water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

2030 NDP
NATIONAL DEVELOPMENT PLAN
Our Future - make it work

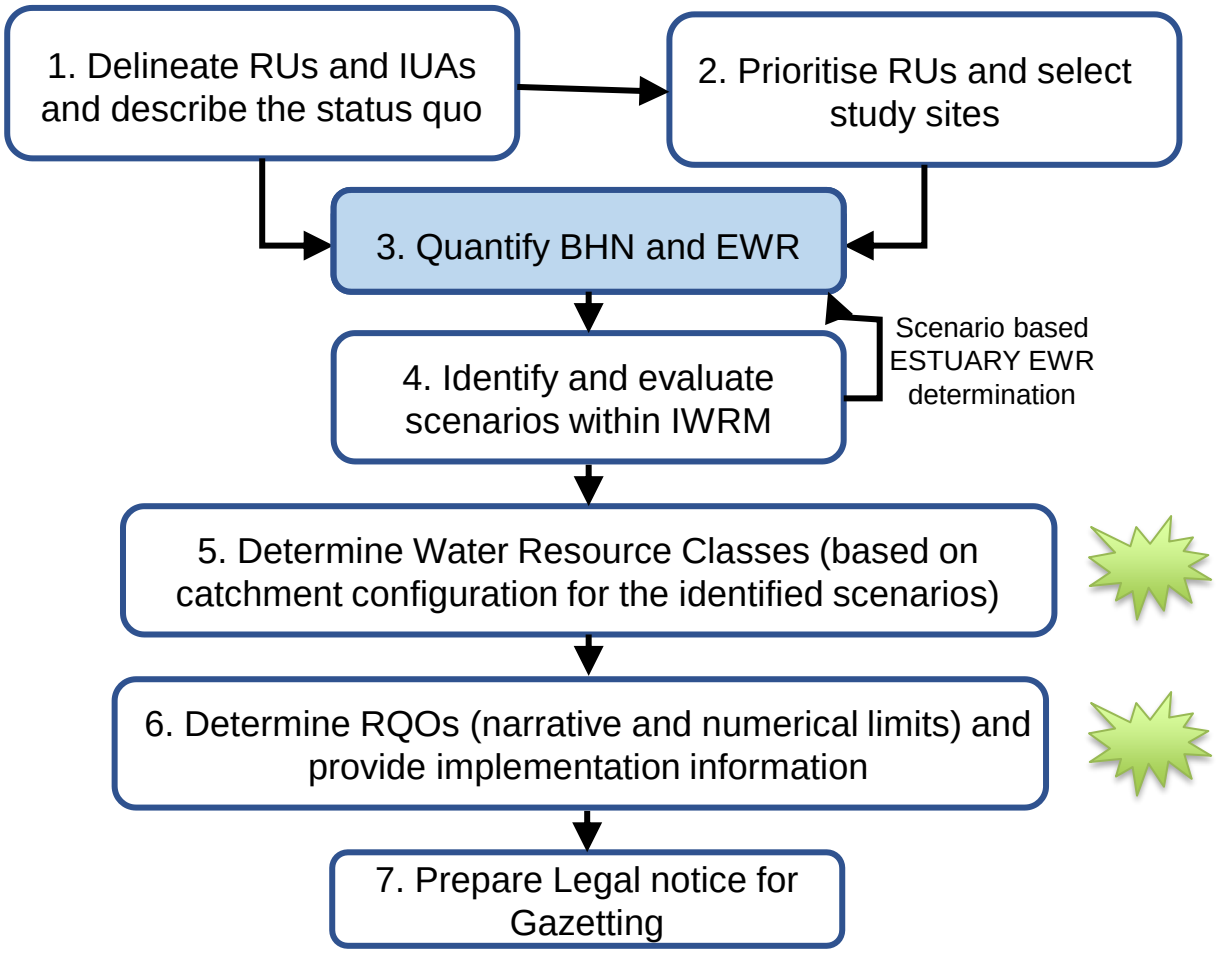
CLASSIFICATION OF SIGNIFICANT WATER RESOURCES AND DETERMINATION OF RESOURCE QUALITY OBJECTIVES FOR WATER RESOURCES IN THE USUTU TO MHLATHUZE CATCHMENTS (WP11387)

TECHNICAL TASK GROUP 1: RIVER WATER QUALITY

Patsy Scherman

3 November 2022




1. Delineate RUs and IUAs and describe the status quo
2. Prioritise RUs and select study sites
3. Quantify BHN and EWR
4. Identify and evaluate scenarios within IWRM
Scenario based ESTUARY EWR determination
5. Determine Water Resource Classes (based on catchment configuration for the identified scenarios)
6. Determine RQOs (narrative and numerical limits) and provide implementation information
7. Prepare Legal notice for Gazetting

CLASSIFICATION OF SIGNIFICANT WATER RESOURCES AND DETERMINATION OF RESOURCE QUALITY OBJECTIVES FOR WATER RESOURCES IN THE USUTU TO MHLATHUZE CATCHMENTS: TECHNICAL TASK GROUP MEETING 1	
SESSION ON IDENTIFYING LAND USERS, WATER QUALITY ROLE PLAYERS, DRIVING VARIABLES AND COMPONENTS IN PREPARATION FOR CLASSIFICATION STEPS	
3 November 2022, 9am-3pm	**Technical Task Group meeting: WATER QUALITY**
VENUE	**Mhlathuze Water Training Room (Corner South Central Arterial and Battery Bank, Alton Industrial Area, Richards Bay) and online via Microsoft Teams Platform**
OBJECTIVES	The focus of the meeting is gathering information for assessing water quality consequences and setting up river water quality RQOs once Water Resource Classes have been determined. The objective of the meeting is therefore to obtain specialist stakeholder input with reference to: 1. identifying the priority water quality indicator components to be addressed at identified priority river Resource Units; and 2. providing input on water quality indictors and driving variables where water quality has been identified as an indicator. NOTE: 1. Priority river Resource Units will be presented to provide catchment context. 2. No quantification of RQOs will be undertaken at this meeting. 3. This is NOT a stakeholder or PSC meeting, but a technical meeting to obtain specialist information from stakeholders able to contribute. 4. Although the focus is on RIVERS, water quality information or data for other water resources will be forwarded to the relevant specialist. 5. The Agenda is a guideline only; as the emphasis is on discussion and information-gathering.

