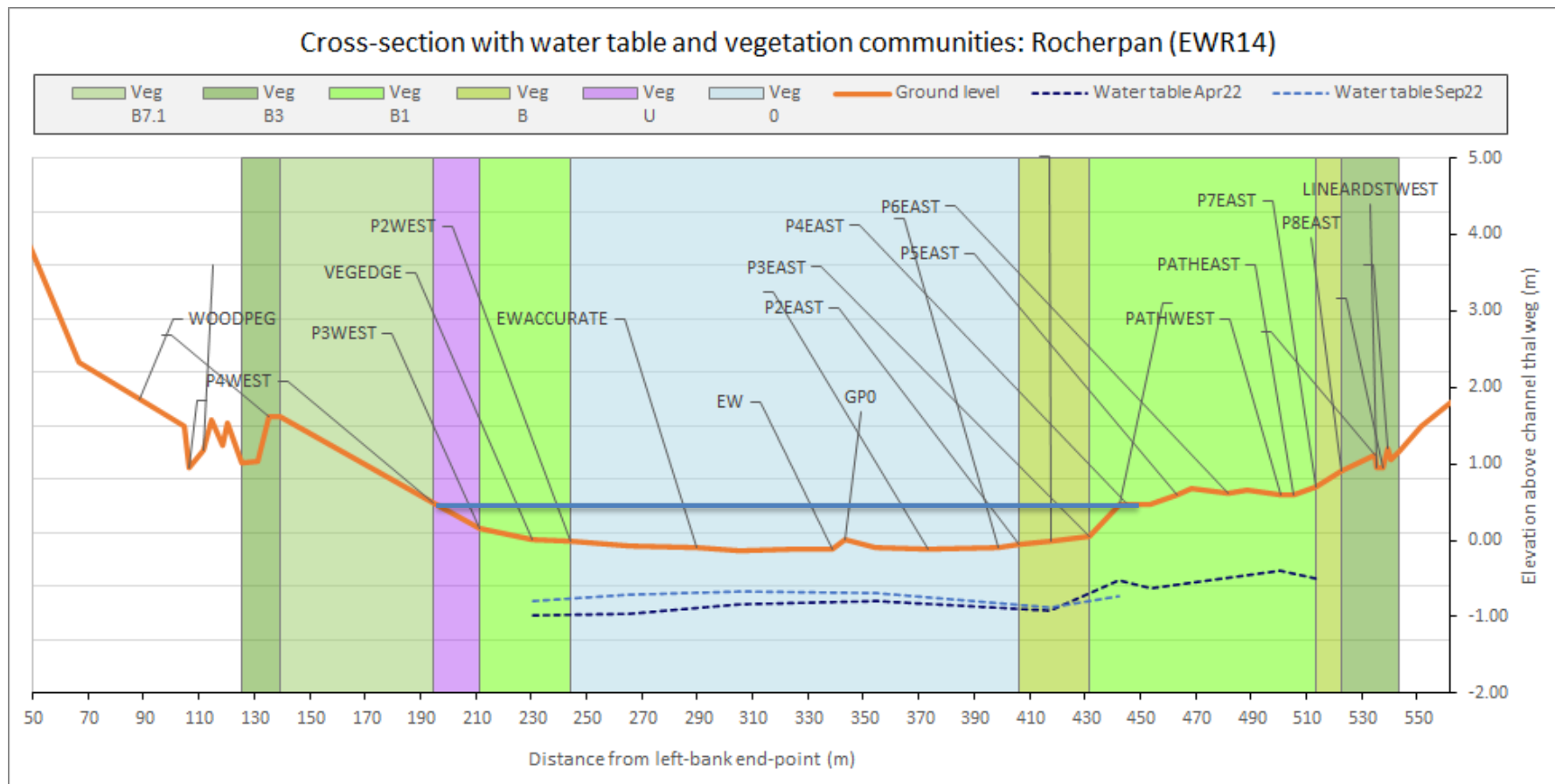
Cross-Section Surveys & Hydraulic Modelling

Lower Verlorenvlei EWR site cross-section



Cross-Section Surveys & Wetland Assessment

Rosherpan EWR site cross-section with vegetation zones and water table



Past water level recordings show inundation of the pan for up to 1m for approx. 5 months of the year (July to November)

