water & sanitation
Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

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

16 November 2016

RAPID EWR ESTIMATES FOR ORANGE TRIBUTARIES AND OTHER RIVERS

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WATER IS LIFE, SANITATION IS DIGNITY

EWR assessments: WHERE DOES IT FIT?

1. Initiate the BHN and EWR assessment
How will be study be executed?

2. Delineate RU, select study sites
Where will detailed work be undertaken?

4. Determine BHN and EWR
How much water do you need for basic human needs and to maintain a certain ecological status?

3. Determine reference condition, PES and EIS
What are the ecological status, importance and future ecological objectives?

5. Determine operational scenarios and evaluate consequences
How will the current state and ecological objectives be influenced by future changes in operation?

6. Ecological specification, monitoring and implementation information
How do we know that we will achieve our objectives

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ECOLOGICAL CLASSIFICATION

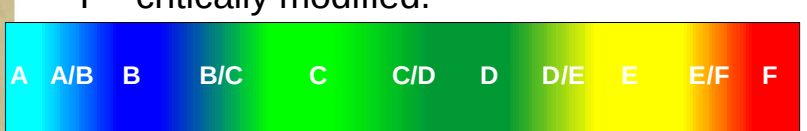
What is ecological classification?

- EcoClassification consists of three processes:
  - Present Ecological State (PES)
  - Ecological Importance
  - Recommended Ecological Category (REC)
- The PES describes river according to ecological status or health compared to natural conditions.

ECOLOGICAL CLASSIFICATION

Ecological status described in terms of Ecological Categories:

A – near natural,
B – largely natural
C – moderately modified
D – largely modified
E – seriously modified
F - critically modified.



ECOLOGICAL CLASSIFICATION APPROACH

- Assessment used for desktop/rapid nodes (90)
- Data sources were a desktop quaternary classification undertaken during 2010 (did not cover the tributaries that are not part of the Orange system), and
- The countrywide study on subquat scale done by DWS and available 2012 (did not address many tributaries which were deemed to be dry)
- This assessment now done for each quaternary catchment main river. Two data sets compared and where obvious differences existed, the river reach was assessed through Google Earth.

ECOLOGICAL CLASSIFICATION APPROACH

- Used rule based models rating metrics from 0 (no change from natural) to 5 (severe change from natural).
- Metrics are: Bed modification, Flow modification, Inundation, Riparian bank modification, water quality modification
- Results in a habitat integrity rating that is converted to A to F
- This is undertaken for a reach of river.
- Tools mostly used are GOOGLE EARTH and any readily available information.

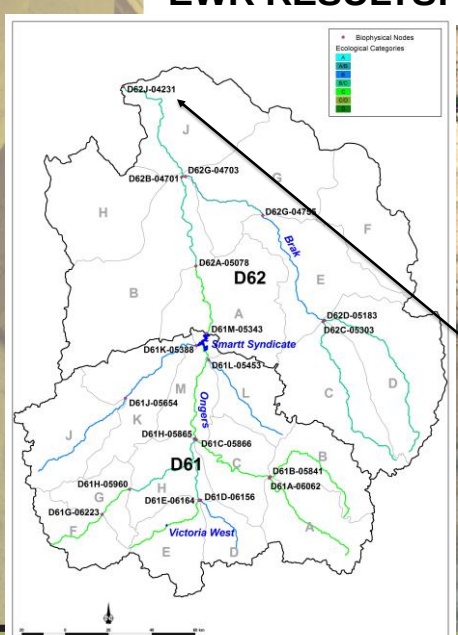
ECOLOGICAL CLASSIFICATION APPROACH (continue)

- Ecological Importance and Sensitivity is undertaken using similar models to determine Very High, High, Moderate, Low Importance.
- Based on the outcome of the Importance assessment
- the Recommended Ecological Category can be derived as follows:
- If Importance is High or Very High – the REC should be improved if the PES is lower than a B.
- NB, need an indication whether flow, water quality or land use/catchment activities must be improved.
- The PES assessment which identified the reasons NB

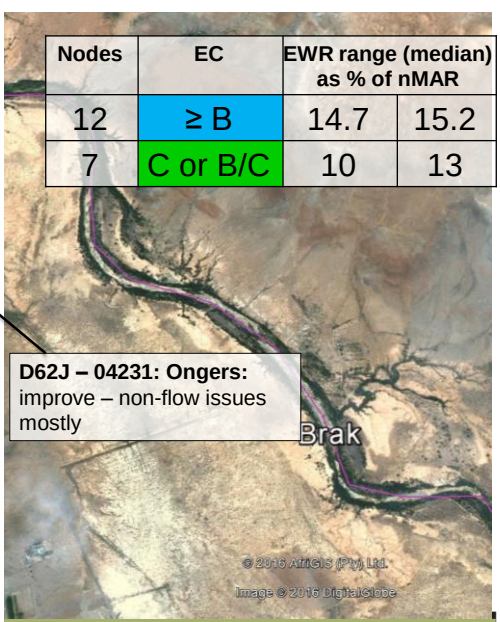
EWR ESTIMATES

- Use desktop models to estimate EWR at 90 nodes.
- Models have been used widely since 2000 and are calibrated and updated often.
- Model uses hydrology which is provided at the end of each of the 90 river reaches.
- The reach assessed is represented by a point (node) at the downstream end of the reach. This point only for purposes of hydrological assessment.
- Model estimates flow for all categories.
- The REC flows are provided and summarised statistics given on the maps.