Starting time	Duration (min)	Item	Presenters
08:30		**TEA AND COFFEE AVAILABLE**	
09:00	5	Introduction and welcome	Lebogang Matlala (LM)
09:05	15	Meeting objective and outcomes, Resource units	Patsy Scherman (PS)
09:20	15	Water quality input requirements - Ecological and other users/role players	PS
09.35	1hr 25	Identify key water quality impacts in priority RUs. Iidentify indicator components derived from the above.	Split into workshing groups. PS and general discussion.
11.00	25	**TEA AND COFFEE AVAILABLE**	
11:30	1 hr	Verifying and refining water quality hotspots (ecological and user). Verifying and refining primary users and driving variables in identified areas.	PS and general discussion in working groups.
12:30	1 hr	**LUNCH**	
14:00	1 hr	Verifying and refining water quality hotspots (ecological and user). Verifying and refining primary users and driving variables in identified areas.	PS and general discussion in working groups. Feedback seesion.
15:00		**CLOSURE**	

DELINEATION AND CLASSIFICATION

- **Classify every Integrated Unit of Analysis (IUA). Units are similar in terms of land use &/or ecological state. So, an IUA consist of many river reaches, wetlands and/or estuaries. Homogenous area that can be managed as an entity.**

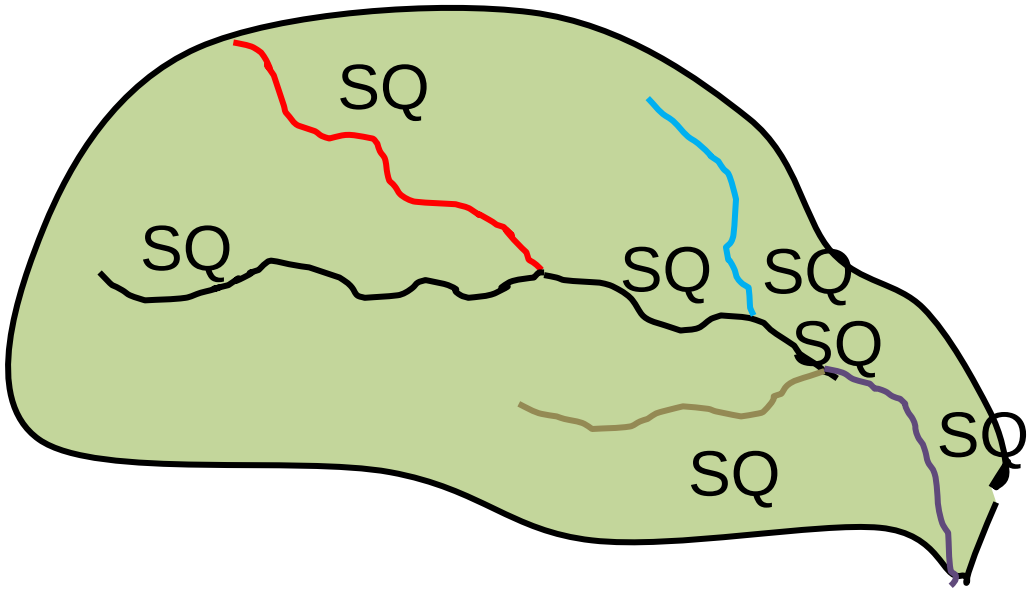
- **Resource Units (RUs) are nested within an IUA, and consist of many SQs. SQs grouped into RUs depending on similar ecological state, and land use (impacts). Using the PES for the SQs, a PES was assigned to the RUs.**

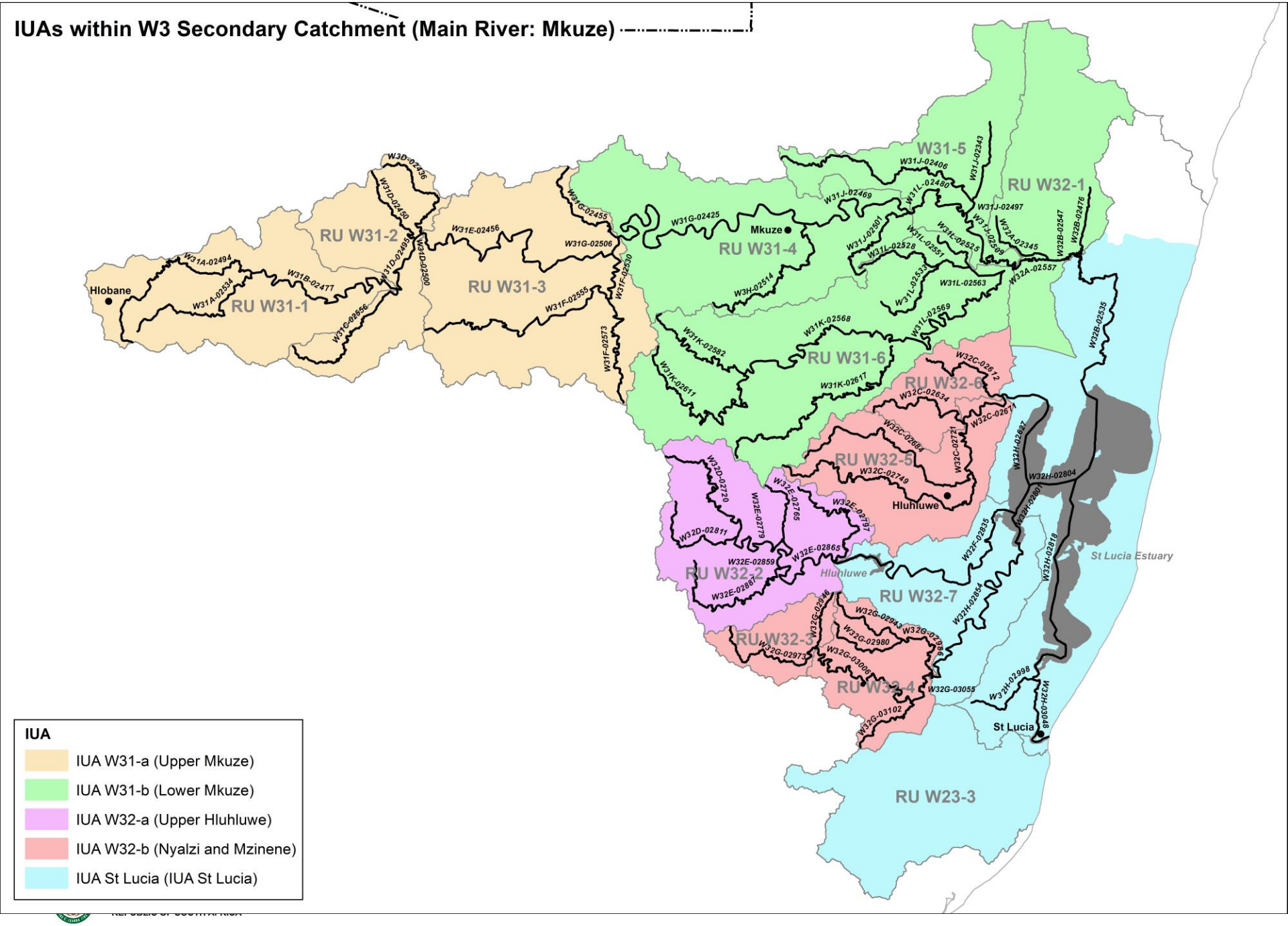
- **RUs require different EWRS (due to different flow patterns, reaction of habitat and biota to stress, management and operational structures).**

