Transboundary Water Quality Management and Third Joint Basin Survey (JBS 3)

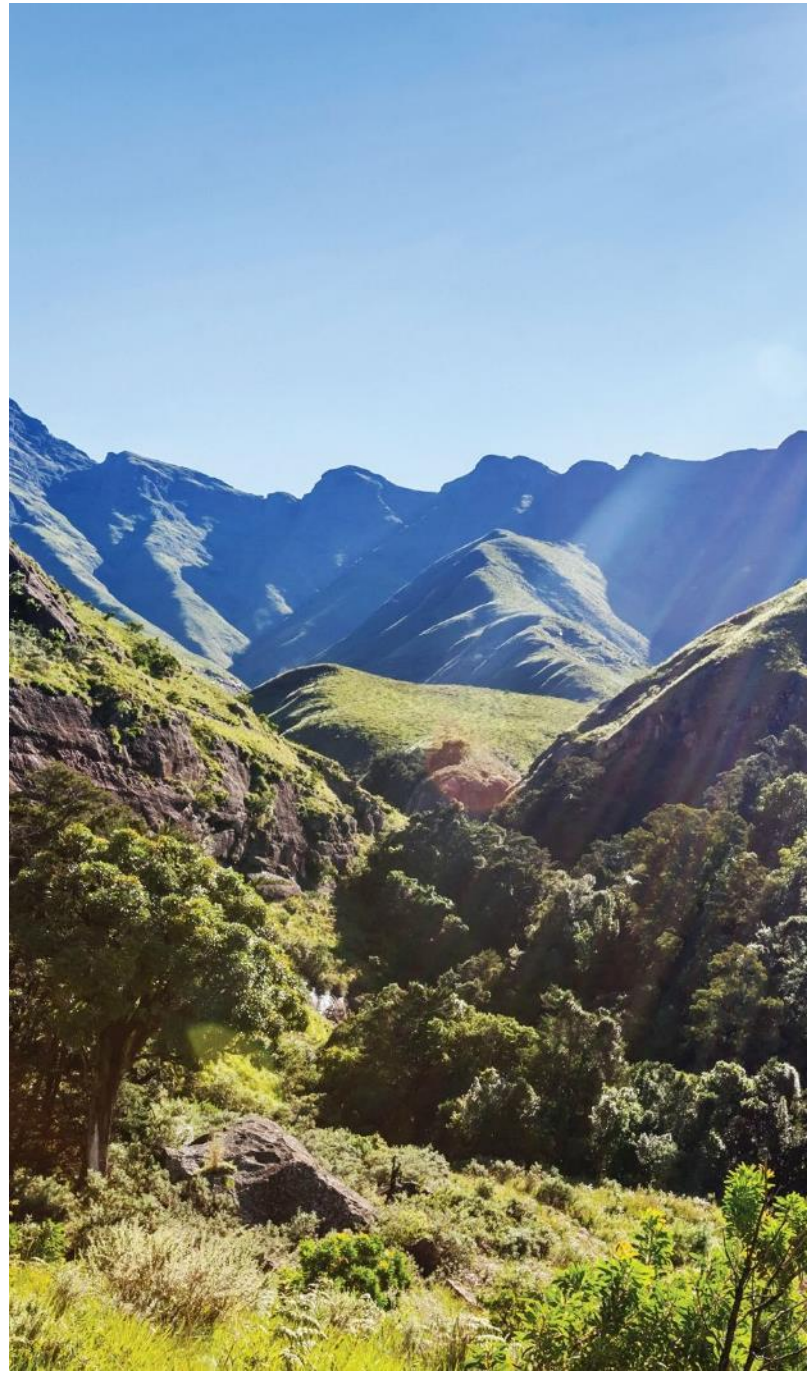
Comfort Molosiwa
Executive Secretary

ORASECOM
THE ORANGE-SENQU RIVER COMMISSION

THE STATE OF THE ORANGE-SENQU RIVER SYSTEM

WATER RESOURCES QUALITY – 11 YEARS ON

WHAT IS CHANGING AND WHY?



