

DETERMINATION OF WATER RESOURCE CLASSES, RESERVE AND RESOURCE QUALITY OBJECTIVES IN THE KEISKAMMA AND FISH TO TSITSIKAMMA CATCHMENTS WITHIN THE MZIMVUBU-TSITSIKAMMA WATER MANAGEMENT AREA (WP11354)

TECHNICAL TASK GROUP MEETING RESOURCE QUALITY OBJECTIVES

ESTUARIES
K, L, M, N and P - CATCHMENT

Presented by: GroundTruth and Collaborators
Directorate: Classification
Date: 6 June 2025

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ESTUARIES APPROACH

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PRIORITISATION OF RUs

- Estuaries is a single RU based on the Estuarine Functional Zone (EFZ) (previously done national scale by van Niekerk et al. 2019)
- Water resource importance (use/quality)
- High ecological importance (resource is currently/future stressed)
- Previous assessments
- Further considerations/inclusions:
 - High Ecological Category: A, A/B or B (High EC);
 - Critically endangered fish species
 - Carbon sequestration (mangrove, salt marsh & seagrass)
 - Nursery areas
 - Critically endangered species (other)



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RESOURCE QUALITY OBJECTIVES

- Study confidence & detail captured in RQOs is influence by :
 - Quality of the flow data & simulated hydrology – uncertainty we aggregate
 - Historical imagery (aerial photographs and satellite)
 - Information on mouth state (if relevant)
 - **Historical abiotic and biotic measurements and studies**
 - Do we understand the Reference/Natural conditions?
 - Time scales at which an estuary respond to flow (i.e. Keiskamma (weeks to months) vs East Kleinmonde (days))

Limited data available for SA estuaries, especially data matched with salinity data and river inflow data - Specialists often must use expert judgement/option

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Typical abiotic Conditions/States

Link states to flows

| State | Name | Flow range (m³/s) |
|---------|----------------------|-------------------|
| State 1 | Marine/brackish | < 0.2 |
| State 2 | Full Gradient | 0.2-0.5 |
| State 3 | Brackish/fresh | 0.5-20 |
| State 4 | Freshwater dominated | > 20 |

Define typical conditions associated with States

| State | Salinity | Temperature | pH | Dissolved Oxygen | Chlorophyll a | Chlorophyll b | Chlorophyll c | Chlorophyll total | Secchi depth | Turbidity | Water column depth |
|---------|----------|-------------|-----|------------------|---------------|---------------|---------------|-------------------|--------------|-----------|--------------------|
| State 1 | 35 | 18 | 8.2 | 5.0 | 0.5 | 0.5 | 0.5 | 1.5 | 1.0 | 1.0 | 1.0 |
| State 2 | 25 | 18 | 8.2 | 5.0 | 0.5 | 0.5 | 0.5 | 1.5 | 1.0 | 1.0 | 1.0 |
| State 3 | 15 | 18 | 8.2 | 5.0 | 0.5 | 0.5 | 0.5 | 1.5 | 1.0 | 1.0 | 1.0 |
| State 4 | 5 | 18 | 8.2 | 5.0 | 0.5 | 0.5 | 0.5 | 1.5 | 1.0 | 1.0 | 1.0 |

Changes from Reference to Present

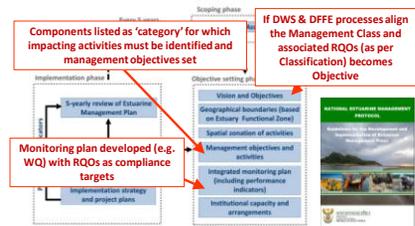
| State | Reference | Present |
|---------|-----------|---------|
| State 1 | 0.0 | 0.0 |
| State 2 | 0.0 | 0.0 |
| State 3 | 0.0 | 0.0 |
| State 4 | 0.0 | 0.0 |

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ESTUARY MANAGEMENT PLANS

National Estuarine Management Protocol requires Estuarine Management Plans (under Integrated Coastal Management Act)



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Estuary Mitigation Measures

- Restore/protect base flows, floods or groundwater
- Improve urban runoff (stormwater)
- **Manage agricultural runoff (e.g. fertilizing, buffer zones)**
- **Manage Plastic Pollution (storm water)**
- **Improve WWTW infrastructure/operations**
- Restore connectivity/ hydrodynamic functioning
- Improve mouth management
- Rehabilitate riparian areas/ wetlands
- **Remove alien vegetation**
- **Reduce grazing (sheep, cattle, goats)**
- **Implement cattle exclusion zone (browsing of mangroves)**
- **Control mangrove harvesting**
- **Control recreational activities (impacting on birds or seagrass)**
- **Manage/reduce fishing pressure/ bait collection**
- Restore/protect against impact from mining
- Investigate eradication of alien fish

