



**INKOMATI-USUTHU**

CATCHMENT MANAGEMENT AGENCY



# **Resource Quality Data Management Within Inkomati Usuthu WMA, South Africa**

## **Blue Deal Southern Africa Meeting**

### **25 November 2022**

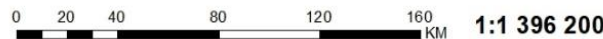


# INKOMATI USUTHU WMA

The WMA comprises of four Catchments :

- Sabie/Sand Catchment,
- Crocodile Catchment,
- Komati Catchment and
- Usuthu Catchment

Inkomati-Usuthu WMA forms part of Inkomati-Maputo River Basin, South Africa.



1:1 396 200

Date: 2022/09/01



# RESOURCE QUALITY MONITORING PROGRAMME(S)

- “Can’t manage what you can’t measure”
- Measurement equals monitoring
- **IUCMA** has the following Monitoring Programme(s):

❖ Water Quantity

❖ Water Quality

❖ River Eco-status Monitoring programme (REMP)



Surface and Groundwater



# RESOURCE QUALITY MONITORING OBJECTIVES

- IUCMA conducts regional monitoring within the Inkomati-Usuthu WMA which feeds into the national monitoring system.
- Regional resource monitoring objectives is to **measure, assess** and **report** on water resource compliance status and trends.
- Relating to **quantity, quality** and **aquatic ecosystem** in a manner that support balanced decision-making and planning for management, protection and sustainable use of water resources.



# MONITORING SYSTEMS

Surface water monitoring systems within Inkomati-Usuthu WMA:

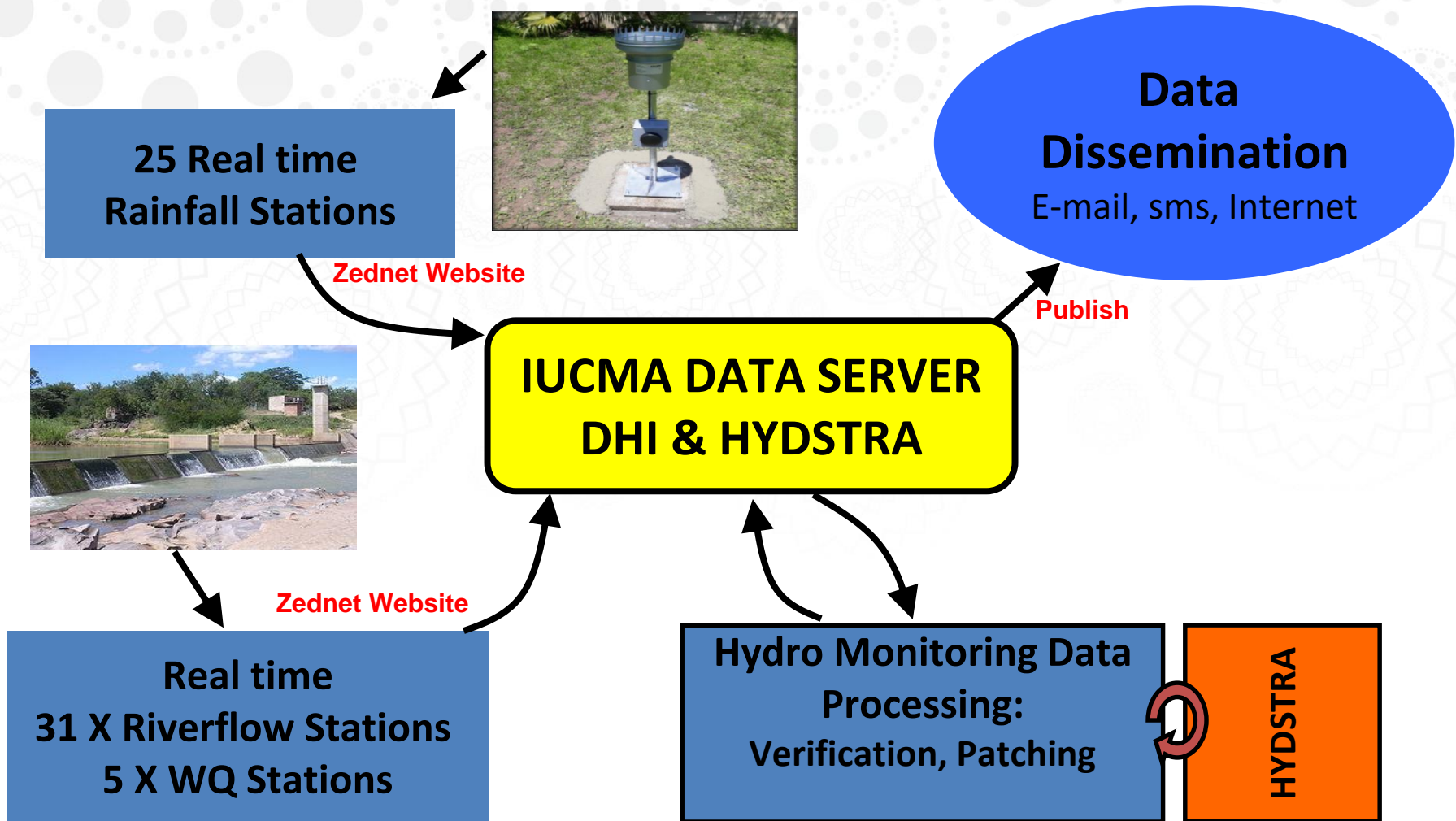
## – **Water Flow/ Quantity Monitoring Systems**

