water affairs

Department:
Water Affairs
REPUBLIC OF SOUTH AFRICA

# Estuary EcoClassification & identification of hotspots

## PRESSURES, PRESENT ECOLOGICAL STATUS, ECOLOGICAL IMPORTANCE, HOTSPOTS

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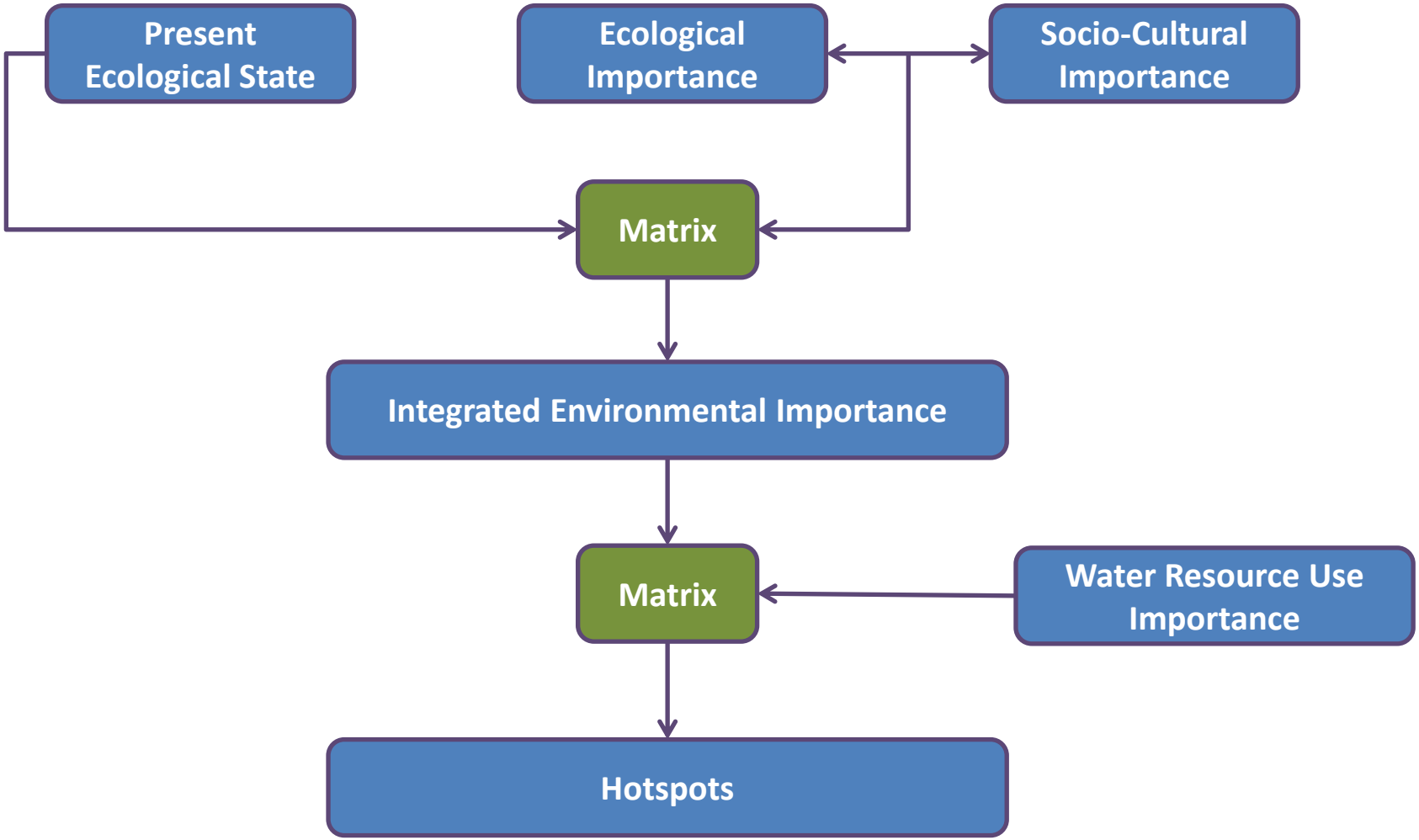
# OUTLINE