A system under pressure

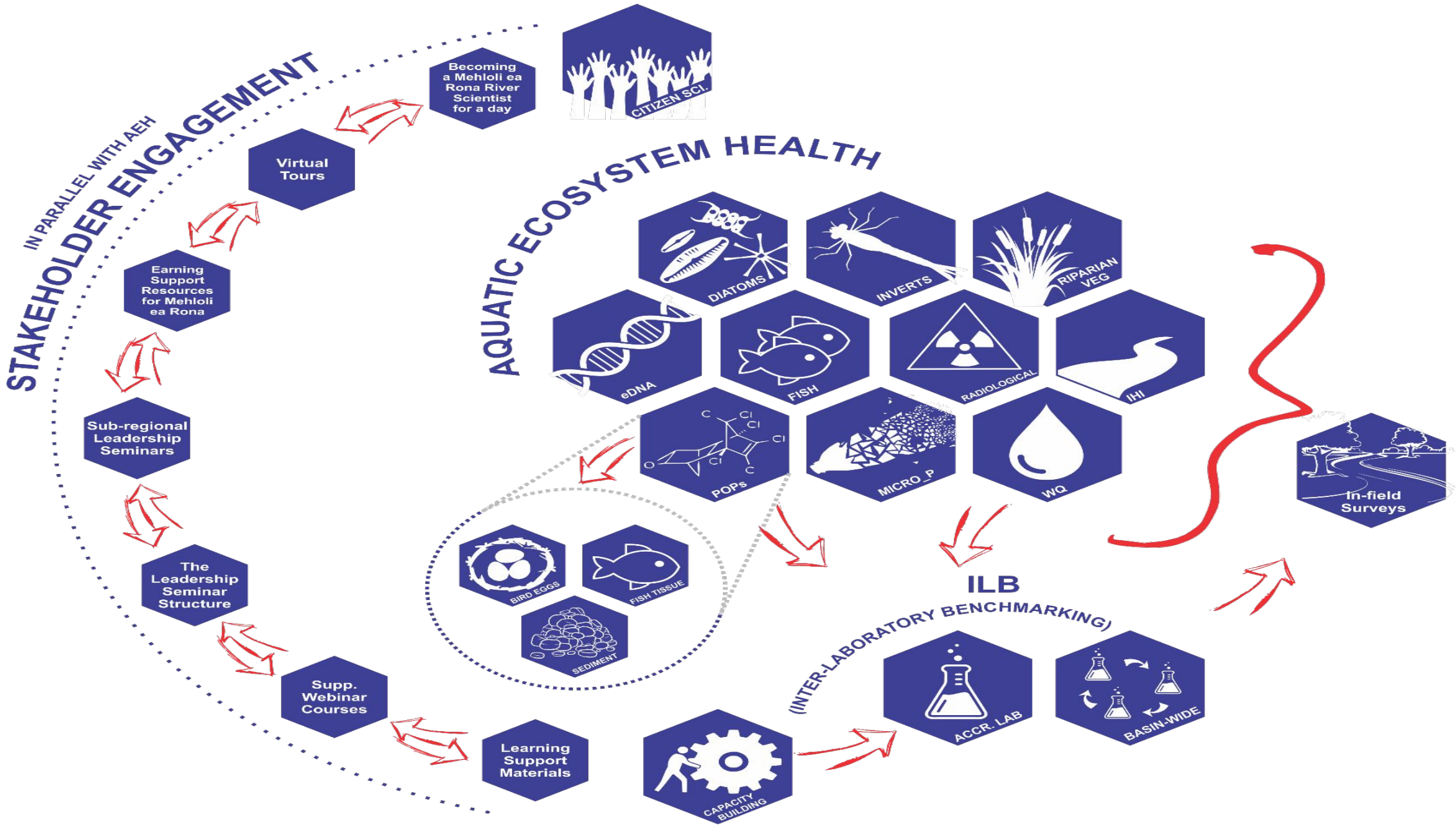
- Drivers & Pressures
  - Urbanisation
  - Mining & Agriculture
  - Impoundments
  - Water quality / pollution
  - Flow alteration
  - Sediment flows
  - Barriers for movement
  - Habitat loss