- Continuous monitoring
- Rectangular and Triangular Weirs
- Level Measurement

## – **Water Quality Monitoring Systems**

- Continuous monitoring ( Aqua Toll probes)
- Field measurements (Handheld probes)
- Grab and integrated samples (Eutrophication)
- Satellite imagery (Cyanolakes Application)

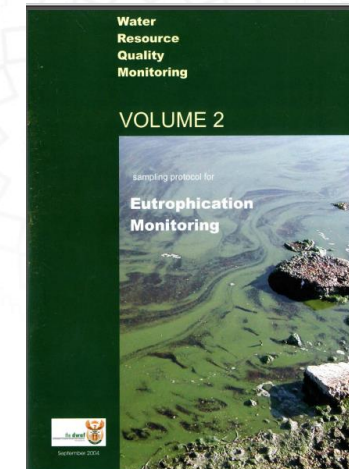
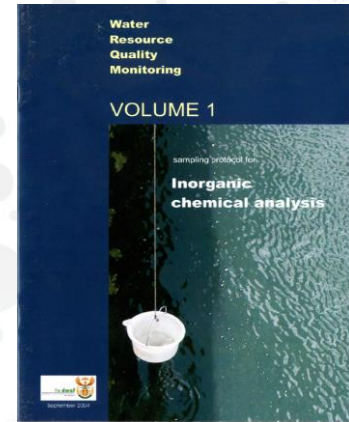
# DATA COLLECTION AND VALIDATION



# DATA COLLECTION AND VALIDATION

Monthly water quality data is collected using the following techniques:

- **Grab samples** – As per the sampling protocol.
  - Samples are submitted to the South African National Accreditation System (SANAS) accredited Laboratory for analysis.
- **Field measurements**- As per the manual procedure(s).
  - Regular service and calibration of the monitoring devices to ensure accuracy of the results.
- **Satellite imagery** – As per operating procedure(s).
  - Monthly sampling for algae identification through National Eutrophication Monitoring Programme (NEMP).



# INFORMATION MANAGEMENT SYSTEMS

**Hydstra database:** Stores, process and archive data that IUCMA collects (hydrological, groundwater and water quality) into a single database.

**HydroNet application:** provide easy access to a wealth of essential external hydrological, meteorological and uploaded water quality data to support IUCMA functions and operations.

**Water Management Systems** - provide comprehensive and integrated water quality management data and information for quality managers.

