



**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**

**WETLAND EWR**

**JAMES MACKENZIE**

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**PRESENTATION LAYOUT**

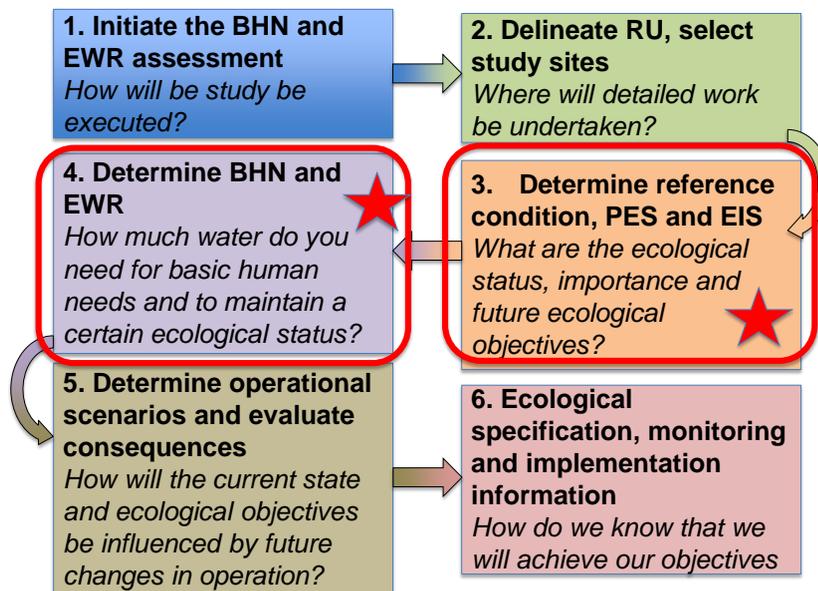
**1) DELINEATE AND PRIORITISE [WETLAND] RUS**

**2) QUANTIFY WETLAND EWR**

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## RESOURCE UNITS: WHERE DOES IT FIT?



### 1: DELINEATE AND PRIORITISE [WETLAND] RUS

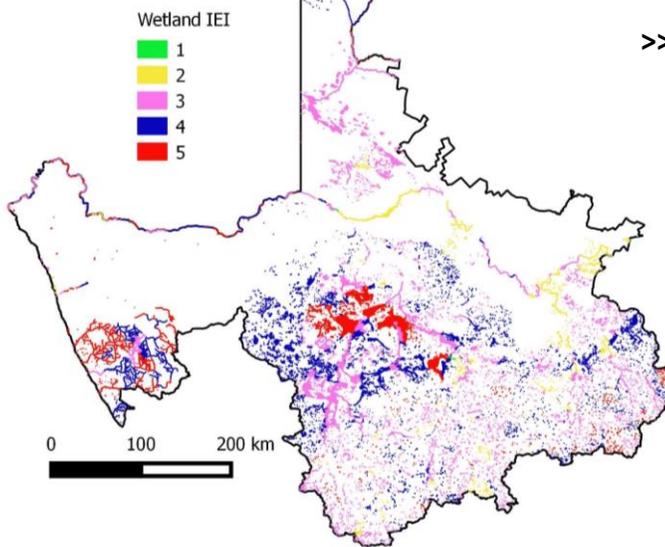
“Wetland resource units (RUs) are individual wetland systems (which may contain more than one HGM type) or wetland clusters (e.g. a group of more than one pan or seeps) that rely on their connectivity to maintain their ecological integrity.”