River and Wetland Ecoclassification

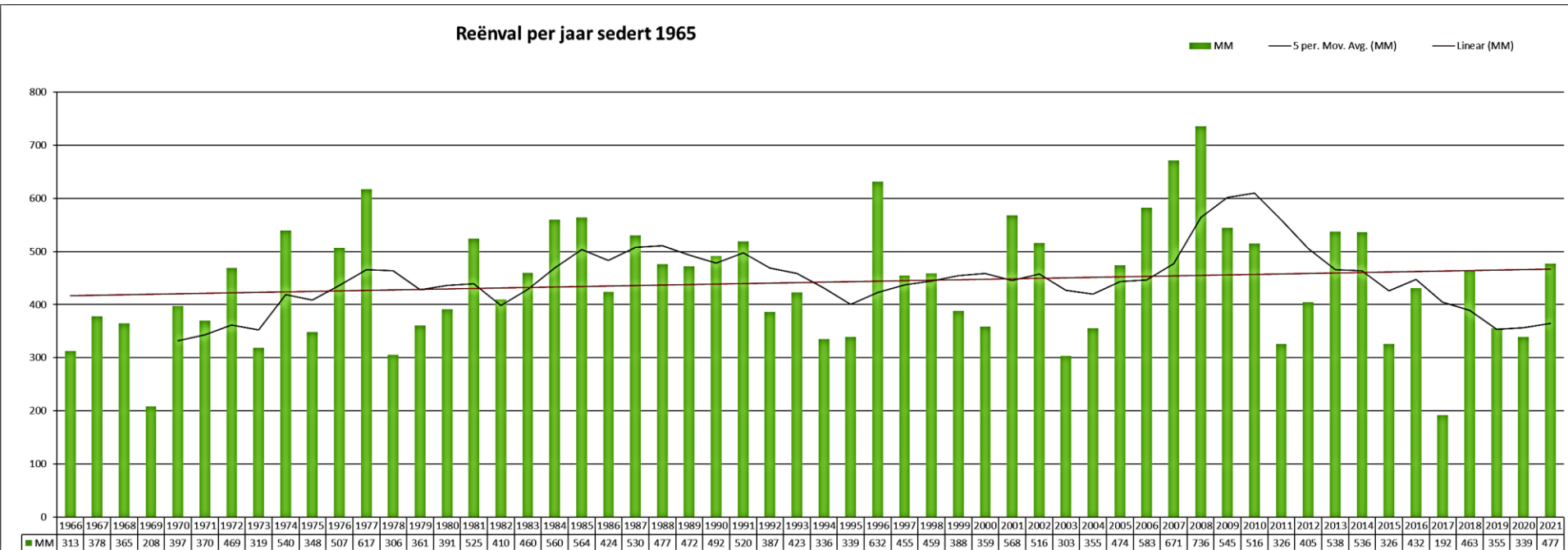
River/ Wetland	Present Ecological Status	Ecological Importance & Sensitivity	Recommended Ecological Category	Attainable Ecological Category	Trajectory of change	Total EWR (% of nMAR)
Jakkals	C/D	Moderate	B/C	C	Negative	45
Langvlei	E	Moderate	D	D	Negative	19
Kruismans	D	High	B/C	C	Negative	40
Krom Antonies	C/D	High	B/C	C	Negative	37
Verlorenvlei	D	High	B/C	C	Negative	37
Papkuils	D	Moderate	C	C	Negative	29
Papkuilsvlei	D	Very High	C	C	Negative	-
Rosherpan	D	Very High	C	C	Negative	-
Coastal duneslacks	D	High	C	C	Negative	-