**Cyanolakes application:** Monitoring of cyanobacteria using satellite imagery.





# HYDRONET APPLICATION

## Water Quality Component

- Upload the data on the HydroView
- View all available data
- Export data to HydroWatch
- Turn data into information (Set thresholds)
- Configure maps and charts to fit your needs
- Export maps and charts to your dashboard
  - Used to compile reports
  - Share the information with stakeholders



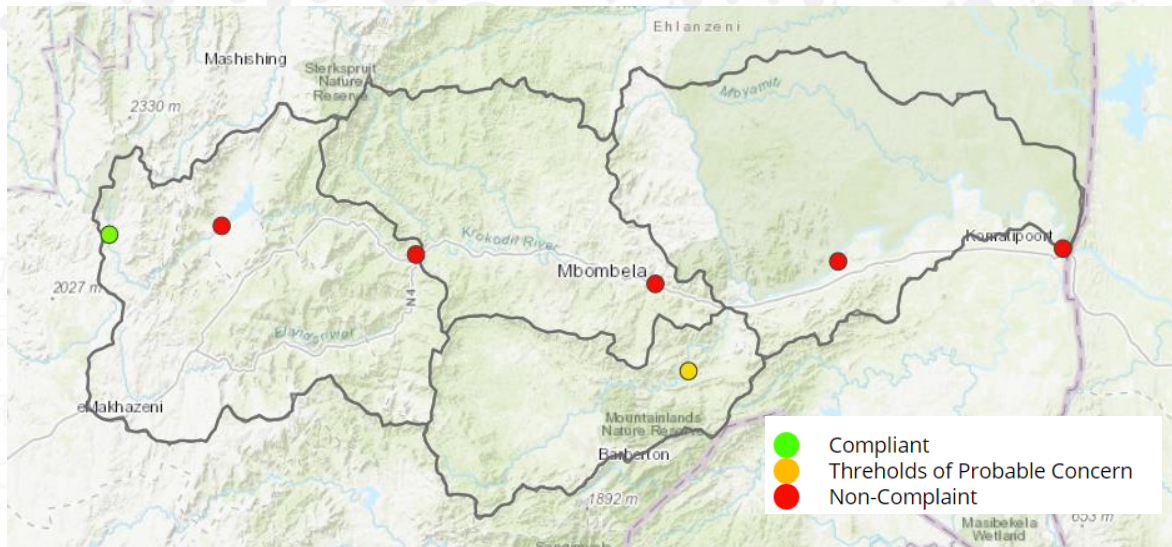
HydroView



HydroWatch 2.0

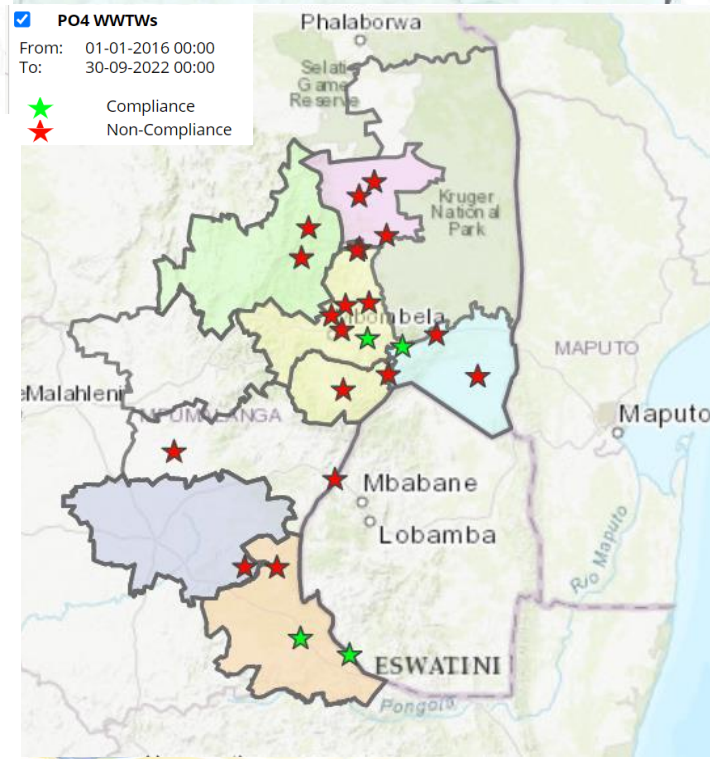
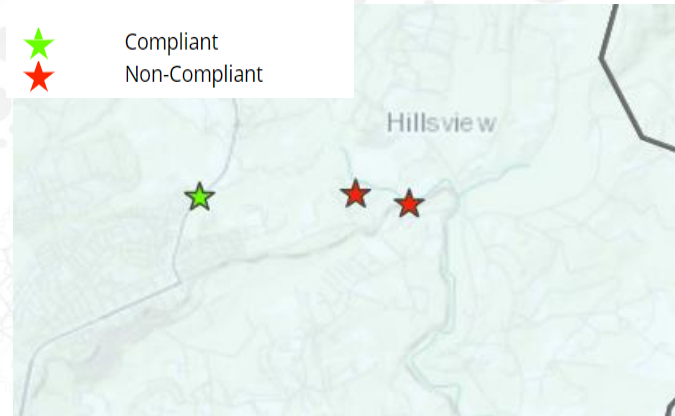
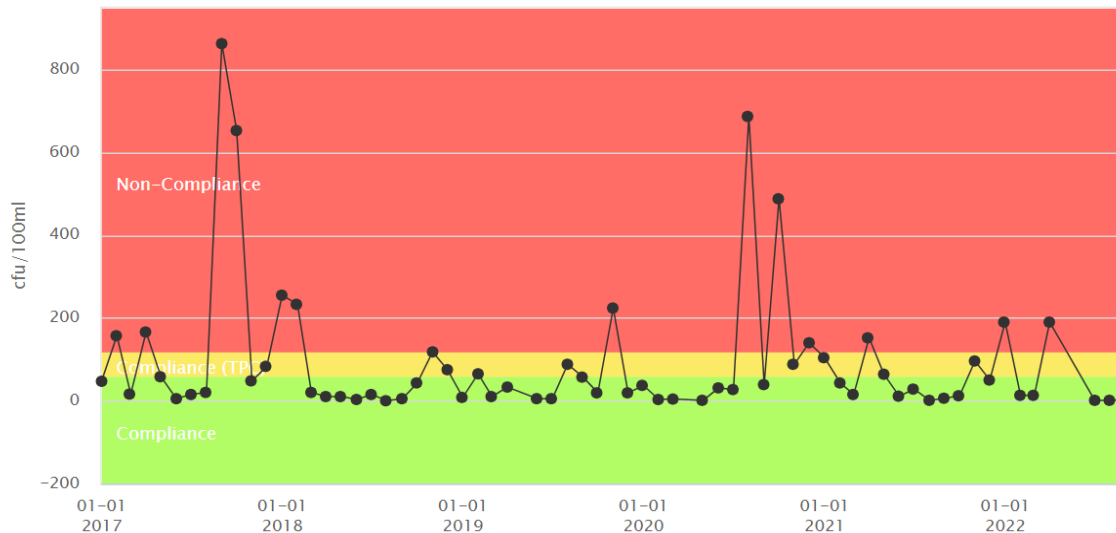
# DATA INTO INFORMATION: MAPS AND CHARTS

