water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

2030 NDP
NATIONAL DEVELOPMENT PLAN
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WP11340: RESERVE DETERMINATION STUDY FOR SELECTED SURFACE WATER, GROUNDWATER, ESTUARIES AND WETLANDS IN THE F60 AND G30 CATCHMENTS WITHIN THE BERG-OLIFANTS WATER MANAGEMENT AREA (WMA9)

PSC Meeting

Hydrology Progress

21 July 2022



Contents

- Rainfall data
- Flow data
- Land use
- Catchment delineation
- Modelling approach
  - Calibration / validation

Rainfall Data

- Rainfall data sourced from SAWS for the study area for selected stations up to September 2021
- Rainfall data will be used in the rainfall-runoff modelling to extend the hydrology to 2020/2021.
- WR2012 hydrology period 1920-2009

Flow Data

- No active streamflow gauges in the study catchment
- G3H001 Kruismans River: 1970-2009
- G3H005 Hol River: 1973-1981 (No data available)

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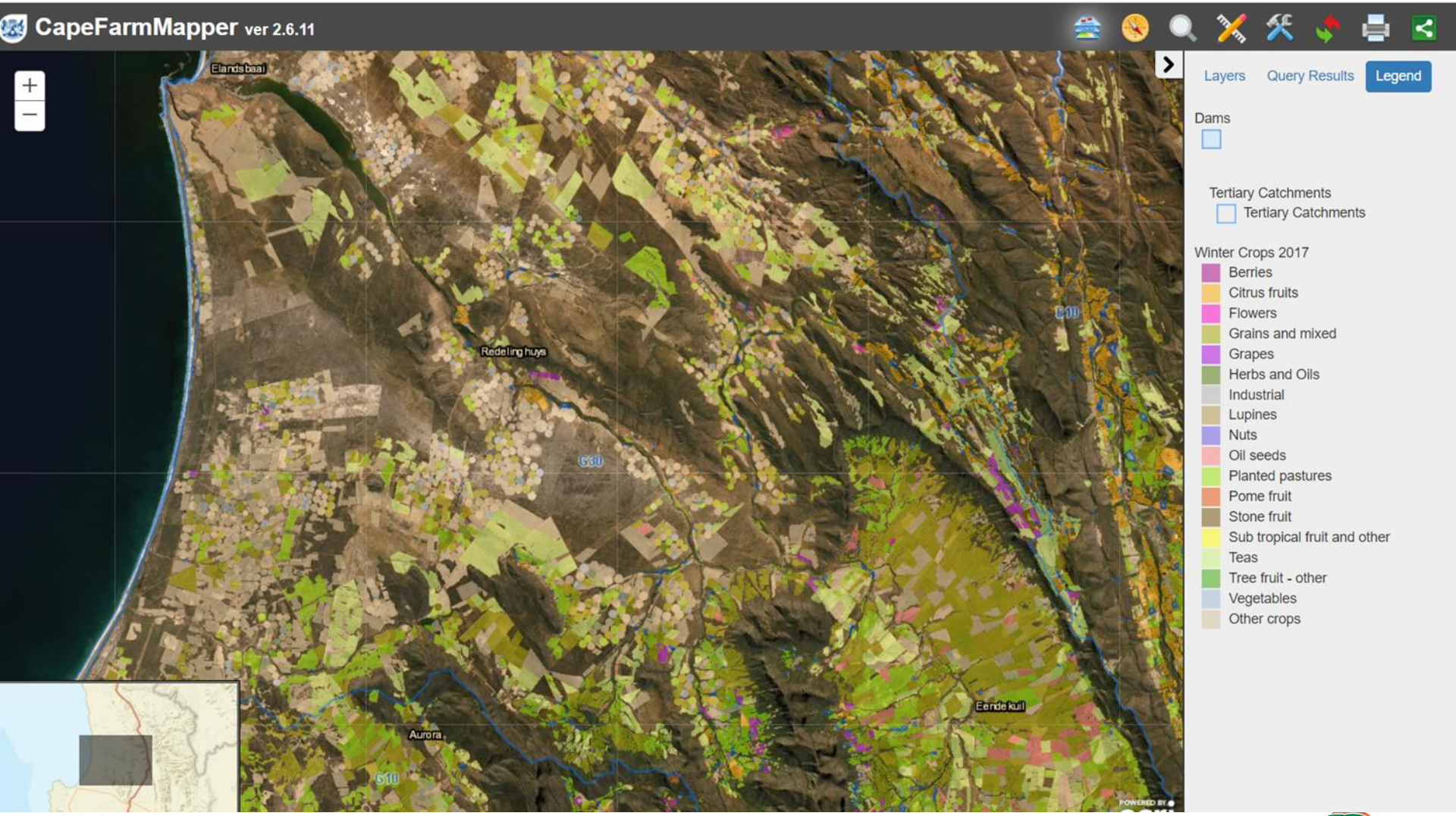
Stations in drainage region F