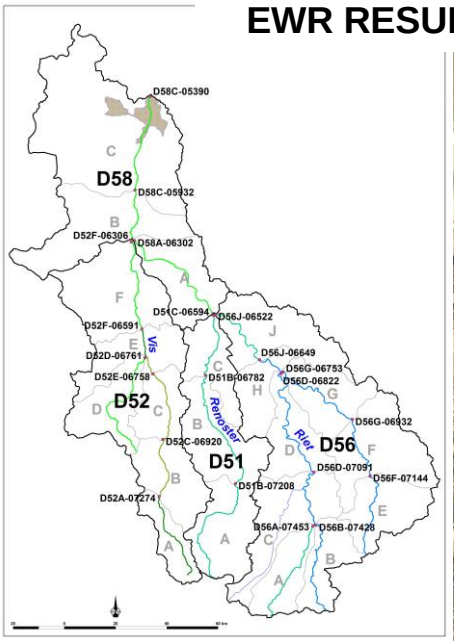
EWR RESULTS: BRAK ONGERS (19 nodes)

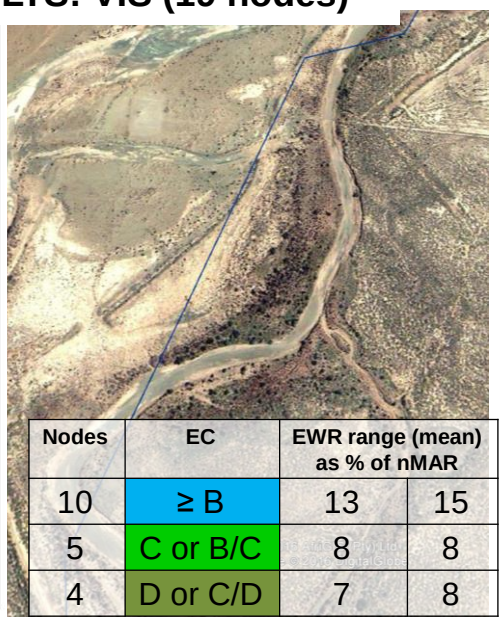


Nodes	EC	EWR range (median) as % of nMAR	
12	≥ B	14.7	15.2
7	C or B/C	10	13



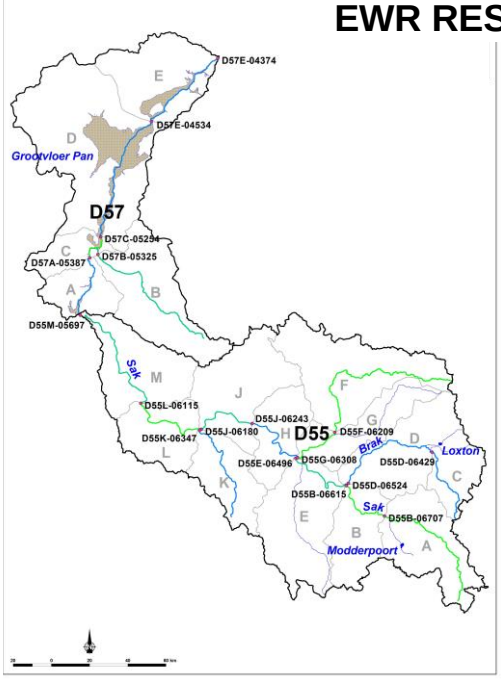
EWR RESULTS: VIS (19 nodes)





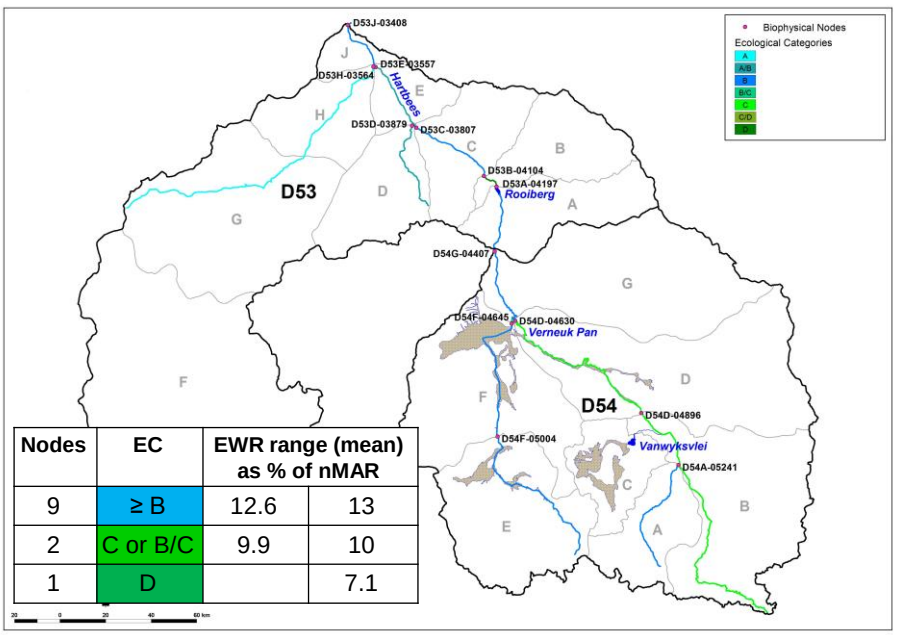
Nodes	EC	EWR range (mean) as % of nMAR	
10	≥ B	13	15
5	C or B/C	8	8
4	D or C/D	7	8