- Geographical Boundaries
- Evaluate pressures
- Define Present Ecological Status
- Importance (national and regional)
- Determining the Recommended Ecological Category
- Hotspot identification
- Estuaries EWR and recommendations

# PURPOSE OF THIS STUDY

- 64 estuaries in WMA
- Do not have long-term data sets available to evaluate individual in detail
- Hotspot screening process to identify key estuaries for additional work (including 7 completed EWR studies)
- Provide sufficient information for authorities to move forward with resource allocation and management

# HOTSPOT PROCESS



1: Delineate units of analysis and describe the status quo

2: Initiation of stakeholder process and catchment visioning

3: Quantify EWRs and changes in EGSA

5: Stakeholder process

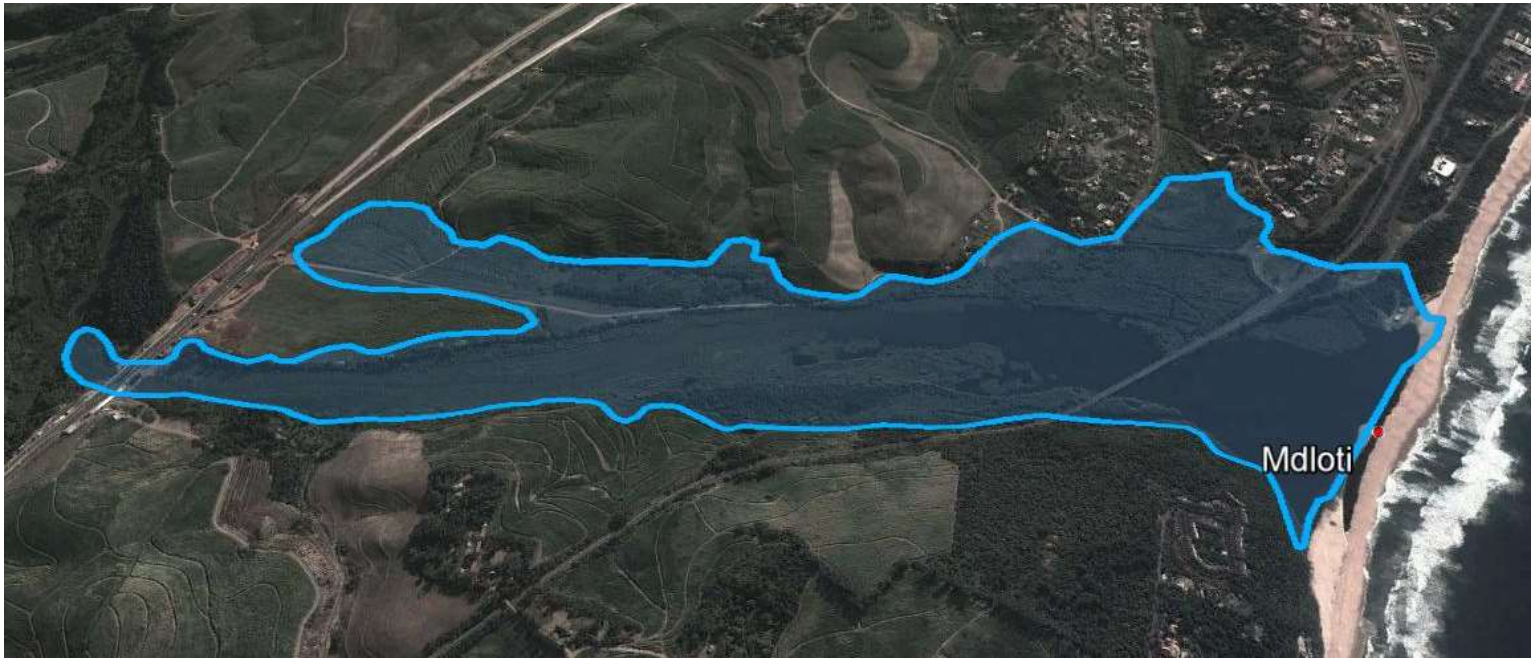
6: Resource Quality Objectives (EcoSpecs & water quality (user))