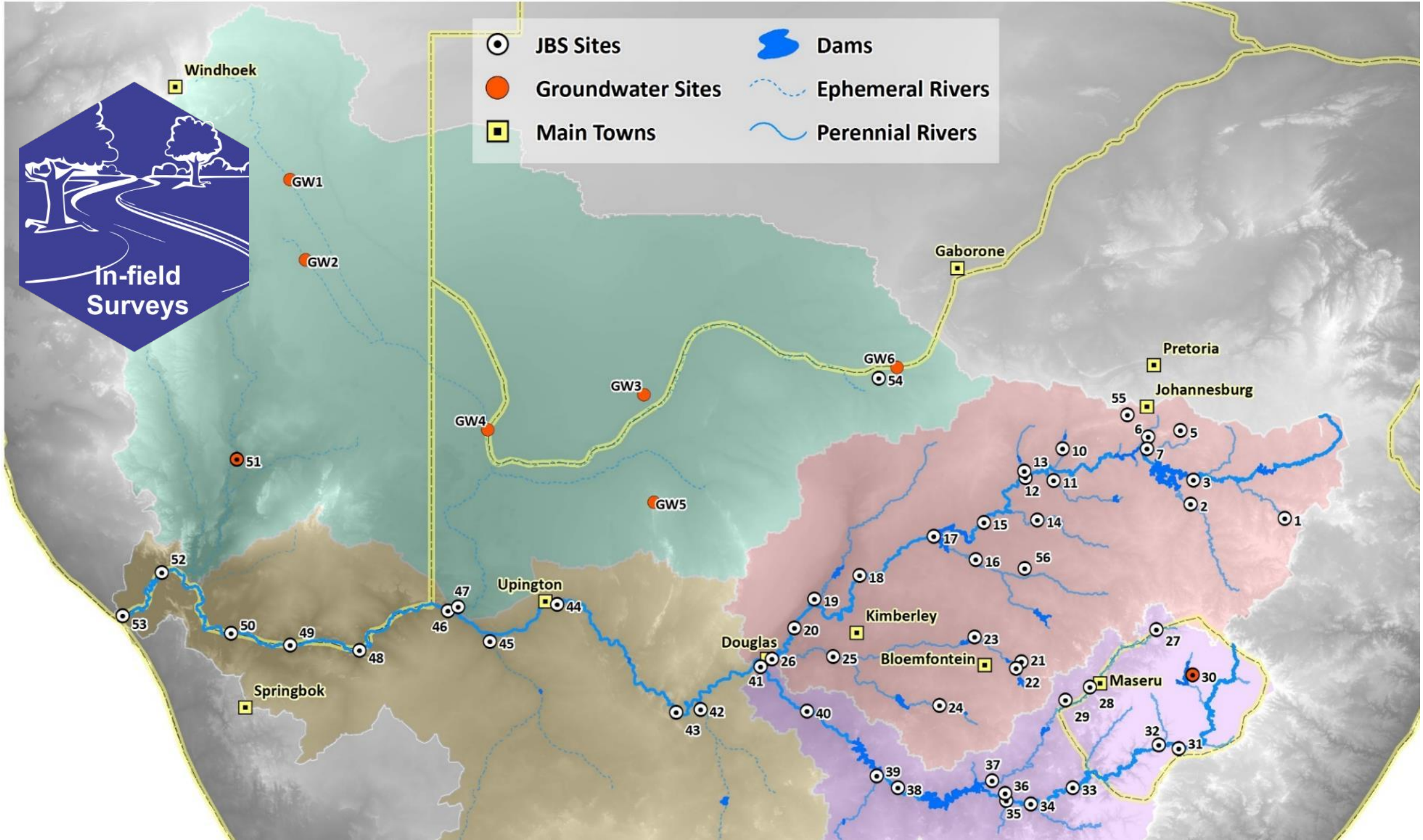
Dealing with Transboundary WQ Challenges