Station No	Place	Catchment Area(km²)	Latitude	Longitude	Data Available
F5H001	Swart-Doring River @ Bruintjieshoogte	2349	-30.82412	18.11771	1967-04-26 to 2022-05-11
F5H002	Kys River @ Leliefontein	233	-30.44025	17.98104	1990-04-20 to 2022-03-30

Stations in drainage region G3

Station No	Place	Catchment Area(km²)	Latitude	Longitude	Data Available
G3H001	Kruismans River @ Tweekuilen	647	-32.60194	18.74972	1970-04-01 to 2009-05-07
G3H005	Hol River @ Wittewater	86	-32.65153	18.63549	1973-04-12 to 1981-12-01

Land use data



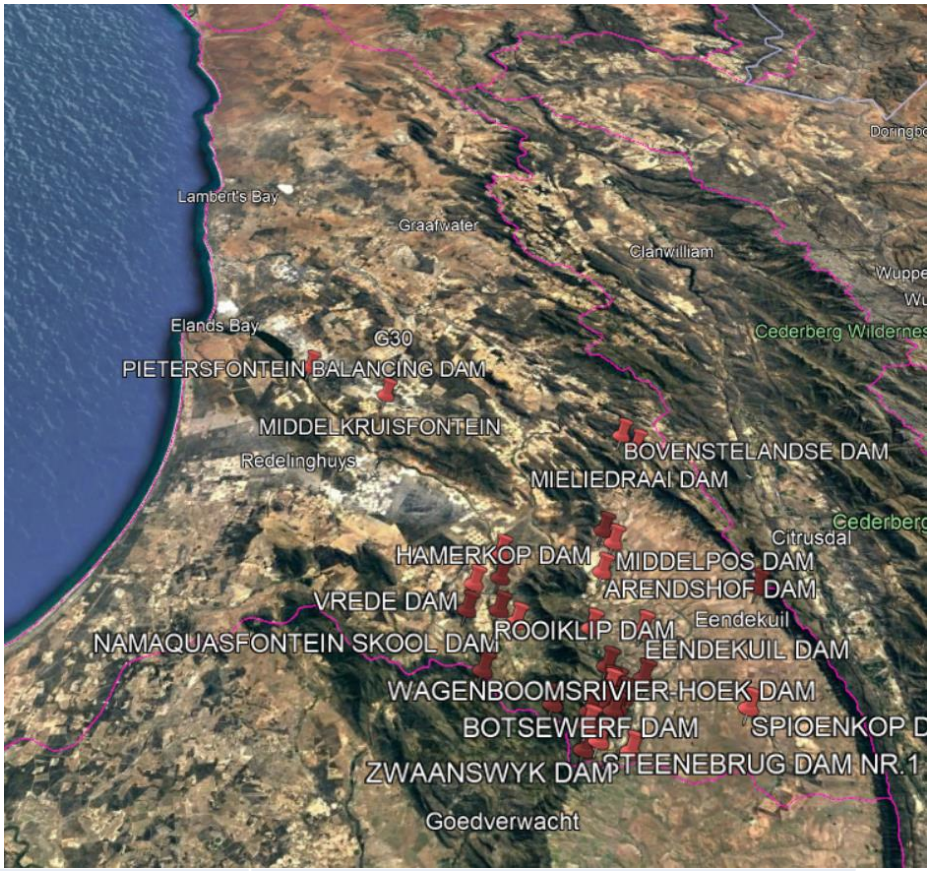
Land use data

- Agriculture – DoA crop census

Crop type	G30A	G30B	G30C	G30D	G30E	G30F	G30G	G30H
Beans (late)		0.01				0.02		
Berries								
Brassicas		0.16	0.39	0.02	0.39	0.70	0.66	0.13
Carrots					0.93			
Citrus		1.74	6.25	3.37	0.57	1.60	0.75	
Cucurbits		0.14	0.12	0.16			0.01	
Deciduous	0.18	0.45	2.43	0.84		0.18	0.02	0.00
Fallow / Weeds		0.32	0.14	0.40	0.26	0.29		
Lucerne (frost-free)	0.07	0.23	0.23	0.60	0.18	0.13	0.19	0.16
Maize (late)	2.28	0.65	0.07	1.89	0.66	2.32	1.58	1.22
Nuts		0.08				0.01		
Onions	0.25			1.02	1.71	0.46	0.07	0.15
Others						0.58		
Pasture	0.88	0.13	0.21	2.25		1.00	0.08	0.21
Peas								
Potatoes (mid)	3.29	0.04	0.43	3.59	0.95	12.32	3.11	0.66
Table Grapes	0.00	2.15	0.12	2.05				
Wheat	3.01	0.40	0.96	1.73	0.23	6.62	0.91	
Wine grapes intensive	0.39	3.15	3.77	0.78		0.08	0.43	0.80
Grand Total	**10.34**	**9.65**	**15.12**	**18.70**	**5.87**	**26.31**	**7.81**	**3.34**