River and Wetland EWR

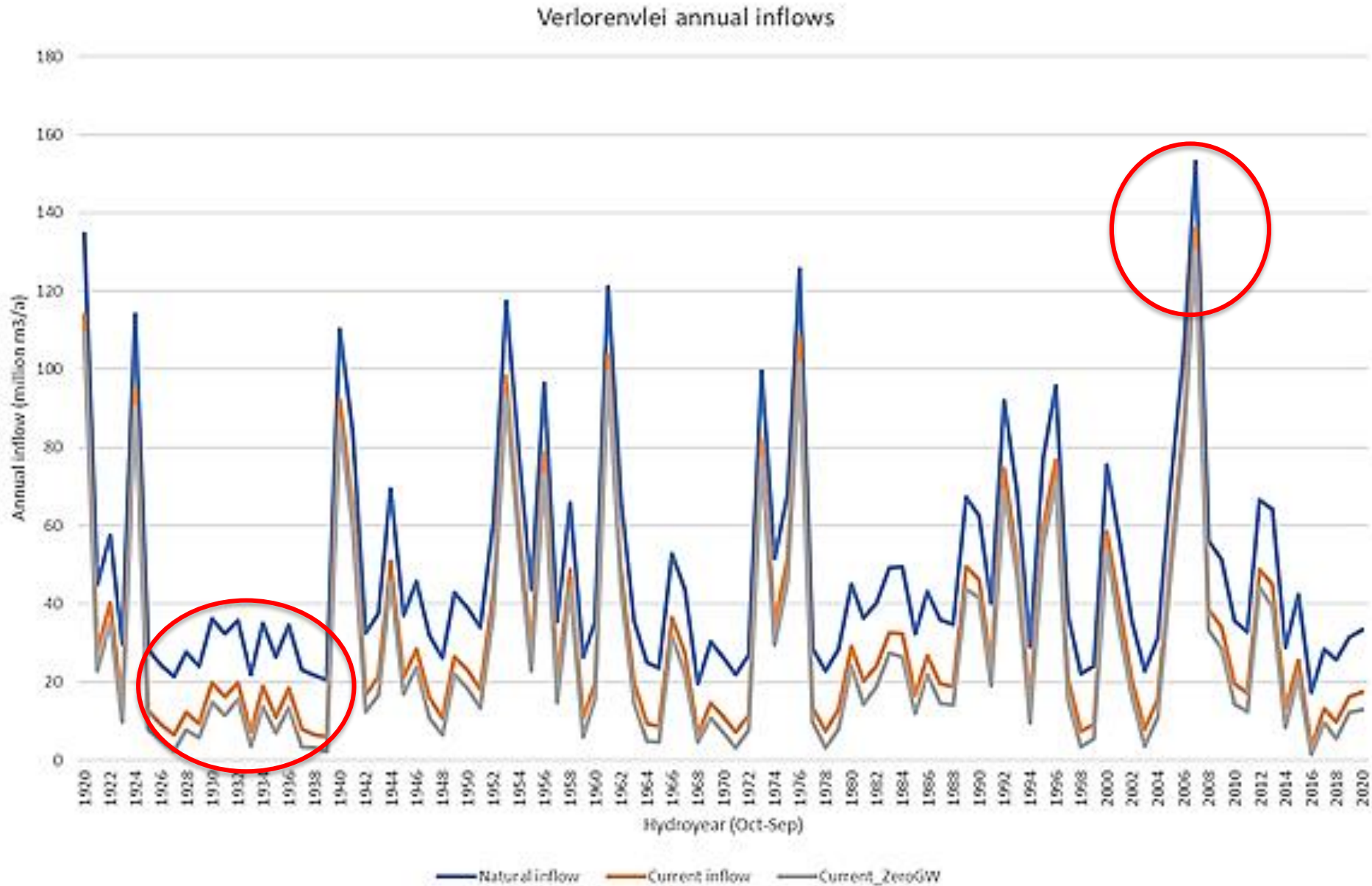
Lower Verlorenvlei: EWR results for PES and REC expressed as a discharge and water level

Month	PES (D)		REC (B/C)		AEC (C)	
	Discharge (m ³ /s)	Depth (m)	Discharge (m ³ /s)	Depth (m)	Discharge (m ³ /s)	Depth (m)
October	1.094	1.060	2.915	1.280	1.905	1.180
November	0.637	0.950	1.353	1.100	0.819	1.000
December	0.183	0.750	0.474	0.900	0.242	0.790
January	0.078	0.640	0.352	0.850	0.175	0.740
February	0.037	0.550	0.24	0.790	0.115	0.690
March	0.022	0.500	0.23	0.780	0.109	0.680
April	0.039	0.560	0.263	0.800	0.127	0.700
May	0.175	0.740	2.424	1.240	1.625	1.140
June	1.061	1.050	5.187	1.430	3.528	1.330
July	1.684	1.150	3.141	1.300	2.053	1.200
August	2.184	1.210	8.538	1.580	5.839	1.470
September	1.987	1.190	3.193	1.300	2.081	1.200