- Determine Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS) of wetland RUs.
- Identify wetland priorities based on ecological status (which includes condition, importance and sensitivity).
- **Refine wetland priorities by considering other factors, particularly current and expected resource demand and risk of degradation e.g fracking.**

RECAP:

WETLAND IEI

>> EI, ES, SCI

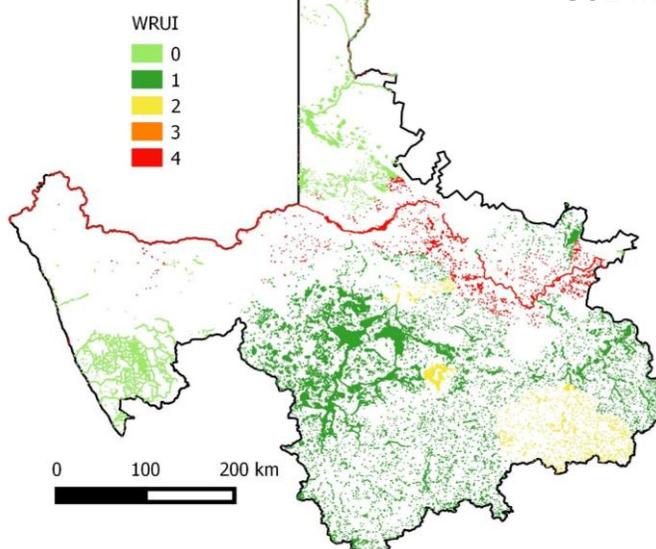


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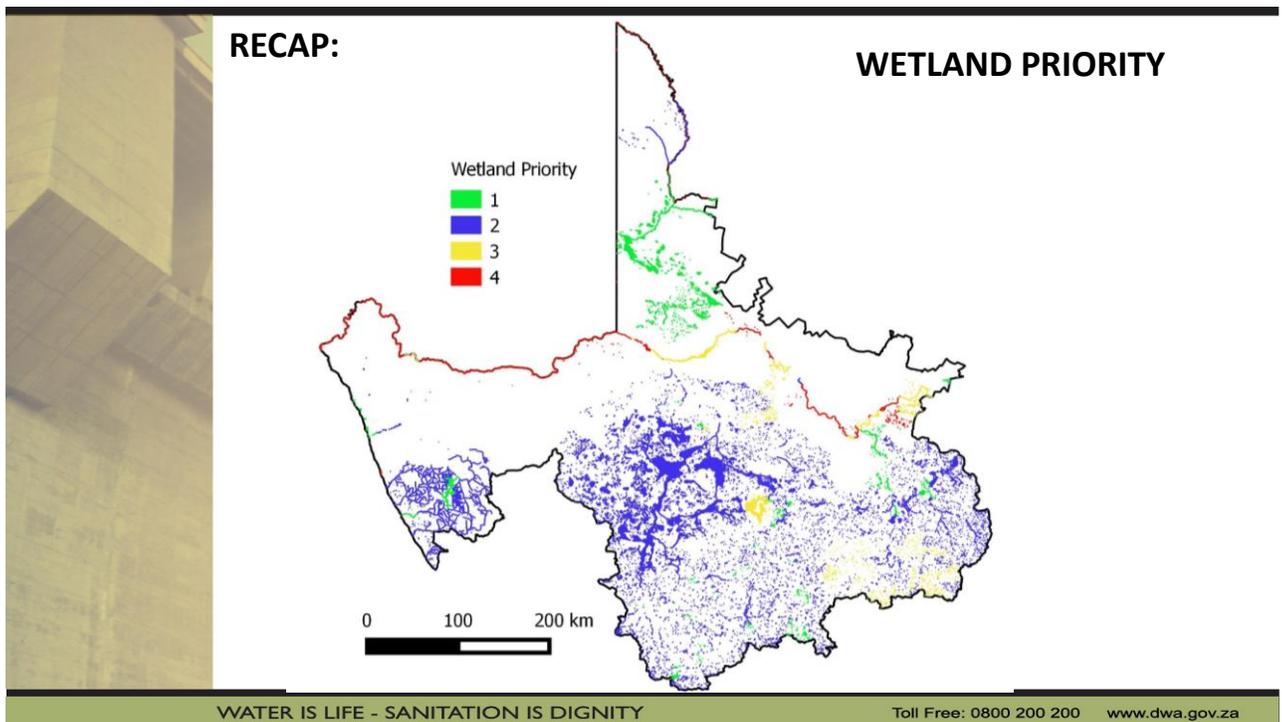
RECAP:

WATER RESOURCE  
USE IMPORTANCE



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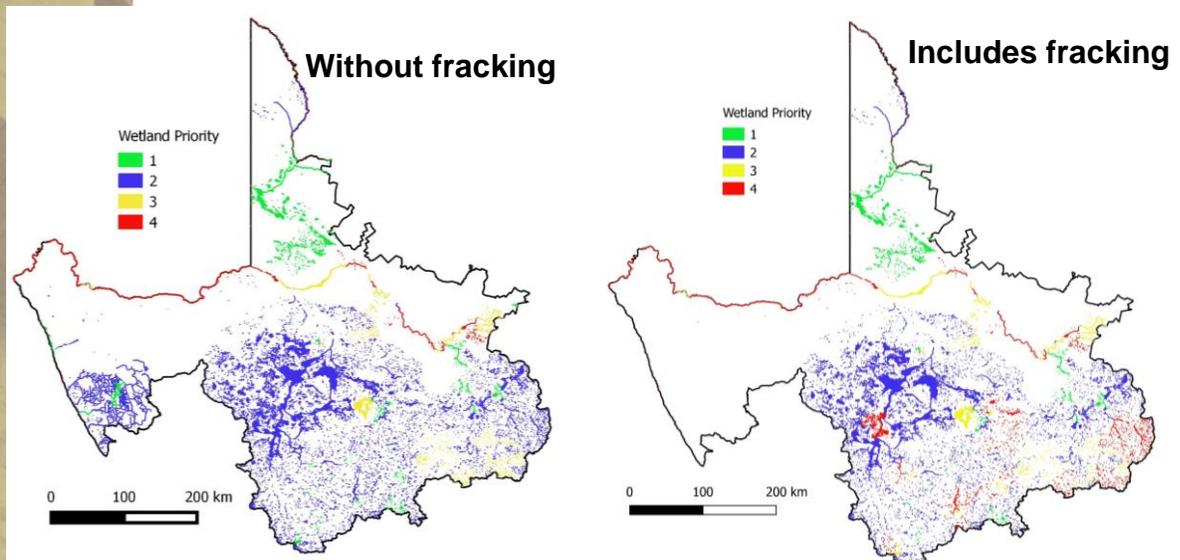


### 1: DELINEATE AND PRIORITISE [WETLAND] RUS

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## WETLAND PRIORITY



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## 2: QUANTIFY WETLAND EWR

The objective is to provide conditions that support the hydrological functioning of wetlands for the maintenance of a desired ecological state

- Determine dominant wetland HGM type
- Determine appropriate level of RDM study for wetlands
- Assess EcoStatus of priority wetlands
  - Validate PES
  - Determine EIS
  - Determine the REC
- Determine EWR (or other RDM) to achieve REC

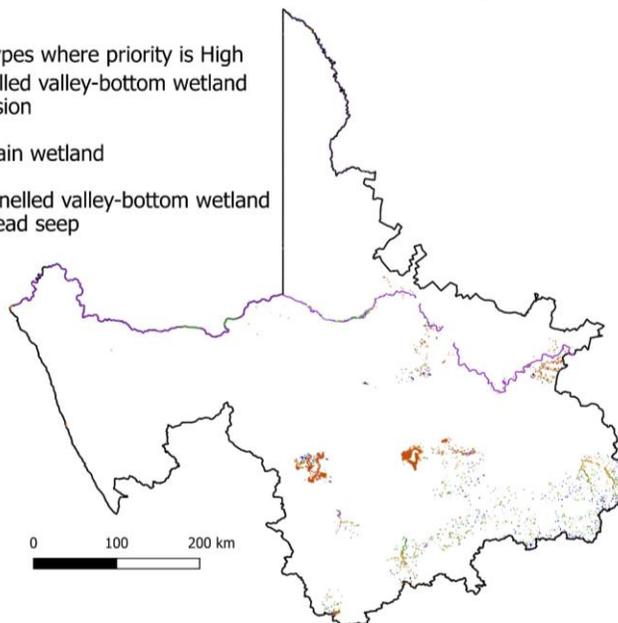
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## Determine dominant wetland HGM type