- ORASECOM has set up a robust system to tackle transboundary water quality challenges but still the situation is getting worse
- A Expert group known as the Water Resource Quality Committee (WRQC) was set up to address the challenges. The WRQC is made up of 2 experts from each of the 4 state parties
- The WRQC has develop a basin-wide WQ Monitoring Programme which includes;
  - Agreement on Transboundary and national monitoring sites for both surface and groundwater
  - Have set up Transboundary WQ Objectives which are enshrined in the Resource Quality Objectives, EFLOWS, Environmental & Social Assessment Guidelines, Aquatic Ecosystem Health, data and info sharing standards
  - Water Quality Parameters to be measured and how often (frequency of measurements)
  - Agreed on a national monitoring plan and ensuring its implementation at state party level
  - Promotion of Citizen Science as a community engagement tool in raising awareness on WQ issues
  - Implementation of the Joint Basin Survey

- Joint Basin Survey: is a water quality assessment to establish the health of the system. Its carried out every 5 years
- JBS 1 was in 2010, JBS 2 in 2015 and JBS 3 in 2021 (delayed by COVID)

Components of JBS




JBS Sites
Groundwater Sites
Main Towns
Dams
Ephemeral Rivers
Perennial Rivers
In-field Surveys
Windhoek
Gaborone
Pretoria
Johannesburg
Upington
Kimberley
Douglas
Bloemfontein
Springbok
Maseru
GW1
GW2
GW3
GW4
GW5
GW6
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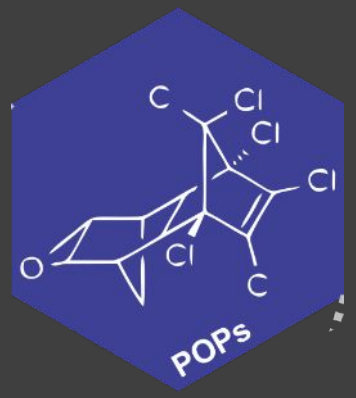
Water Quality
Conclusions

- Vaal most impacted (indicators of sewage problems, mining, industry).
- Upper Orange best but still impacted (erosion).
- Lower Orange moderately impacted (heavy metals).
- One sample every 5 years – single sample might not be representative.
  - *Need for more regular sampling.*



POPs & Heavy Metals

- POPS: organic compounds resistant to degradation.
- ‘Heavy metals’: broad term, referring to metalloid chemical elements which may be toxic to humans or the environment.
- Tested for in:
  - Sediment.
  - Fish tissue.
  - Bird eggs.

- Challenges and delayed analyses
  - No single institution has the FULL analytical capability within SA.

❖ Basin-wide impacts

- **Vaal** – Sewage, coal, industry, domestic etc.
- **Upper Orange** – Unregulated agriculture (erosion and sediment).
- **Lower Orange** – Agriculture (pesticides) & mining (heavy metals).

❖ Bio-accumulation

- Fish and bird eggs compromised (mixed results between JBS).
- Large fish have dangerous levels of heavy metals (e.g., mercury).