7: Gazette class configuration

# DESKTOP ESTUARY ECOCLASSIFICATION AND EWR: Where does it fit in?

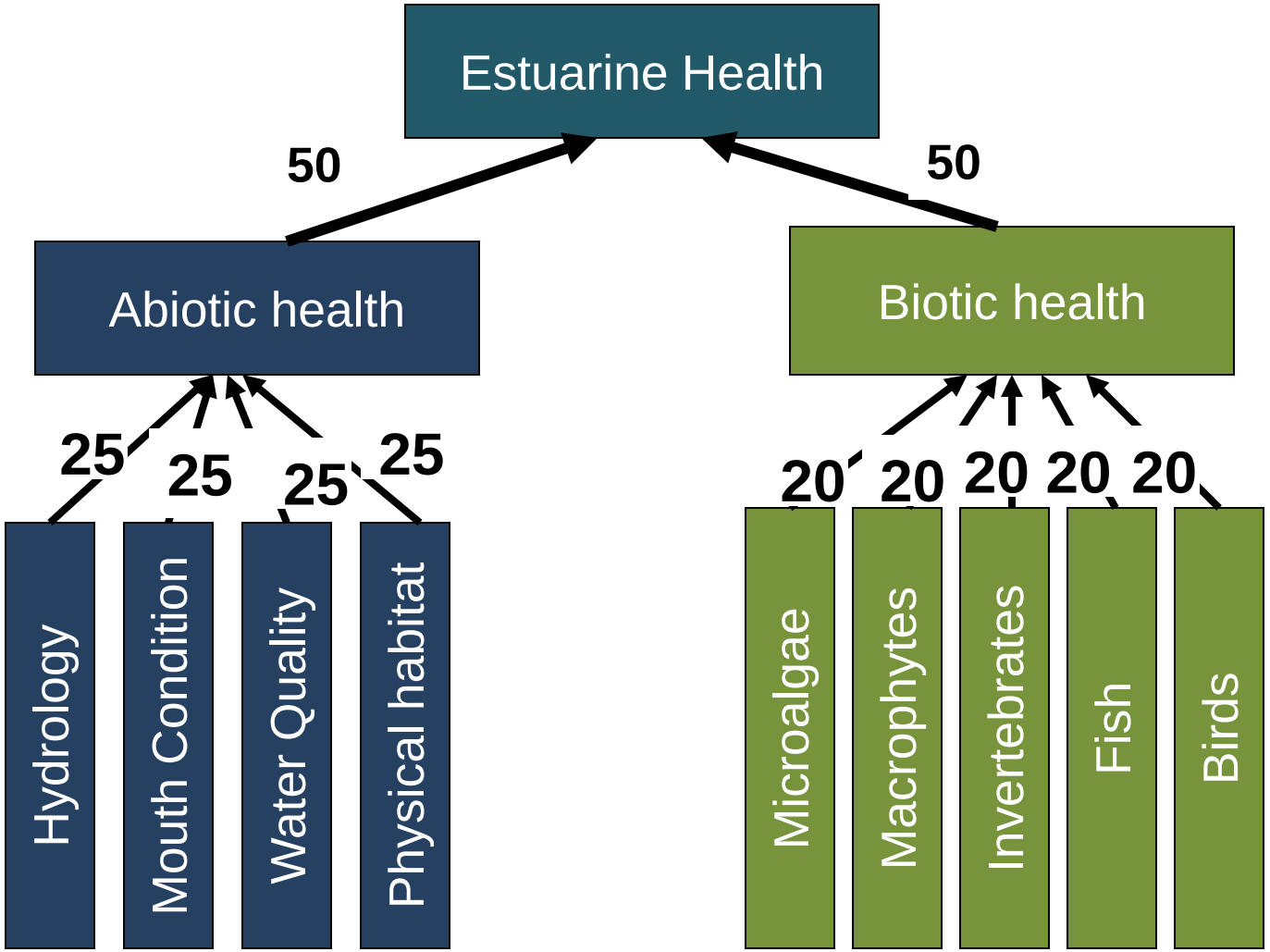
# GEOGRAPHICAL BOUNDARIES

- 5 m mean sea level contour from Survey General
- Modify with KNZ database (B Escott) AND Forbes & Demetriades (2009)
- Confirmed at workshop by regional experts