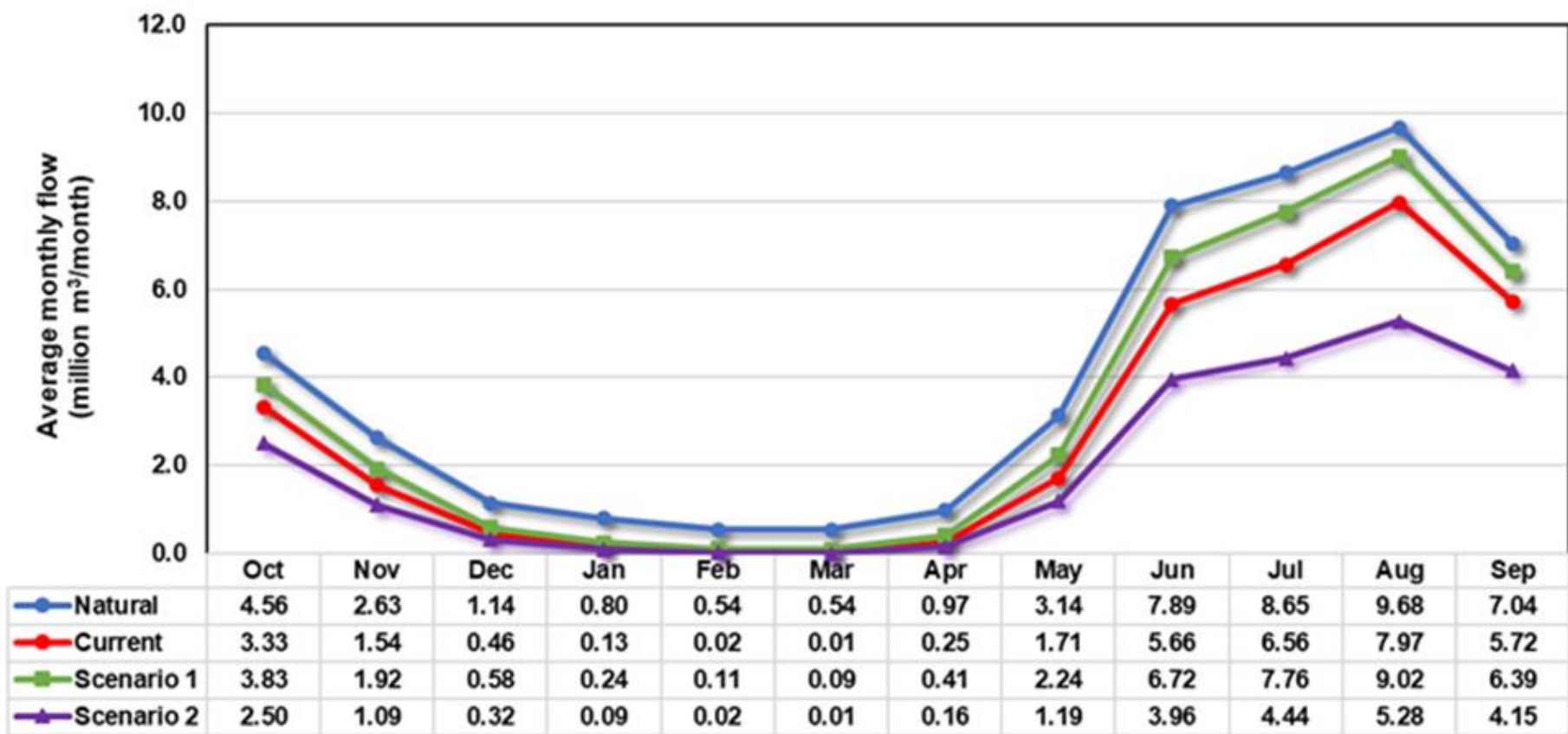
Rainfall measure in the Krom Antonies Valley from 1965