- **Key biophysical nodes (or EWR sites) within RUs: where (1) scenarios are evaluated, and (2) suite of RQOs are supplied (depending on priority).**

SUB QUATERNARY RIVER REACHES

Short sections of river from the inflow of one tributary to the inflow of a next tributary – the baseline is the 1:500 000 rivers network scale.




IUAs within W3 Secondary Catchment (Main River: Mkuze)
W31-5
RU W32-1
RU W31-2
RU W31-4
Mkuze
RU W31-3
RU W31-1
Hlobane
RU W31-6
RU W32-6
RU W32-5
Hluhluwe
RU W32-2
Hluhluwe
RU W32-7
RU W32-3
RU W32-4
St Lucia
St Lucia Estuary
RU W23-3
IUA
IUA W31-a (Upper Mkuze)
IUA W31-b (Lower Mkuze)
IUA W32-a (Upper Hluhluwe)
IUA W32-b (Nyalzi and Mzinene)
IUA St Lucia (IUA St Lucia)

DELINEATION

1. PURPOSE OF DELINEATION: To MANAGE the catchment at an applicable scale.

MANAGEMENT

- Common goals – EcoStatus/Ecological Category, RQO, Water Resource Class
- Similar land use (similar impacts)
- Similar Water Resource operation

2. DELINEATION STARTING POINT: Sub-quaternary (SQ) Reaches and available data for the Present Ecological State

→ **PES/EI/ES DATABASE**

WHAT IS THE PES/EI/ES DATABASE

- **Desktop PES for each SQ for SA**
- **Factsheet for each SQ with information of impacts for most SQs**
- **Desktop EI and ES for each SQ for SA**
- **Much additional supporting info provided by DWS**
- **All easily accessible with all the shapefiles**

PES METRICS

POTENTIAL PHYSICO-CHEMICAL MODIFICATION ACTIVITIES

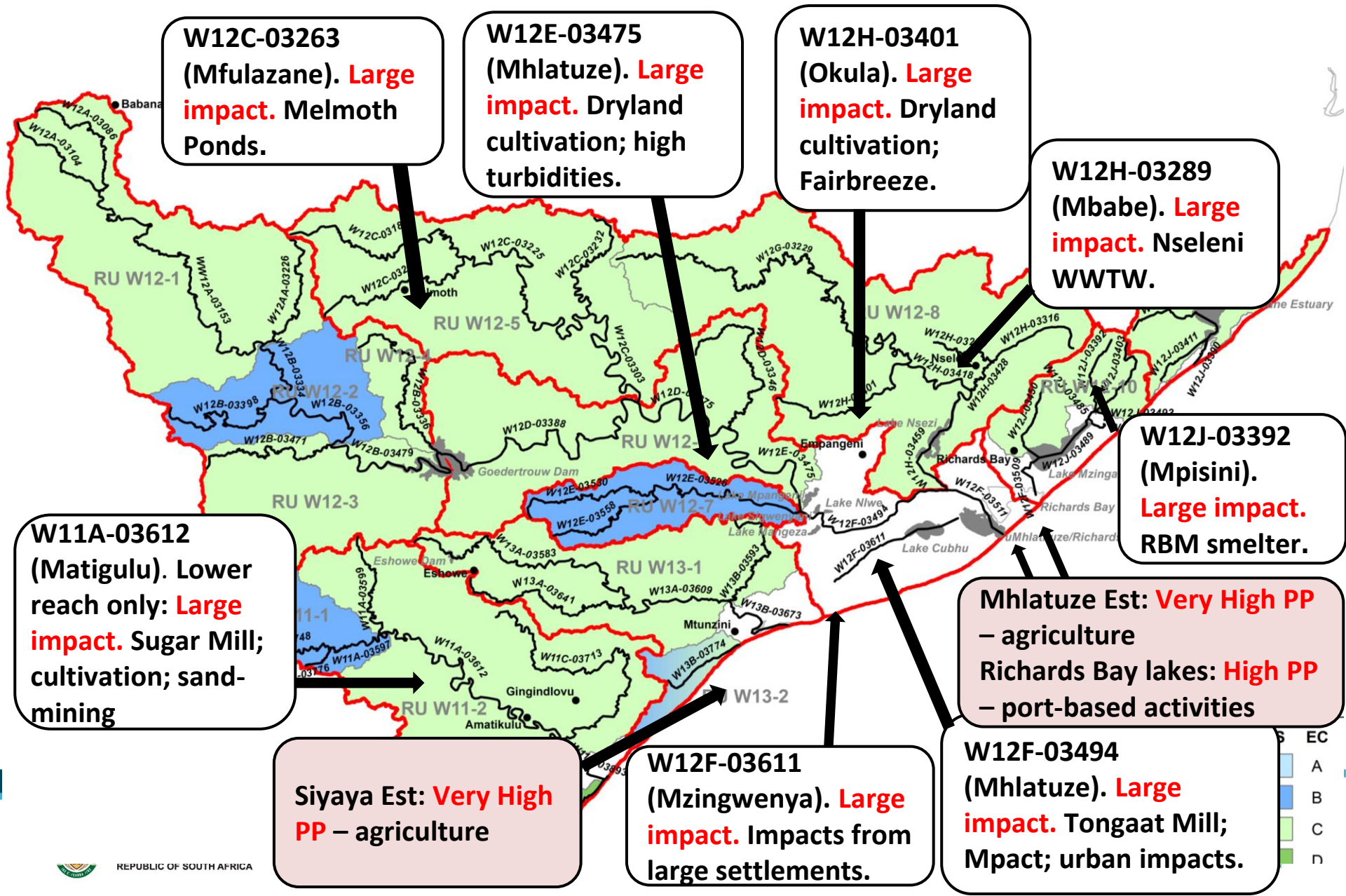
Activities that indicate the potential that physico-chemical conditions may have changed from the reference.