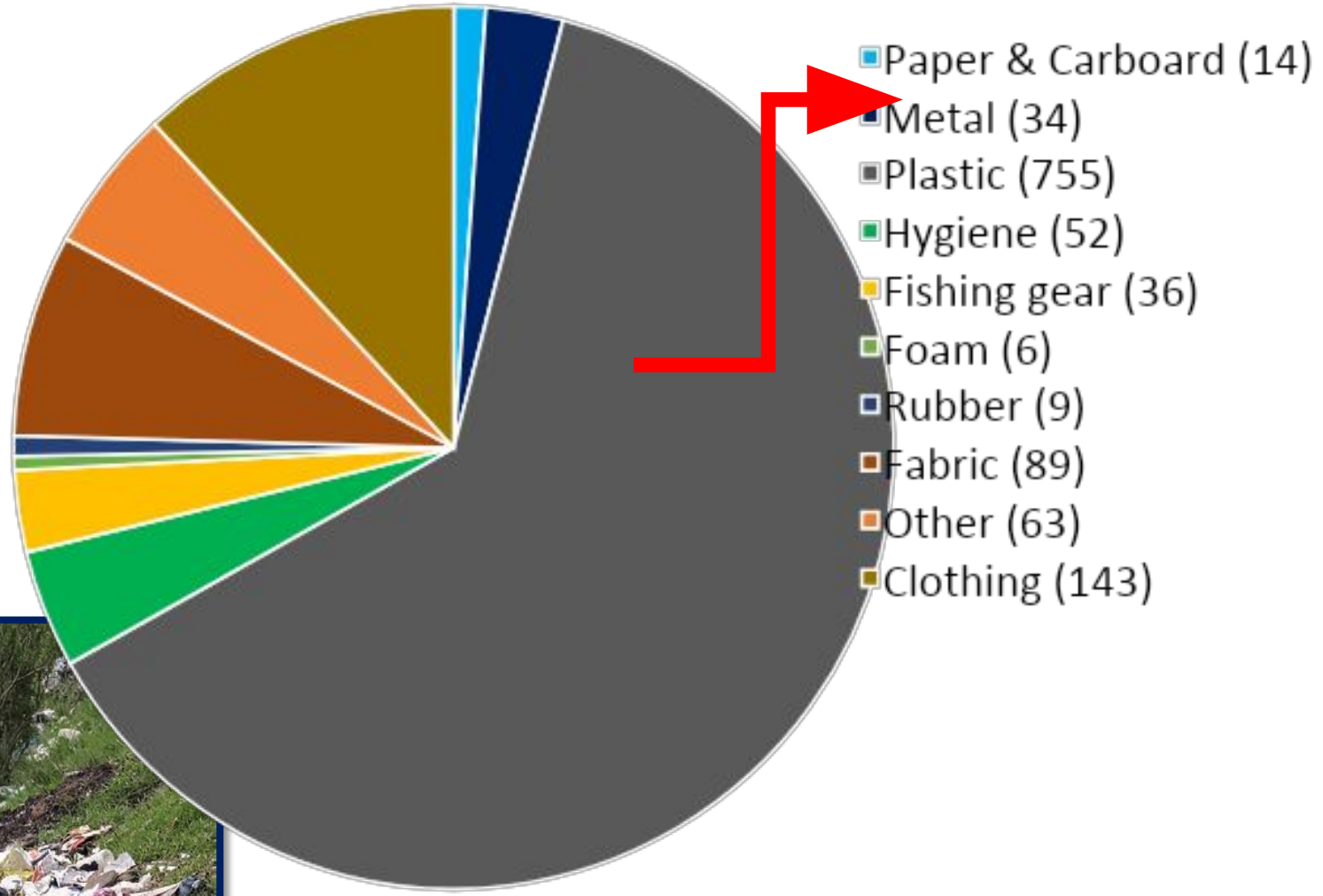
Solid Waste and Microplastics

- **Monitored for the 1st time in JBS3.**

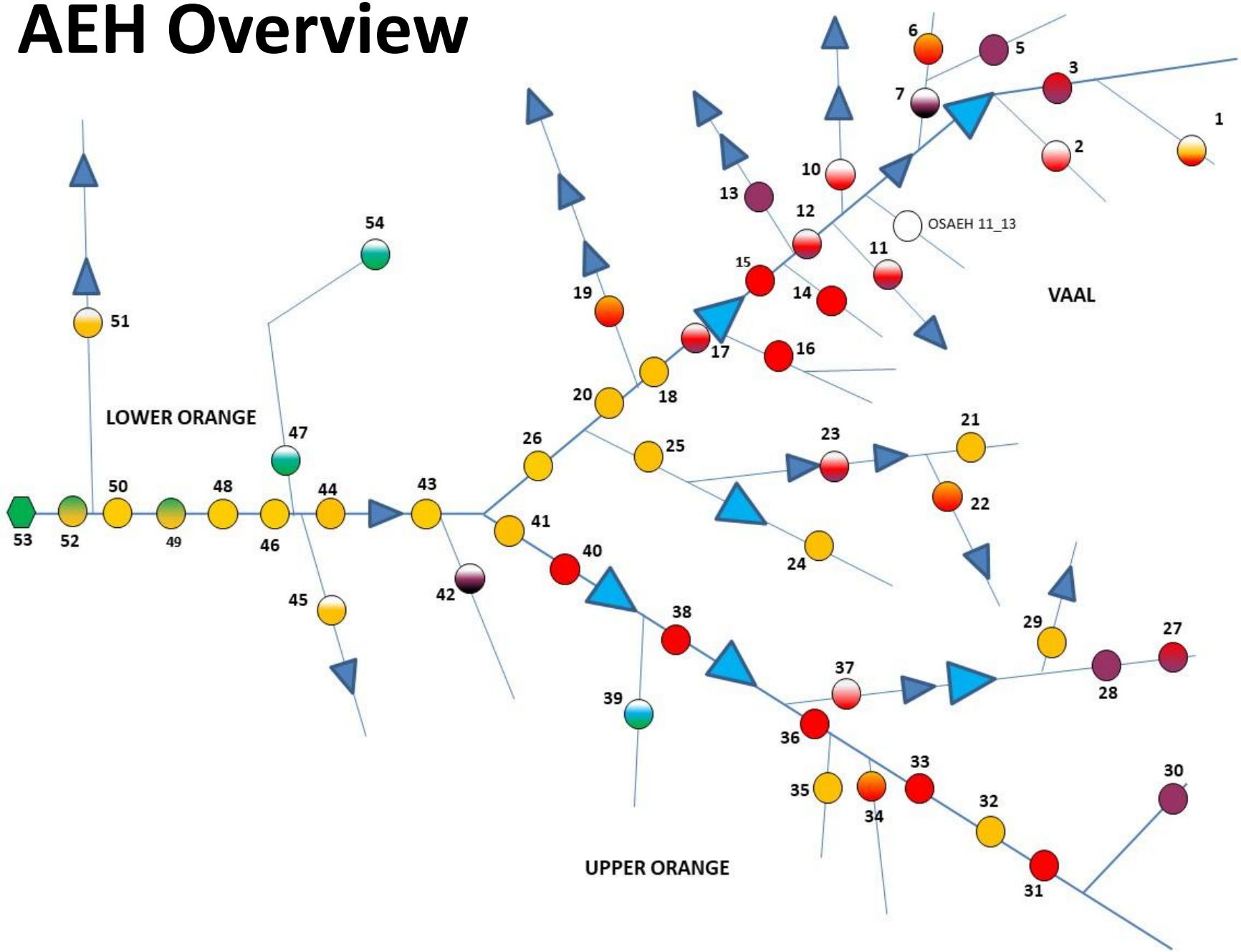
- Sampling methods:
  - Line transects using the River-OSPAR protocol monitoring (solid waste) – *preferred*.
  - Water filtration (microplastics).
  - Sediment samples (microplastics).

Large Solid Waste

- Plastic the major contributor to solid waste pollution.