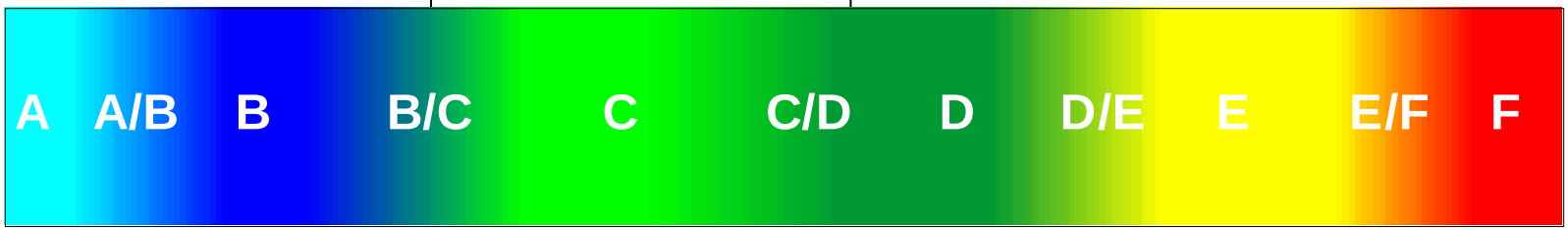

**Mdloti Estuary boundaries**

# ESTUARINE HEALTH INDEX

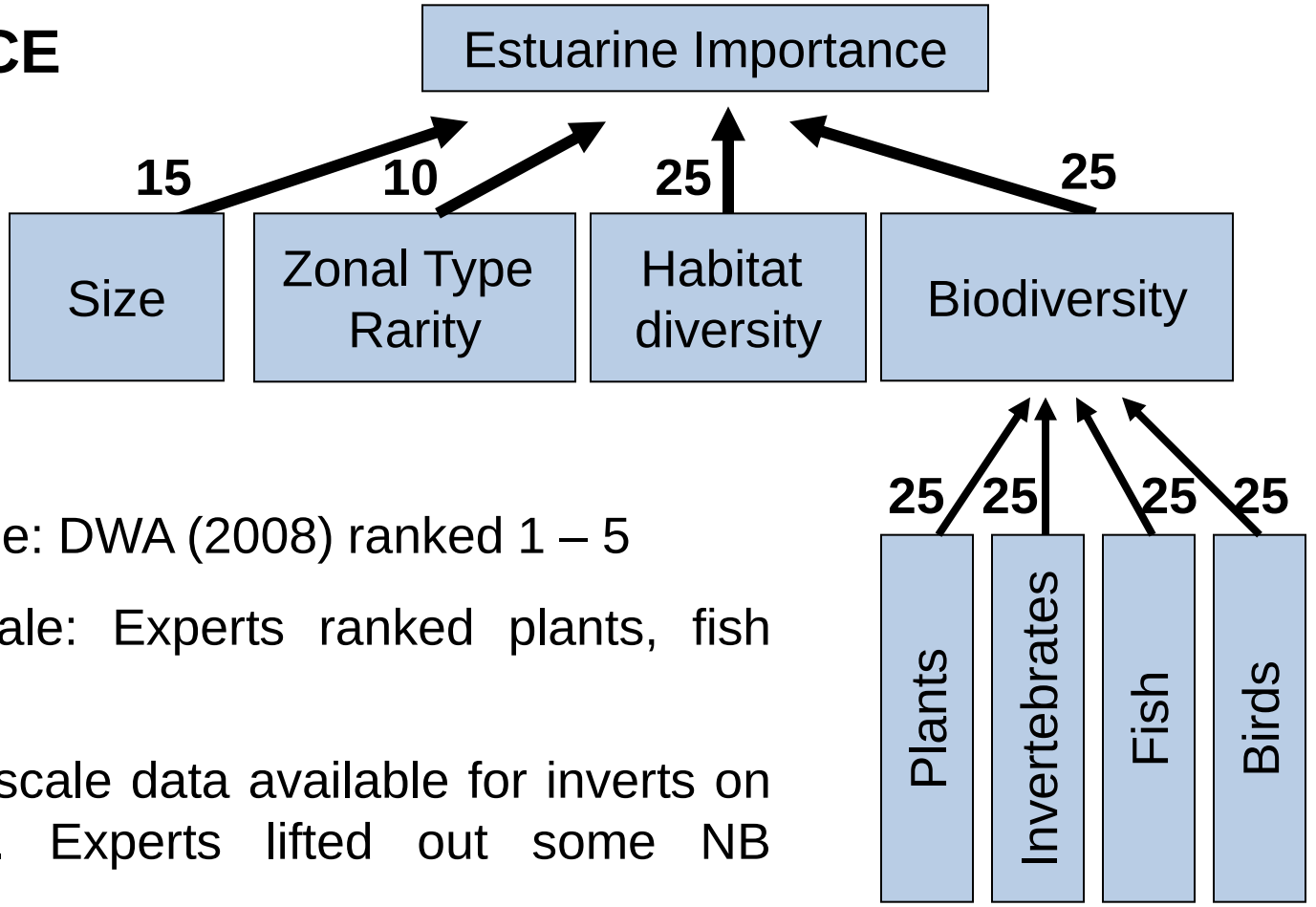


# DEFINE PRESENT STATUS CATEGORY

| EHI Score | Present Status Category | General Description |
|---|---|---|
| 91 - 100 | A | Unmodified, natural |
| 76 - 90 | B | Largely natural, few modifications |
| 61 - 75 | C | Moderately modified |
| 41 - 60 | D | Largely modified |
| 21 - 40 | E | Highly degraded |
| 0 - 20 | F | Extremely degraded |



# ESTUARINE IMPORTANCE




- National scale: DWA (2008) ranked 1 – 5
- Regional scale: Experts ranked plants, fish and birds.
- No regional scale data available for inverts on all systems. Experts lifted out some NB systems.
- Used **<u>maximum of national or regional</u>** importance

# RECOMMENDED ECOLOGICAL RESERVE CATEGORY

| PROTECTION STATUS/ IMPORTANCE | ECOLIGICAL RESERVE CATEGORY |
|---|---|
| Protected Area | A or Best Attainable Status (BAS) |
| Desired Protected Area | A or Best Attainable Status |
| Highly important (rated = 5) | Present Status Category +1, min B, or BAS |
| Important (rated = 4) | Present Status Category +1, min C, or BAS |
| Low to average importance (≤ 3) | Present Status Category, min D |