Indicators: Presence of land cover/land use that implies the likelihood of a change of physico-chemical conditions away from the reference. Activities such as mining, cultivation, irrigation (i.e. agricultural return flows), Waste Water Treatment Works (WWTW), urban areas, industries, etc. are useful indicators. Algal growth and macrophytes may also be useful response indicators.

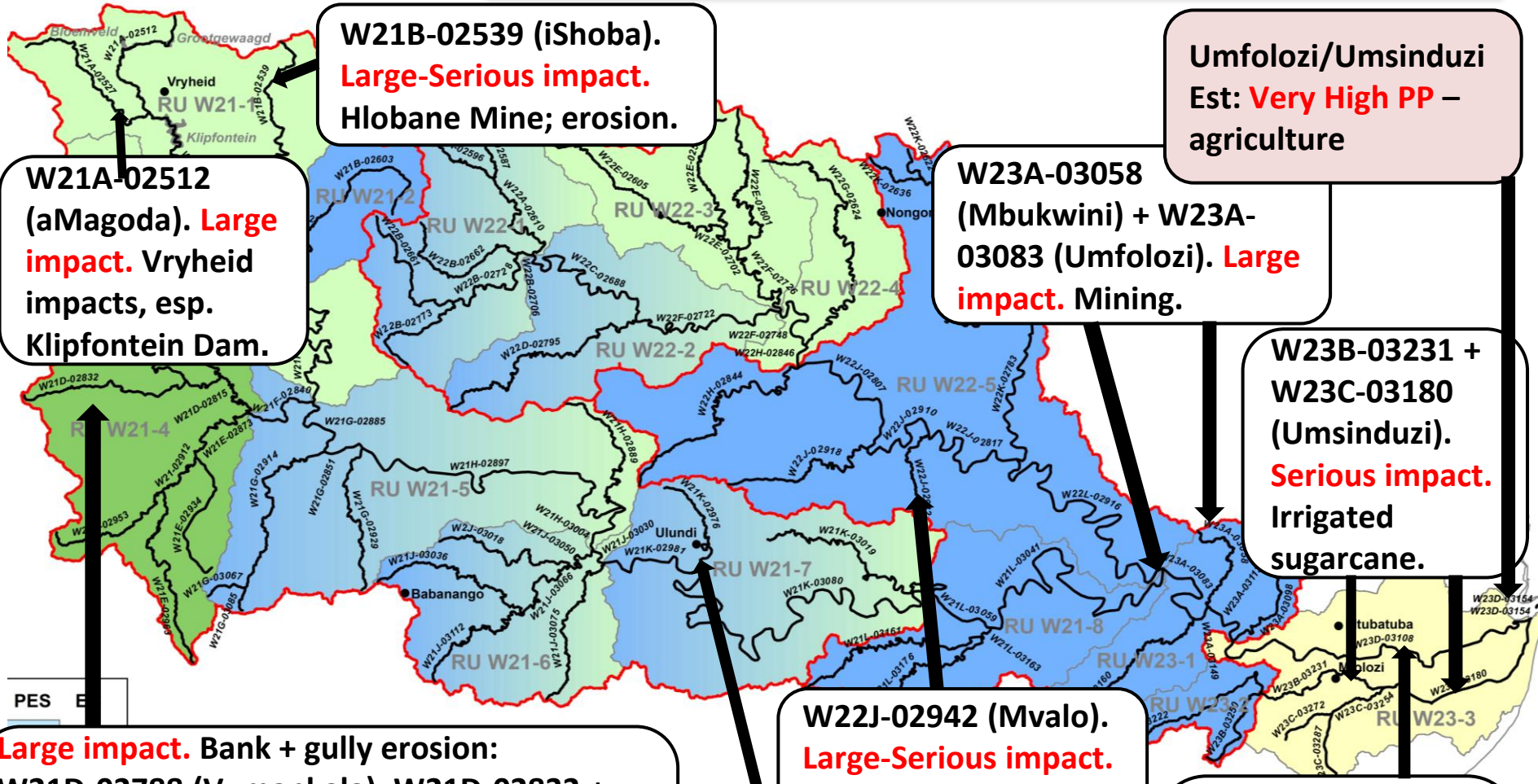
STATUS QUO: WATER QUALITY

- **Aim: Identify water quality priority areas per secondary catchment. NB: First step toward identifying driving water quality variables for which RQOs will be set.**
- **Rivers: Based on a water quality impact rating (0: no impact to 5: serious impact).**
- **Estuaries: Based on identifying pollution pressures. *Note PP on maps = Pollution Pressure.***
- **Based on desktop information and liaison with water quality managers.**
- **Following data sources used:**
  - **ISP 2004, Reserve 2014, PES/EIS review of Jan 2022, 2020 DWS Planning Review, DWS's IRIS, 2020 IUCMA Usuthu EcoStatus report, 2022 Green Drop report**

W1 (Mhlathuze): Water quality status quo



W2 (Umfolozi): Water quality status quo



W21B-02539 (iShoba). Large-Serious impact. Hlobane Mine; erosion.