Land use data

- Registered dams (DWS, 2019)

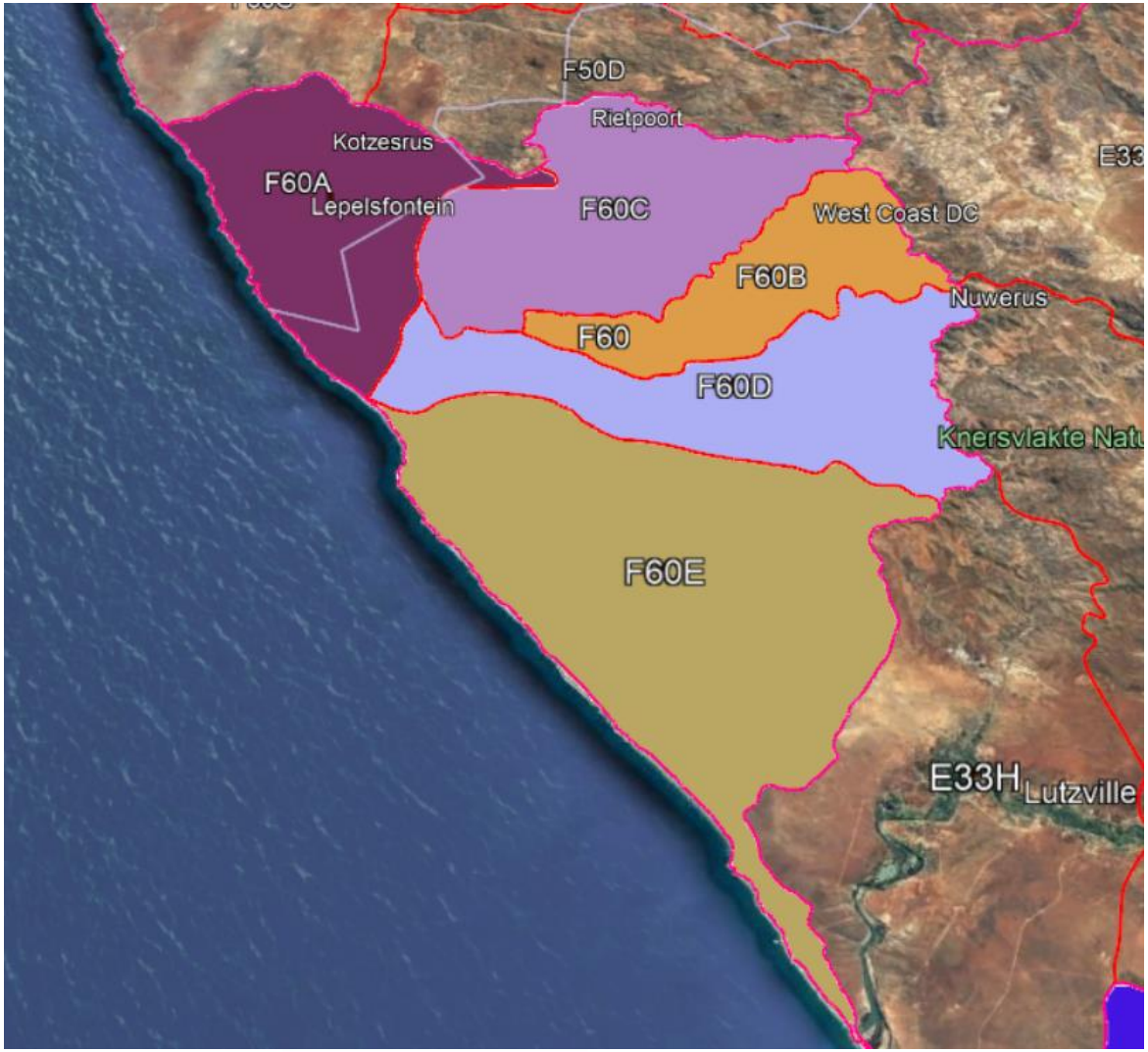


Quaternary catchment	Combined capacity (million m3)	Combined surface area (km2)	Number of registered dams (DWS, 2019)
G30B	5.107	1.054	22
G30C	0.443	0.1	2
G30D	1.413	0.26	9
G30E	0.063	0.02	2
Grand Total	**7.026**	**1.434**	**35**