Wetland Types where priority is High

- Channelled valley-bottom wetland
- Depression
- Flat
- Floodplain wetland
- Seep
- Unchannelled valley-bottom wetland
- Valleyhead seep



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## DETERMINE THE APPROPRIATE LEVEL OF EWR DETERMINATION

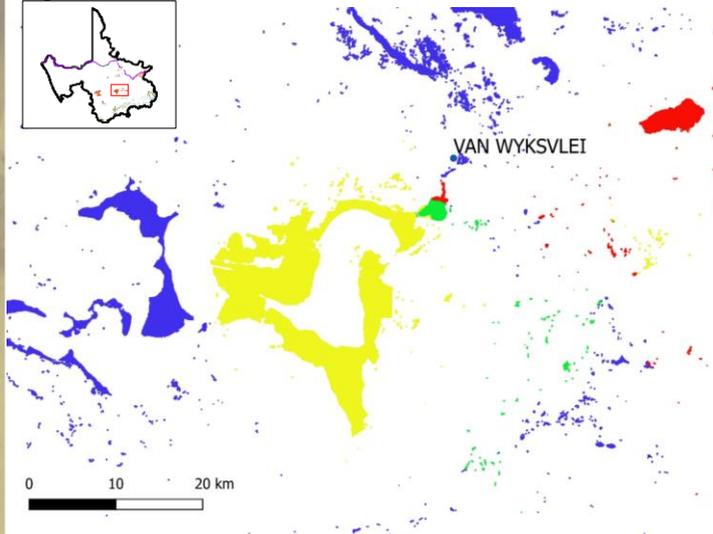
- 1) Floodplains along the Orange River are mostly in-channel features (inset benches, flood benches or terraces). These floodplains are assessed when the riparian zone is assessed (including EcoStatus and flow requirements) e.g. EWR 3 and 4 at Augrabies and Vioolsdrift respectively. Methods for rivers are used. EWR will be quantitative flow regime and can be extrapolated to up/downstream similar floodplains.
- 2) Pans in areas with high GW use are numerous, some extensive, e.g. Verneuk Pan, Grootvloer, Boesmankop, Bitterputs etc. Approach is to only assess wetlands with priority rating of 4 or 5 (High, Very High) and WRUI rating of 4 (High). Level 1 WET-Health for PES and broad EcoSpecs.

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### ASSESS ECOSTATUS OF PRIORITY WETLANDS

Only assess wetlands in red or yellow with WET-Health (Version 2) to validate the PES.  
Each wetland was assessed using Google Earth ©.



Wetland Priority

- 1
- 2
- 3
- 4

### VAN WYKS VLEI



|                          |          |
|--------------------------|----------|
| Present Vegetation State | <b>C</b> |
| Trajectory of change     | ↓        |

| Disturbance class | Brief description of disturbance class | Extent (%) |
|-------------------|--|------------|
| 1                 | Infrastructure                         | 5          |
| 2                 | Shallow flooding by dams               | 6          |
| 3                 | Agricultural activities / Crop lands   | 10         |
| 4                 | Perennial pastures                     | 10         |
| 5                 | Canals / trenching /furrows            | 3          |
| 6                 | Watering points                        | 2          |
| 7                 | Dense alien vegetation patches         | 8          |
|                   |  | <b>44</b>  |

| WET-Health Name | WET-Health Score | Updated PES - WET-Health Category | Trend | SQR        | PESEIS    | Wetland EI | Wetland ES | SCI | REC        |
|-----------------|------------------|-----------------------------------|-------|------------|-----------|------------|------------|-----|------------|
| Van Wyksvlei    | 3.7              | <b>C</b>                          | ↓     | D54C-05087 | VERY HIGH | VERY LOW   | LOW        | LOW | <b>B/C</b> |
|                 |                  |                                   |       | D54C-05147 | LOW       | MODERATE   | LOW        | LOW |            |
|                 |                  |                                   |       | D54C-05162 | LOW       | VERY LOW   | LOW        | LOW |            |
|                 |                  |                                   |       | D54C-05185 | HIGH      | VERY LOW   | LOW        | LOW |            |