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RESOURCE QUALITY OBJECTIVES: 83 Estuaries

| NAME | RES | Transect | RSC | TRC | Hydrology | Hydrodynamics | Water Quality (Salinity) | Water Quality (Nutrient) | Physical Habitat | Macroalgae | Macrobenthos | Invertebrates | Fish | Birds |
|-----------------------|-----|----------|-------|-------|-----------|---------------|--------------------------|--------------------------|------------------|------------|--------------|---------------|------|-------|
| Gxara (Qorha) | A/B | A | A-A/B | A-A/B | A | A | A | A | B | B | A | B | B | B |
| Ngqwane | B | B | B | B | B | B | A | B | B | B | B | B | B | B |
| Qolora (Qolorha) | B | B | B | B | A | B | A | B | B | B | B | B | B | B |
| Niciale | A/B | A-A/B | A-A/B | B | A | A | A | B | A | B | B | B | B | B |
| Yimba | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| Kobongaba (Kobongaba) | B | A/B | A/B | B | A | B | B | B | B | B | B | B | B | B |
| NzazonNgqusi | B | A/B | A/B | B | A | A | A | B | C | B | A | B | B | B |
| Cebe | A/B | A-A/B | A-A/B | B | A | A | A | B | B | A | A | B | B | B |
| Gumane | A/B | A-A/B | A-A/B | B | A | A | A | B | B | B | A | B | B | B |
| Zulu | B | B | B | B | A | B | A | B | B | B | B | B | B | B |
| Ngawara (Ngawarha) | A/B | A-A/B | A-A/B | B | A | A | A | B | B | B | B | B | B | B |
| Sibonhweni | A/B | A-A/B | A-A/B | B | A | A | A | B | B | A | A | B | B | B |
| Nehelide | A/B | B | B | B | B | A | A | B | B | A | A | B | B | B |
| Gora (Gorha) | B | A/B | A/B | B | A | A | A | B | B | B | B | B | B | B |
| Jubura (Juburha) | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| Nwala | A/B | A-A/B | A-A/B | B | A | A | A | B | B | A | A | B | B | B |

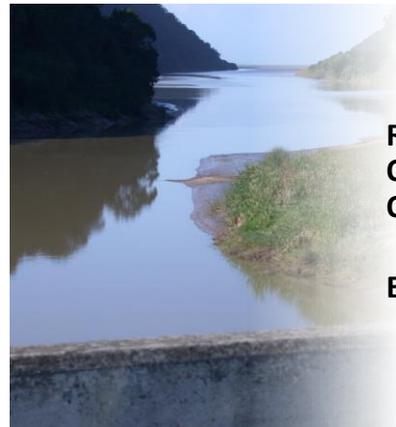
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RESOURCE QUALITY OBJECTIVES: 83 Estuaries

Detail available for all systems

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RESOURCE QUALITY OBJECTIVES ESTUARIES

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SUMMARY OF IUAs – PRIORITY RU

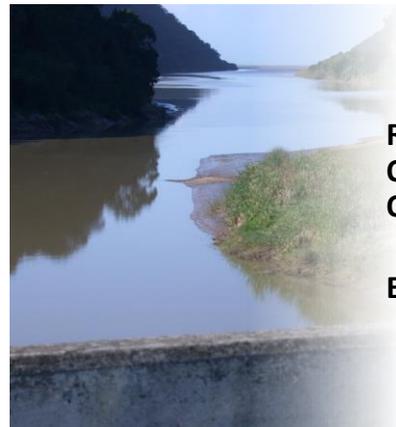
| IUA No. | IUA Code | Estuaries |
|---------|----------|-----------|
| 1 | IUA_K01 | ✓ |
| 2 | IUA_KL01 | ✓ |
| 3 | IUA_L01 | ✗ |
| 4 | IUA_M01 | ✓ |
| 5 | IUA_LN01 | ✗ |
| 6 | IUA_N01 | ✗ |
| 7 | IUA_P01 | ✓ |



RESOURCE QUALITY OBJECTIVES ESTUARIES

| IUA No. | IUA Code | Estuaries |
|---------|----------|----------------------------------------------------------------------------|
| 1 | IUA_K01 | Lottering, Elandsbos, Storms, Elands, Groot (Oos) |
| 2 | IUA_KL01 | Kromme, Kabeljous, Gamtoos |
| 4 | IUA_M01 | Van Staders, Swartkops |
| 7 | IUA_P01 | Kariega, Bushans, Kowie, Kasouga, Riet, West Kleinemonde, East Kleinemonde |

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RESOURCE QUALITY OBJECTIVES ESTUARIES

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THANK YOU!

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All study reports can be accessed from the DWS
website: <https://www.dws.gov.za/RDM/WRCS/>

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