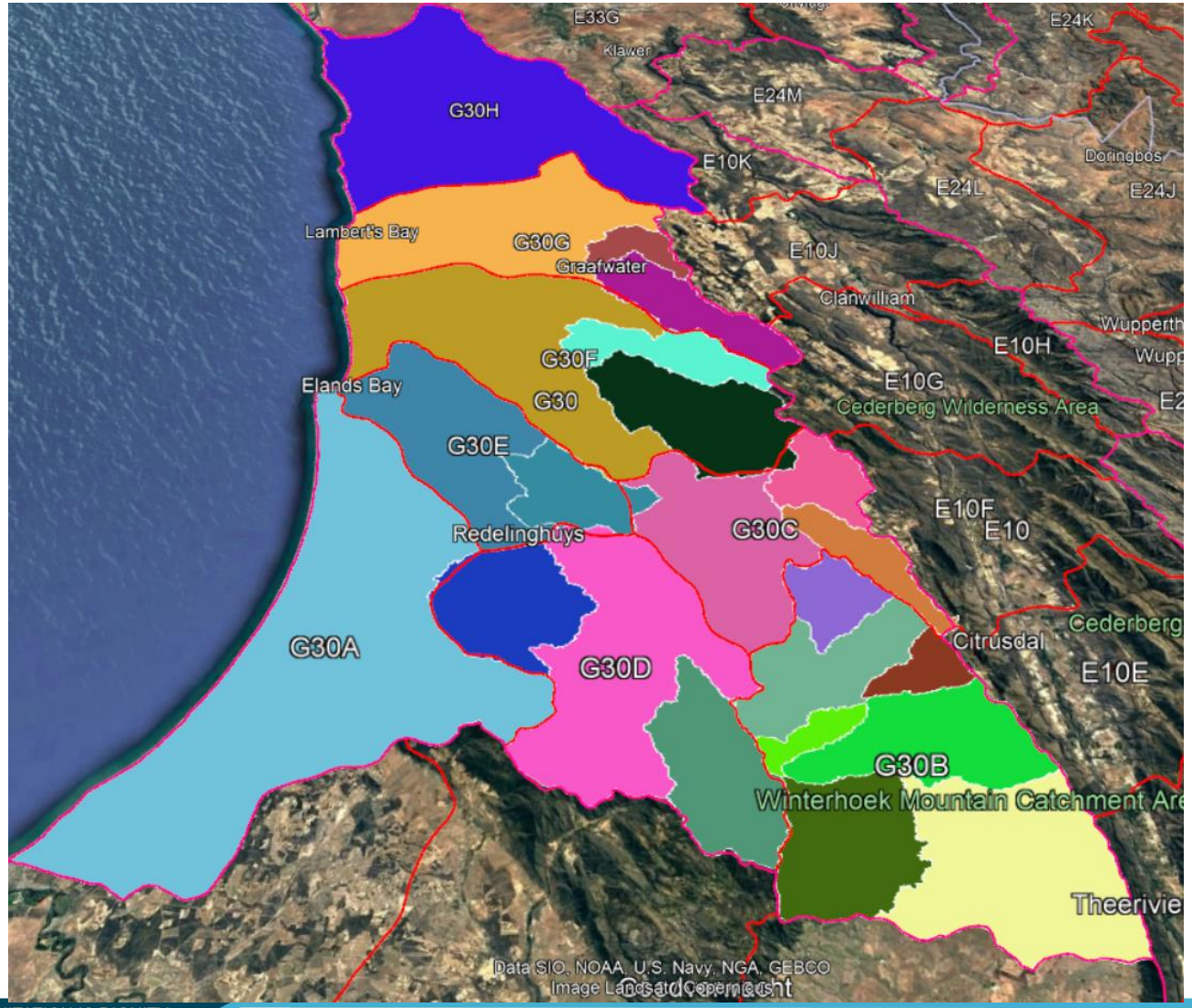
Catchment delineation

- Quaternary catchments sub-divided according to significant tributaries, EWR sites, hydrological characteristics, GW-SW interactions and characteristics
- Preliminary delineations shown in following slides

Catchment delineation (F60)



Catchment delineation (G30)



Modelling approach

- Simplified configuration to account for GW contributions via recharge as a % of rainfall on the catchment area.
- Assume large proportion of water use comes from groundwater resource except in Kruismans, Hol and Krom Antonies catchments where surface water runoff is more significant.
- Validation on proportion of baseflows to surface water from reference gauges if available, or expert knowledge and anecdotal evidence, as appropriate.
- Configure study sub-catchments in SPATSIM for natural and current day conditions to generate monthly time series of flows.

Thank You!