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## RESULTS SUMMARY

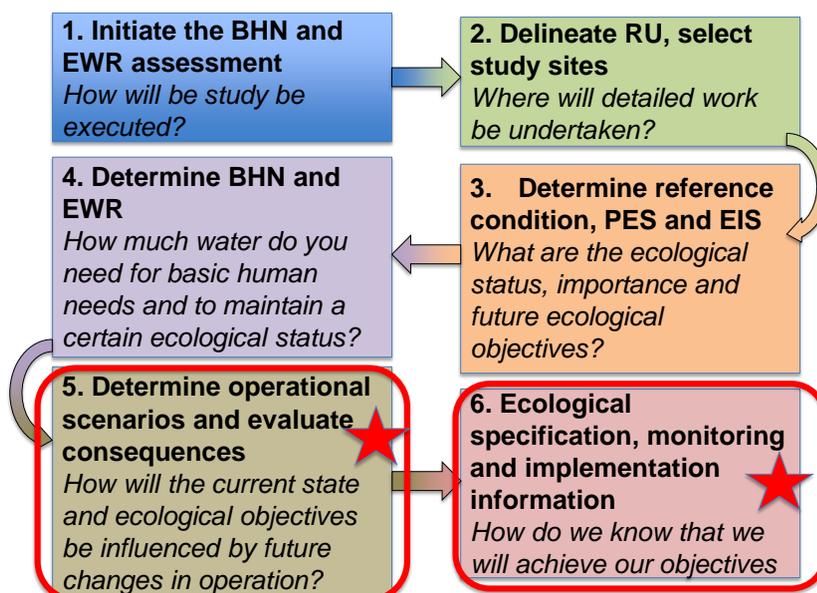
| Name           | HGM               | Size (Ha) | PES      | EI               | ES              | SCI        | Trajectory of change | REC        |
|----------------|-------------------|-----------|----------|------------------|-----------------|------------|----------------------|------------|
| Bosduiflaagte  | Depression (Pans) | 24029     | <b>B</b> | <b>VERY HIGH</b> | <b>VERY LOW</b> | <b>LOW</b> | →                    | <b>B</b>   |
| Grootvloer B   | Depression (Pans) | 17069     | <b>B</b> | <b>VERY HIGH</b> | <b>LOW</b>      | <b>LOW</b> | ↓                    | <b>B</b>   |
| Grootvloer NW  | Depression (Pans) | 7556      | <b>C</b> | <b>HIGH</b>      | <b>LOW</b>      | <b>LOW</b> | ↓                    | <b>B/C</b> |
| Grootvloer-Sak | Depression (Pans) | 74429     | <b>B</b> | <b>HIGH</b>      | <b>VERY LOW</b> | <b>LOW</b> | ↓                    | <b>B</b>   |
| Skerpionkolk   | Depression (Pans) | 1470      | <b>C</b> | <b>VERY HIGH</b> | <b>VERY LOW</b> | <b>LOW</b> | ↓                    | <b>B/C</b> |
| Van Wyksvlei   | Depression (Pans) | 24435     | <b>C</b> | <b>HIGH</b>      | <b>LOW</b>      | <b>LOW</b> | ↓                    | <b>B/C</b> |
| Verdorstkolk   | Depression (Pans) | 4208      | <b>A</b> | <b>VERY HIGH</b> | <b>VERY LOW</b> | <b>LOW</b> | →                    | <b>A</b>   |
| Verneukpan     | Depression (Pans) | 57656     | <b>C</b> | <b>VERY HIGH</b> | <b>VERY LOW</b> | <b>LOW</b> | ↓                    | <b>B/C</b> |

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## CONCLUSION

- High priority floodplain wetlands have been dealt with as part of the river process and results at EWR sites presented at previous meetings.
- The EWR of high priority pans is expressed through ecological specifications that protect the habitat. To provide these specifications, the EWRs are expressed in terms of a PES which must be maintained or improved.

## WHERE TO NEXT





**THANK YOU**

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