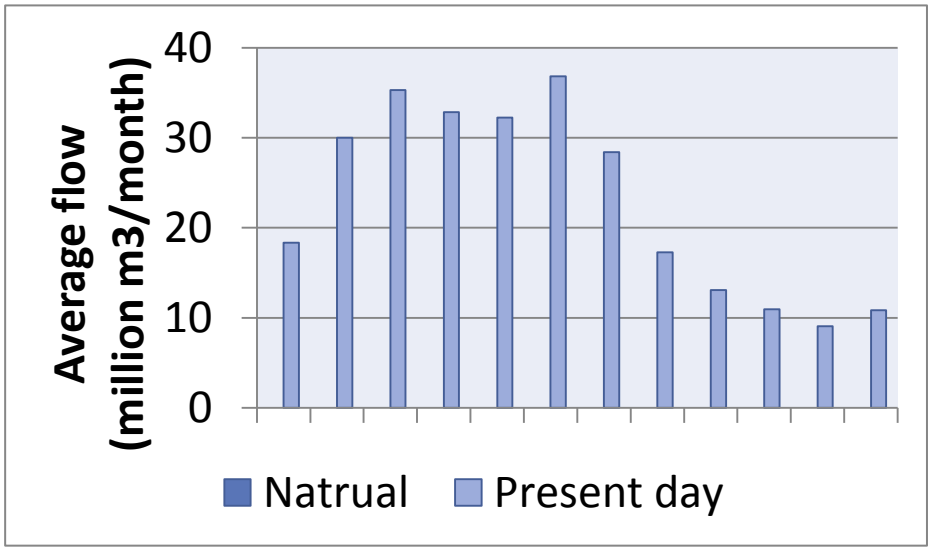
‘Present Status Category = ‘B’ & ‘Highly important ’

REC Should be = A

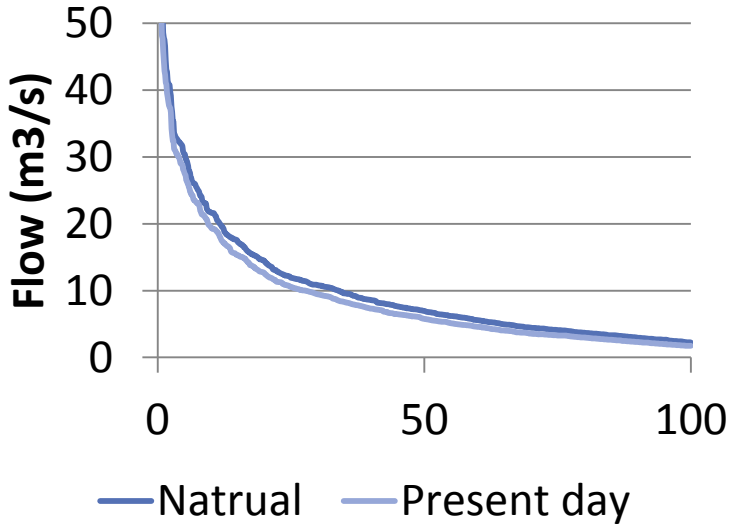
However, not likely to attain ‘A’, thus go for BAS = ‘B’

# HYDROLOGY

- Reference flow scenario
- Present flow scenarios
  - WWTW, forestry, stormwater




| | Natural | Present Day |
|---|---|---|
| Oct | 18.35 | 15.86 |
| Nov | 30.02 | 25.61 |
| Dec | 35.30 | 30.14 |
| Jan | 32.86 | 28.18 |
| Feb | 32.24 | 27.98 |
| Mar | 36.83 | 32.51 |
| Apr | 28.43 | 25.87 |
| May | 17.26 | 15.55 |
| June | 13.09 | 11.59 |
| July | 10.95 | 9.49 |
| Aug | 9.06 | 7.57 |
| Sep | 10.82 | 9.15 |