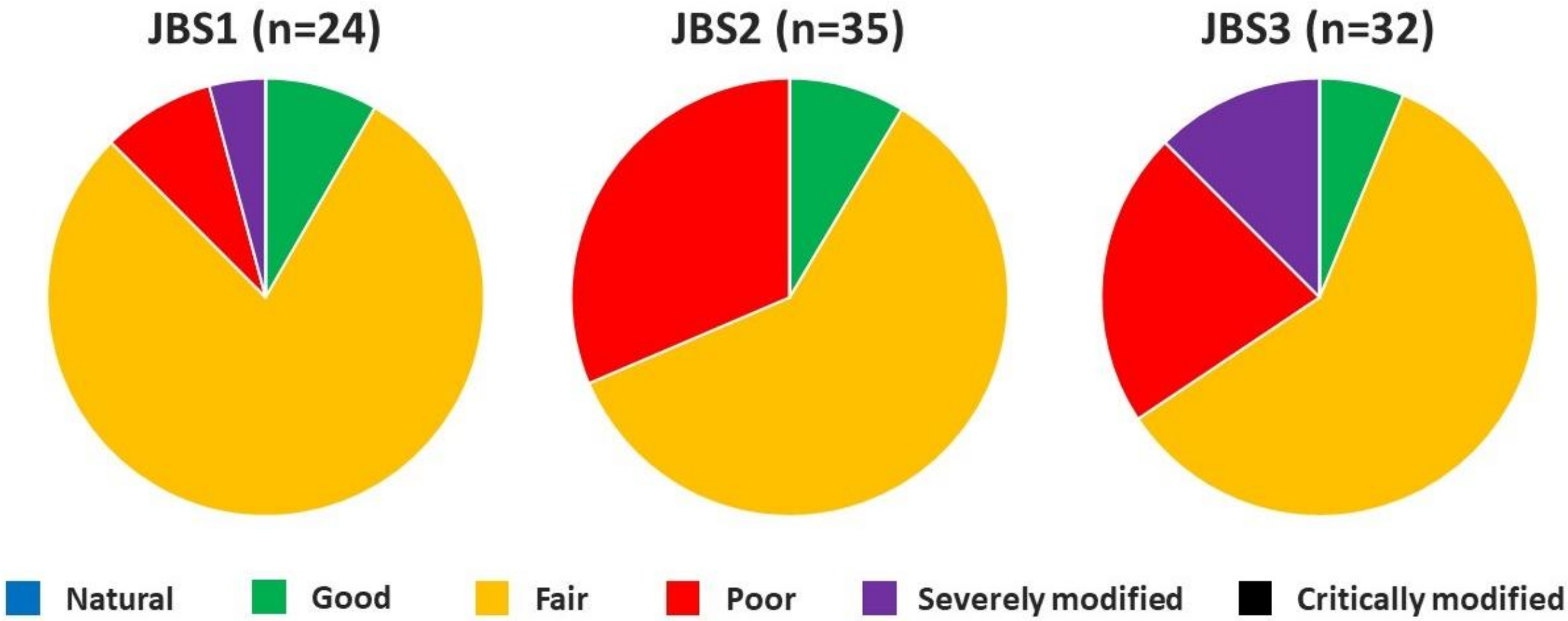


JBS3 AEH Overview



- Estuarine site
- **A** - Natural
- **A/B**
- **B** – Largely natural
- **B/C**
- **C** – Moderately modified
- **C/D**
- **D** – Largely modified
- **D/E**
- **E** – Seriously modified
- **E/F**
- **F**
- **A/B -** Not assessed fully
- **C -** Not assessed fully
- **D -** Not assessed fully
- **E/F -** Not assessed fully

JBS AEH Comparison



Main Findings from the JBS 3

- The Orange-Senqu River System appears to have declined since JBS-1
- The good quality water from Lesotho has come at the price of promoting toxic algal blooms in the Vaal Dam.
- AEH in the Gauteng and North-West, and the lower Mohokare River is severely degraded and are classified as largely to seriously modified.
- Dissolved oxygen concentrations in these rivers above is low, and nutrient concentrations are high.
- Macro - and micro-plastics are a problem in urban rivers. Only exception is the Matsoku River in the Lesotho Highlands which had the highest concentration of solid waste, and a seriously modified aquatic ecosystem.
- Salinity management in irrigation schemes is a problem. At present the highest salinities are found in the Riet River due to irrigation return flows and the way the system is operated to maximise water availability.
- There is a trend towards increasing salinity in the lower Orange River. Average salinity is below the levels of concern, but peaks that exceed the irrigation guidelines.
- Maintaining “flushing” environmental flows is likely to pose challenges.

Challenges Identified - JBS 3

- Improving the ability of local governments to manage their solid waste, stormwater, and wastewater systems. This is a socio-political challenge which is difficult to address

- Finding the water to provide for environmental flows, and especially the peak flows, will be difficult as demands on the system grow

- The government laboratories needed for water quality monitoring are in poor state and condition leading to very unreliable results. None of them are accredited either for sampling or undertaking the testing. The inter-laboratory benchmarking indicated a lot of challenges which need to be addressed if future JBS is to be institutionalized

- Growing and adequately funding the involvement of citizens in river rehabilitation exercises will need “new” investments. This is imperative for more responsive monitoring by the relevant entities in the state parties


Orange River Mouth - Oranjemund - Namibia
Oranjemund
28°37'39"S, 16°26'53"E

Thank you!