Umfolozi/Umsinduzi Est: Very High PP – agriculture

W21A-02512 (aMagoda). Large impact. Vryheid impacts, esp. Klipfontein Dam.

W23A-03058 (Mbukwini) + W23A-03083 (Umfolozi). Large impact. Mining.

W23B-03231 + W23C-03180 (Umsinduzi). Serious impact. Irrigated sugarcane.

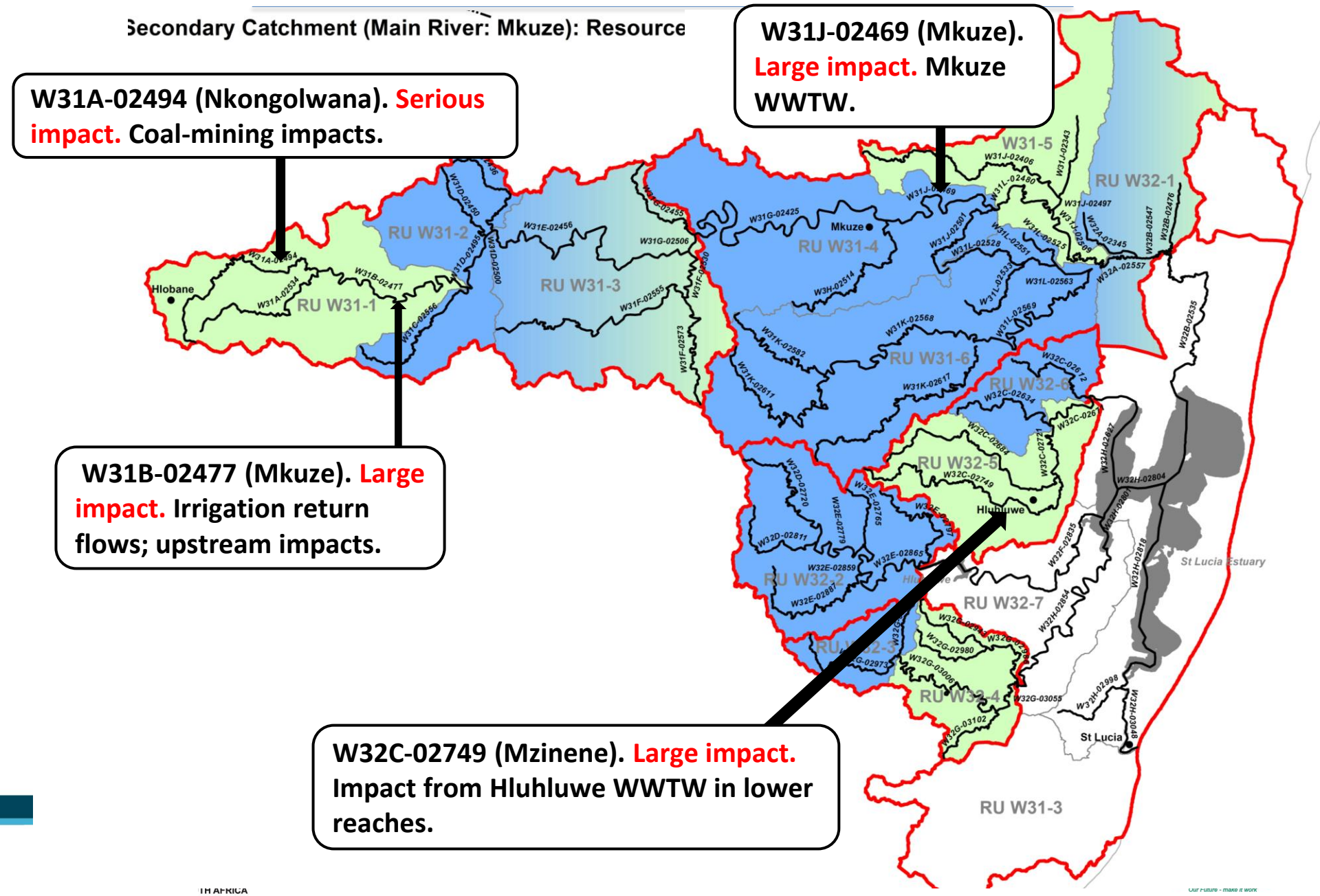
Large impact. Bank + gully erosion: W21D-02788 (Vumankala), W21D-02832 + W21D-02848 (Joiosi), W21E-02963 (Large-Serious), W21E-02912 + W21E-02873 (Nondweni), W21D-02676 (Mvunyane): Also settlements, WWTW.

W22J-02942 (Mvalo). Large-Serious impact. Zululand Anthracite Collieries impact.

W21K-02976 (Mbilane). Serious impact. WWTW + urban impacts; coal mining; erosion.

W23D-03108 (Umfolozi). Serious impact. Extensive urban impacts; irrigated sugarcane; extensive cultivation.