# EXAMPLE OF DESKTOP HEALTH ASSESSMENT

| IUA Code | Name | Hydrology | Hydrodynamics | Water Quality | Physical habitat | Habitat Score | Microalgae | Macrophytes | Invertebrates | Fish | Birds | Biological Score | PES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T40E-05869 | Mtamvuna | B | A | A | B | B | B | B | C | C | B | B | B |
| T40F-05953 | Zolwane | A | A | A | A | A | A | B | B | C | B | B | B |
| T40F-05923 | Sandlundlu | A | A | B | C | B | B | C | D | E | D | D | C |
| T40F-05928 | Ku-Boboyi | A | B | B | B | B | B | B | B | C | C | B | B |
| T40F-05879 | Tongazi | A | A | B | B | B | B | C | D | C | C | C | B |
| T40F-05884 | Kandandhlovu | A | B | C | C | B | B | C | D | C | C | C | B |
| T40F-05770 | Mpenjati | A | A | B | D | B | B | C | D | D | B | C | B |
| T40F-05839 | Umhlangankulu | A | A | D | D | C | C | D | E | D | C | D | C |
| T40F-05820 | Kaba | A | A | C | C | B | B | C | C | D | C | C | C |
| T40F-05666 | Mbizana | A | A | B | C | B | B | C | C | C | B | B | B |
| T40G-05773 | Mvutshini | A | B | C | B | B | B | C | C | C | C | C | B |
| T40G-05722 | Bilanhlolo | A | A | C | D | B | C | D | D | D | D | D | C |
| T40G-05768 | Uvuzana | A | A | C | C | B | B | C | D | D | D | C | C |
| T40G-05739 | Kongweni | E | E | D | D | D | E | E | D | D | D | D | D |
| T40G-05616 | Vungu | B | A | C | B | B | C | B | C | C | C | C | B |
| T40G-05644 | Mhlangeni | B | B | C | D | C | C | D | D | D | C | C | C |

# SUMMARY OF HEALTH ASSESSMENT RESULTS

| Category | No. of Estuaries | % Estuaries | Estuary Area (ha) | % Estuary Area |
|---|---|---|---|---|
| A | 0 | 0 | 0 | 0.0 |
| B | 19 | 30 | 425.59 | 15.6 |
| C | 33 | 52 | 782.99 | 28.6 |
| D | 6 | 9 | 228.92 | 8.4 |
| E | 5 | 8 | 1271.94 | 46.5 |
| F | 1 | 2 | 26.6 | 1.0 |
| | 64 | 100 | 2736.04 | 100 |

- While more than 80% of estuaries are in a B or C category, nearly 50% of estuarine area is in a E category

# ESTUARIES OF HIGH CONSERVATION IMPORTANCE

| NAME | PES | REC |
|---|---|---|
| Mtamvuna | B | A or BAS |
| Mpenjati | B | A or BAS |
| Zotsha | B | A/B or BAS |
| Mzimkulu | B | A/B or BAS |
| Damba | C | A/B or BAS |
| Koshwana | C | A/B or BAS |
| Intshambili | C | A/B or BAS |
| Mhlabatshane | B | A/B or BAS |
| Mfazazana | C | A/B or BAS |
| Kwa-Makosi | B | A/B or BAS |
| Mahlongwa | C | A/B or BAS |
| Mahlongwane | C | A/B or BAS |

| NAME | PES | REC |
|---|---|---|
| Mkomazi | C | B |
| Umgababa | C | A/B or BAS |
| Msimbazi | B | A/B or BAS |
| Lovu | C | A/B or BAS |
| Sipingo | F | E |
| Durban Bay | E | D |
| Mgeni | E | D |
| Mhlanga | D | ***B**** |
| Mhlali | C | B |
| Mvoti | D | D |
| Mdlotane | B | A/B or BAS |
| Zinkwasi | C | A/B or BAS |

- 24 estuaries with high national and/or regional biodiversity conservation importance

# WATER RESOURCE UTILIZATION

| NAME | PES | REC | Very high rating = 4 |
|---|---|---|---|
| Mkomazi | C | B | Future development |
| Durban Bay | E | D | Operational, water quality |
| Mgeni | E | D | Use, operational, water quality |
| Mhlanga | D | B* | Use, water quality |
| Mdloti | D | C* | Use, operational, water quality |
| Tongati | D | D* | Use |
| Mvoti | D | D | Future development |

- 7 estuaries with high (=4) Water Resource Utilization rating

# SOCIO-ECONOMIC USES

| NAME | PES | REC | Ecosystem Services Value |
|---|---|---|---|
| Mtamvuna | B | A or BAS | Moderate |
| Mpenjati | B | A or BAS | Moderate |
| Mbizana | B | B | Moderate |
| Kongweni | D | D | High |
| Vungu | B | B | Moderate |
| Mzimkulu | B | A/B or BAS | Moderate |