EWR RESULTS: SAK (17 nodes)



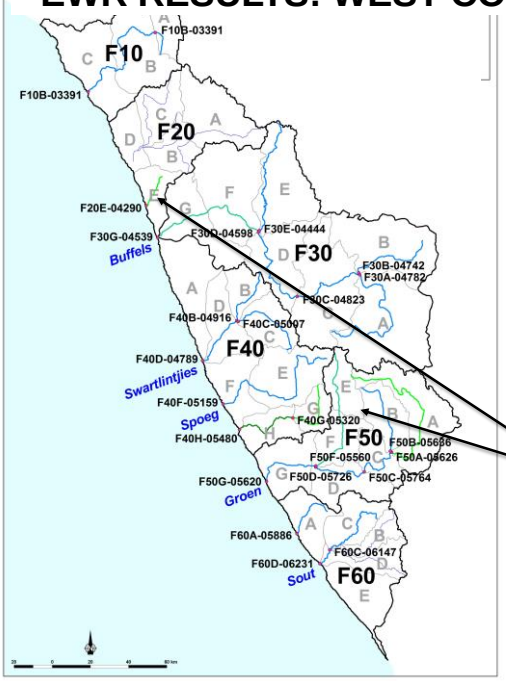
Nodes	EC	EWR range (mean) as % of nMAR	
11	≥ B	14.5	15
6	C or B/C	10.6	10.9

EWR RESULTS: HARTBEES (12 nodes)

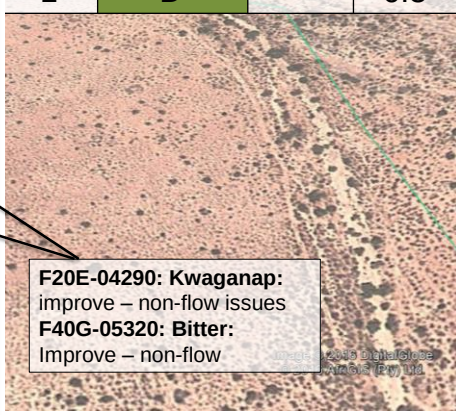


Nodes	EC	EWR range (mean) as % of nMAR	
9	≥ B	12.6	13
2	C or B/C	9.9	10
1	D		7.1

EWR RESULTS: WEST COAST RIVERS (23 nodes)

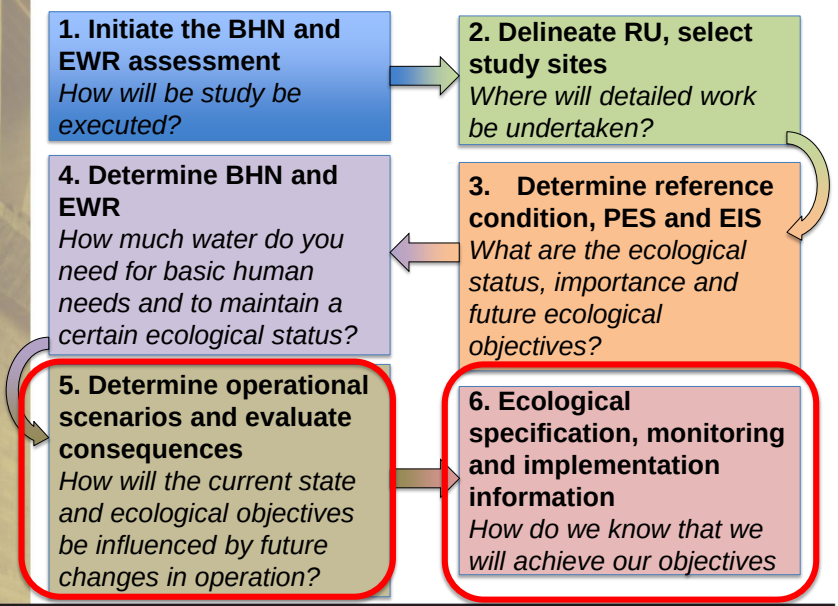


Nodes	EC	EWR range (mean) as % of nMAR	
3	≥ B	14	15
19	C or B/C	11	13
1	D		6.5



F20E-04290: Kwaganap: improve – non-flow issues
F40G-05320: Bitter: Improve – non-flow

OPERATIONAL SCENARIO ANALYSIS IMPACTS: WAY FORWARD TO NEXT MEETING



DISCUSSION AND QUESTIONS FOR CLARIFICATION