W3 (Mkuze): Water quality status quo



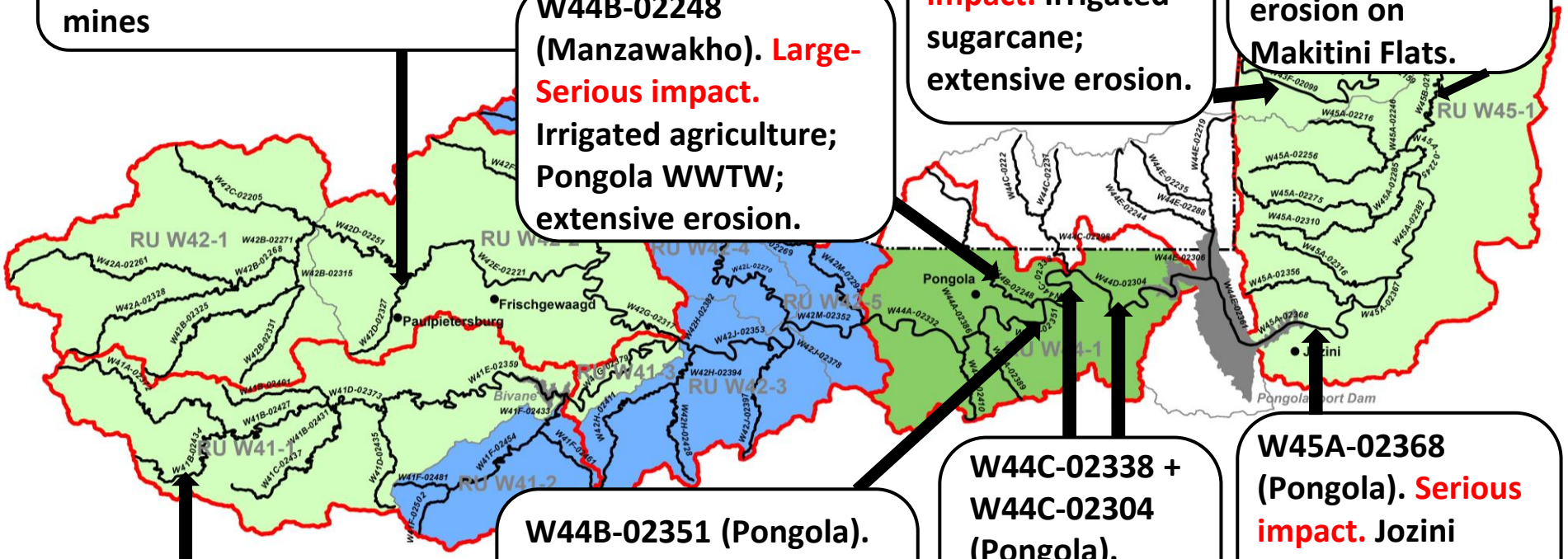
W4 (Pongola): Water quality status quo

W42D-02327 (Gode). **Large impact.** Paulpietersburg impacts; irrigation; operation and non-functional mines

W44B-02248 (Manzawakho). **Large-Serious impact.** Irrigated agriculture; Pongola WWTW; extensive erosion.

W43F-02099 (Ngwauma). **Large impact.** Irrigated sugarcane; extensive erosion.

W45B-02105 (Pongola). **Large impact.** High salinities due to agriculture; dense settlements; erosion on Makitini Flats.



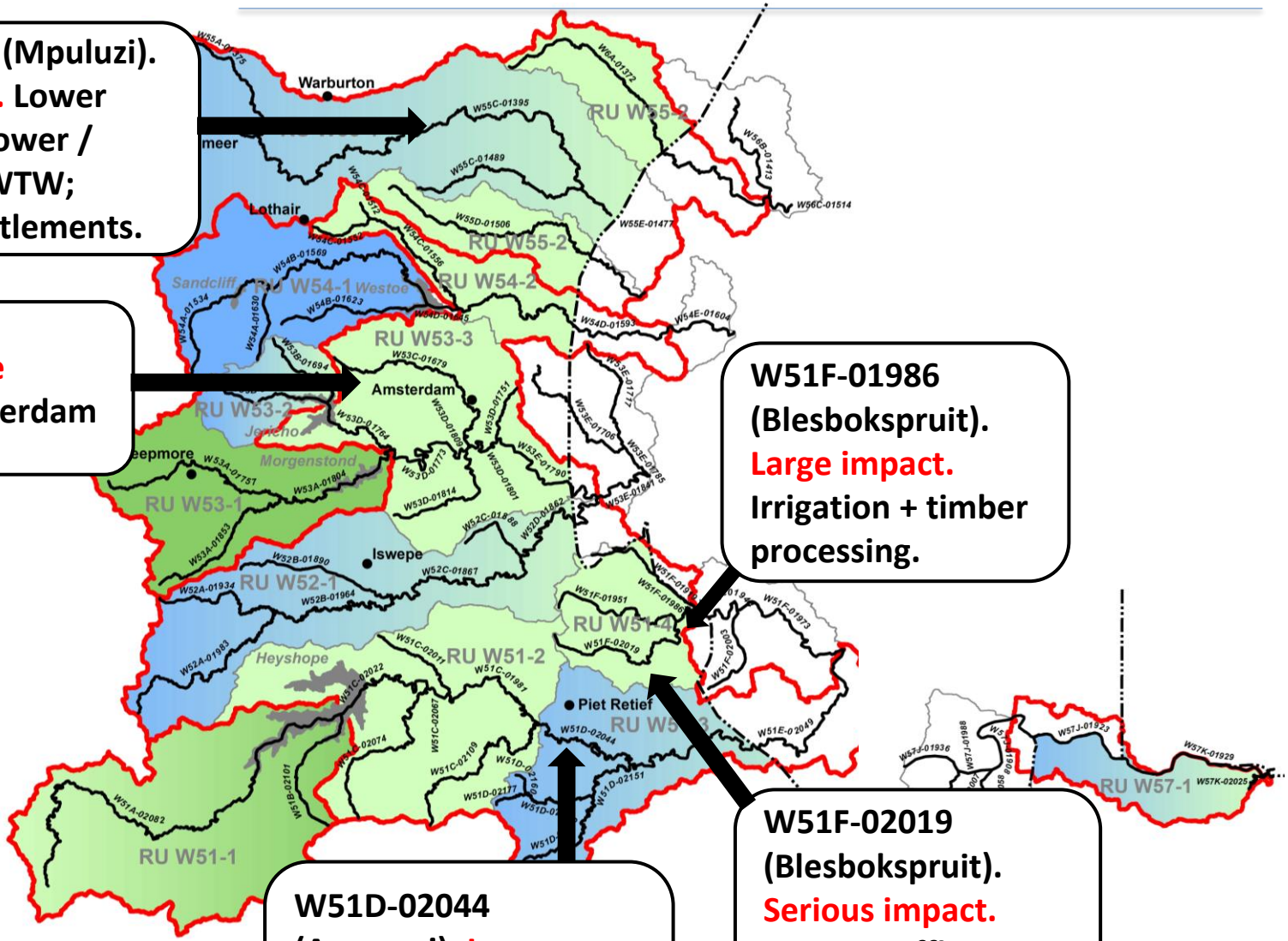
W41B-02434 (Soetmelks). **Large impact.** Kariboo Colliery; agriculture; erosion.