Modelled flow in the Lower Verlorenvlei



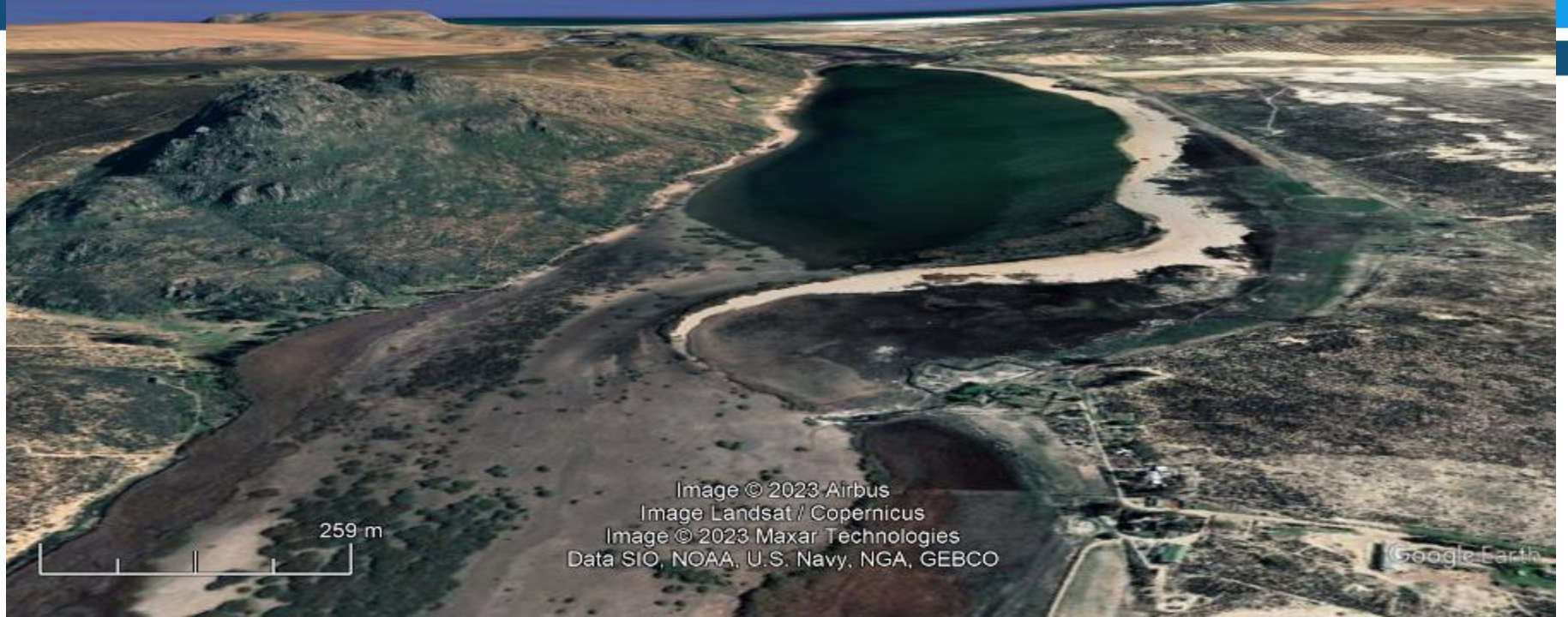
Lower Verlorenvlei River: Modelled Scenarios

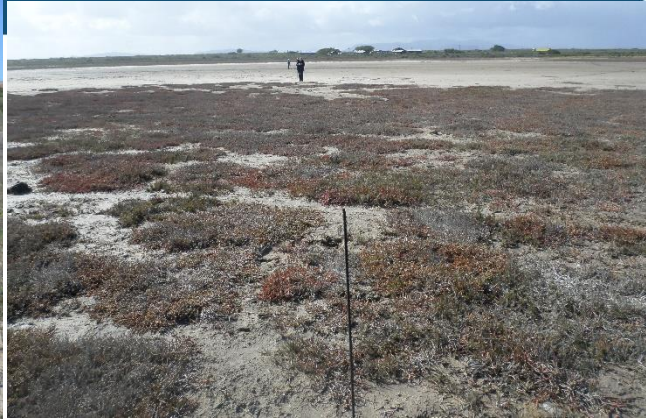


Lessons Learnt and Recommendations

1. Reserve Monitoring, Data and Information: Level of Confidence
2. Dealing with highly variable, sensitive and complex aquatic ecosystems
3. Lumping of Reserve recommendations
4. Need for an adaptive Reserve recommendation
5. Need for better modelling of groundwater contribution to surface water flow
6. Implementation of the Reserve during droughts
7. Current water use in the study area
8. Water resource protection needs to be prioritised in this area
9. The Reserve determination and Implementation Plan is only the start of the process
10. Empowerment of local water resource management







Thank you