- 22 estuaries with medium to medium high ecosystem service values

| | | | |
|---|---|---|---|
| Mzimayi | C | C | Moderate |
| Mpambanyoni | C | C | Moderate |
| Mkomazi | C | B | Moderate |
| Umgababa | C | A/B or BAS | Moderate |
| Msimbazi | B | A/B or BAS | Moderate |
| Durban Bay | E | D | Moderate |
| Mgeni | E | D | High |
| Mhlanga | D | ***B**** | High |
| Mdloti | D | C* | Moderate |
| Zinkwasi | C | A/B or BAS | Moderate |

# Estuary Hotspots

| NAME | PES | Ecological & Conservation Importance | Ecosystem Services Value | Water Resource Use | EWR Status |
|---|---|---|---|---|---|
| Kandandhlovu | B | 2 | Moderate | 3 | **Potential focus** |
| Vungu | B | 2 | Moderate | 3 | EWR Rapid |
| Zotsha | B | 5 | Moderate | 3 | EWR Rapid |
| Mkomazi | *C* | 5 | Moderate | 4 | **This study** |
| Umgababa | *C* | 5 | Moderate | 3 | **Potential focus** |
| Sipingo | F | 3 | Low | 3 | Airport development |
| Durban Bay | *E* | 5 | Moderate | 4 | Harbour |
| Mgeni | *E* | 5 | High | 4 | EWR Rapid |
| Mhlanga | *D* | 5 | High | 4 | EWR Rapid |
| Mdloti | D | 4 | Moderate | 4 | EWR Intermediate |
| Tongati | D | 4 | Moderate | 4 | EWR Intermediate |
| Mhlali | C | 5 | Low | 3 | **Potential focus** |
| Mvoti | D | 5 | Low | 4 | **This study** |

- 14 estuaries keyed out as hotspots

# RECOMMEND FOR FURTHER WORK

| Estuary | EWR level |
|---|---|
| **Mvoti** | Intermediate |
| **Mkomazi** | Intermediate |
| **Mhlali/ Umgababa** | Rapid |

Reference: DWAF (2008) Water Resource Protection and Assessment Policy Implementation Process. Resource Directed Measures for protection of water resources: Methodology for the Determination of the Ecological Water Requirements for Estuaries. Version 2. Pretoria.

# ESTUARIES EWR AND RECOMMENDATIONS

| ESTUARY | nMAR | pMAR | PES | REC | ECOLOGICAL IMPORTANCE | FLOW | WATER QUALITY | NON-FLOW | POTENTIAL RESOURCE DEVELOPMENT | ASPECTS THAT NEEDS TARGETING FOR RESTORATION /REHABILITATION |
|---|---|---|---|---|---|---|---|---|---|---|
| **Mtamvuna** | 275.2 | 239.5 | B | A or BAS | **5** | | | | 5-10% | Flow modification, water quality, some habitat destruction |
| **Mpenjati** | 23.6 | 23.6 | B | A or BAS | **5** | | **X** | **X** | | Water quality, habitat destruction |
| **Mbizana** | 36.3 | 35.5 | B | B | **3** | | | **X** | <5% | |
| **Mbango** | 3.0 | 7.3 | E | D | **3** | **X** | **X** | **X** | | Flow modification, very poor water quality, severe habitat destruction |
| **Mahlongwa** | 13.76 | 13.2 | C | A/B or BAS | **5** | | **X** | **X** | | Medium fishing pressure, poor water quality, habitat destruction |
| **Little aManzimtoti** | 2.8 | 6.6 | **E** | D | **3** | **X** | **X** | **X** | | Significant flow increase, poor water quality, habitat destruction |
| **Nonoti** | 36.2 | 34.7 | C | B | **3** | | **X** | **X** | <5% | Poor water quality, some habitat destruction |