W44B-02351 (Pongola). **Serious impact.** Irrigated agriculture; urban impacts – Pongola town and RCL Sugar Mill.

W44C-02338 + W44C-02304 (Pongola). **Large-Serious impact.** Irrigated agriculture + return flows.

W45A-02368 (Pongola). **Serious impact.** Jozini WWTW; irrigated sugarcane; dense settlements.

W5 (Usutu): Water quality status quo



W55C-01395 (Mpuluzi). Large impact. Lower reach: Mayflower / Empuluzi WWTW; extensive settlements.

W53C-01679 (Thole). Large impact. Amsterdam WWTW.

W51F-01986 (Blesbokspruit). Large impact. Irrigation + timber processing.

W51F-02019 (Blesbokspruit). Serious impact. Tannery effluent; Thuthuka Forestry.

W51D-02044 (Assegaai). Large impact. Urban impacts from Piet Retief + Mpact.

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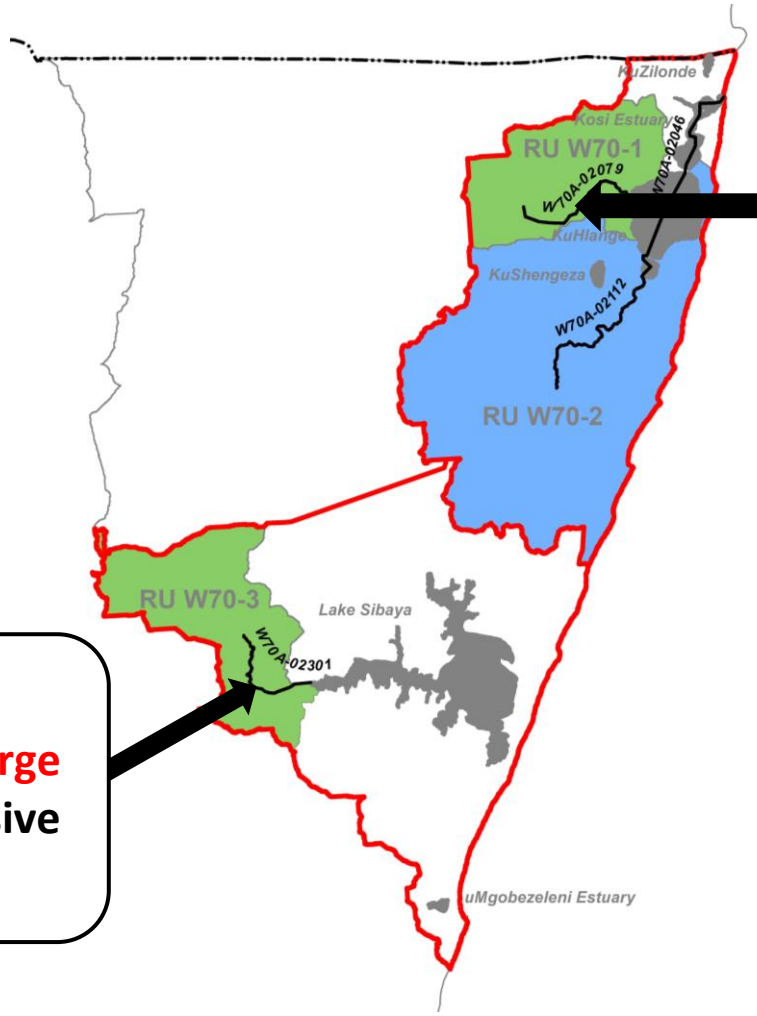
W7 (Kosi & Sibaya): Water quality status quo



W70A-02079 (Swamanzi). Large impact. Urban impacts; Manguzi WWTW.

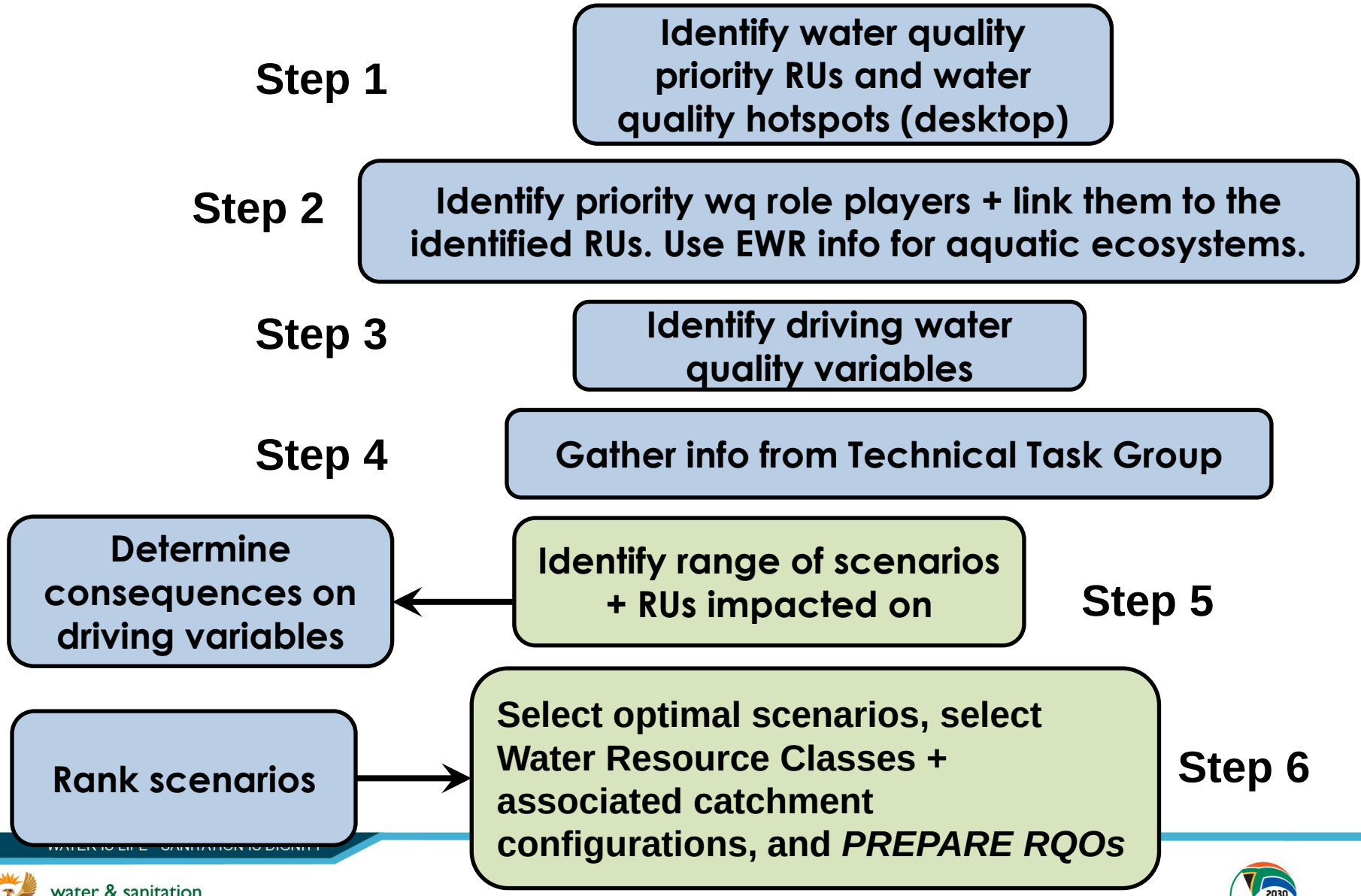
W70A-02301 (unnamed). Large impact. Extensive settlements.

WATER QUALITY INPUT NEEDED: STEPS 5 AND 6

- **Water quality = two broad components**
  - **Ecological, i.e. as part of the EWR process. Output = EcoSpecs.**
  - **Non-ecological or Users, i.e. UserSpecs (excl. aquatic ecosystems + includes users such as irrigation, stock-watering, domestic, recreation and industrial).**

- ***Now need to:***
  - **ID wq role players, including non-ecological e.g. irrigation, settlements**
  - **Start identifying indicators linked to driving variables associated with indicator wq role players, e.g. elevated *phosphate* associated with nutrients linked to stock-watering**
  - **Eventually identify pollution priority areas and / or priority protection areas**

USER WATER QUALITY STEPS: SCENARIOS



CONSEQUENCES ON WATER QUALITY PER SCENARIO AND PER RELEVANT RU AND IUA ARE SCORED USING THE DRIVING WATER QUALITY VARIABLES LINKED TO THE PRIMARY WATER QUALITY ROLE PLAYERS. NOTE THAT ALTHOUGH THE AQUATIC ECOSYSTEM IS THE RESOURCE BASE RATHER THAN A "USER", IT IS GROUPED AND EVALUATED WITH OTHER USERS FOR PURPOSES OF THIS STEP OF THE CLASSIFICATION PROCESS.

RESOURCE QUALITY OBJECTIVES

- **RQOs capture the Water Resource Class of the Classification System and the ecological needs determined in the Reserve into measurable management goals that give direction to resource managers as to how the resource needs to be managed.**

- ***"RQOs for a water resource are a numerical or descriptive statement of the conditions which should be met in the receiving water resource, in terms of resource quality, in order to ensure that the water resource is protected."***

WATER QUALITY COMPONENT OF RQOs

- **Water quality portion of the RQOs (aka Resource Water Quality Objectives) are the most stringent objectives considering all users (i.e. EcoSpecs (from the Reserve/EWR process) and UserSpecs)**
- **Narrative and qualitative statements will be used to describe water quality objectives**
- **Numerical limits provide a quantitative measure to be used for monitoring purposes and auditing compliance**
- **Main focus: An assessment of whether current levels of protection are adequate for the system**
- **All RQOs are linked to the catchment configurations that make up the Water Resource Class of IUAs**

PRIORITISATION OF RUs (to guide RQOs, so undertaken as part of Classification)

RU PRIORITY LEVELS BASED ON:

- **OUTCOME OF THE HOTSPOT ASSESSMENT**
- **AVAILABLE INFORMATION + ASSOCIATED CONFIDENCE**

RU priority level		Associated RQO
Low (1)	1a	Flow RQO. Habitat RQO in terms of Present Ecological State (PES) and Recommended Ecological Category (REC) (EcoStatus).
	1b	Habitat RQO in terms of PES and REC (EcoStatus) (total river length usually in declared conservation areas).
Moderate (2)	2	Flow RQO. Habitat and biota RQO (broad).
High (3)	3a	Forms part of RU represented by an EWR site.
	3b	EWR site. Flow RQO related to preferred scenario. Detailed habitat and biota RQO (EcoSpecs).
	3WQ	Water quality RQOs required as water quality is the driver at these sites. Habitat and biota RQO will be at a Priority level 2.

OBJECTIVES OF MEETING

- **Confirm water quality resource units: High Priority or Moderate where a driver**
- **Identify wq role players/users + their locations within the RUs**
- **Identify driving users in terms of water quality**
- **Identify wq variables that drive wq state or requirements**

- **HIGH PRIORITY SQRs ARE RIVER REACHES WITH A COMBINATION OF HIGH IMPORTANCE RATINGS AND WITHIN A GOOD STATE.**
- **RQOs AT DETAILED LEVEL MUST BE SET FOR RIVERS WITH HIGH PRIORITY SQRs.**
- **A HIGH PRIORITY SQR MEANS CAREFUL DECISION-MAKING RE: CHANGES TO CURRENT OPERATION OF REACH.**