## WATER QUALITY MANAGEMENT



E coli Crocodile EWR Sites–Crocodile river @ Dullstroom

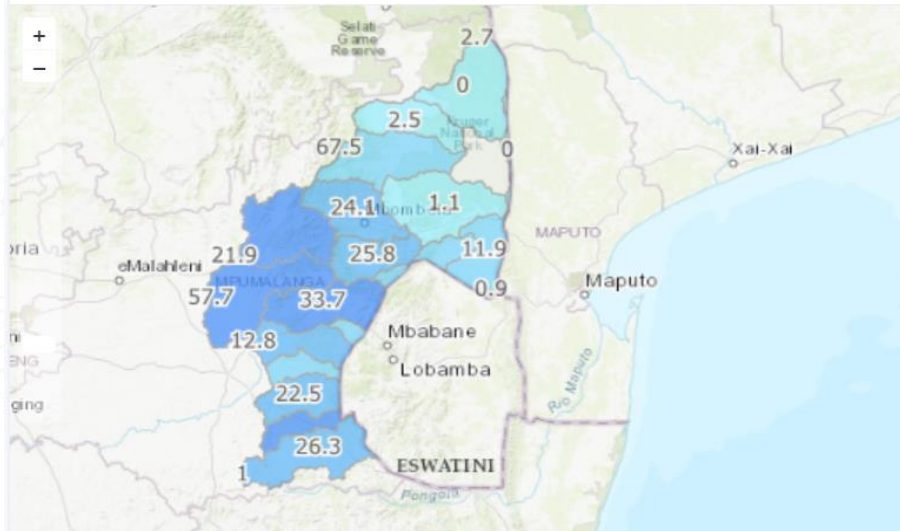
HydroNET



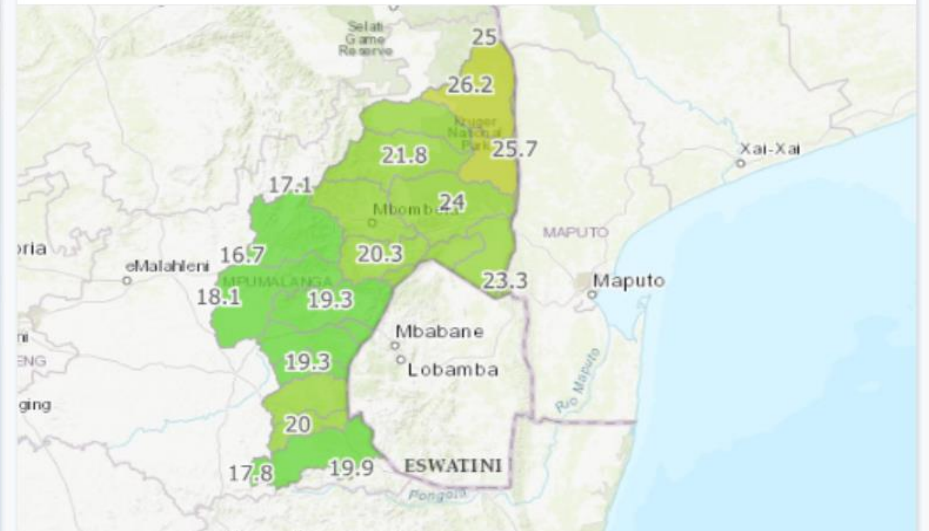
# DATA INTO INFORMATION: DASHBOARD

## WATER QUANTITY MANAGEMENT

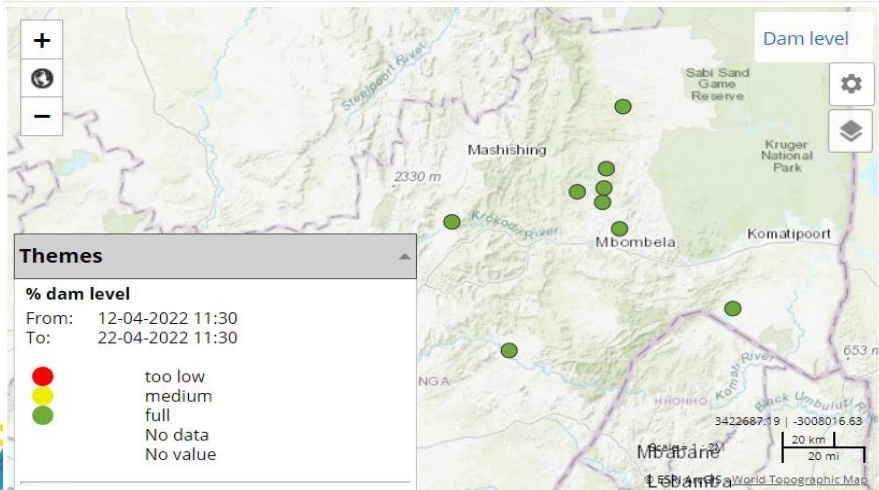
Precipitation Forecast



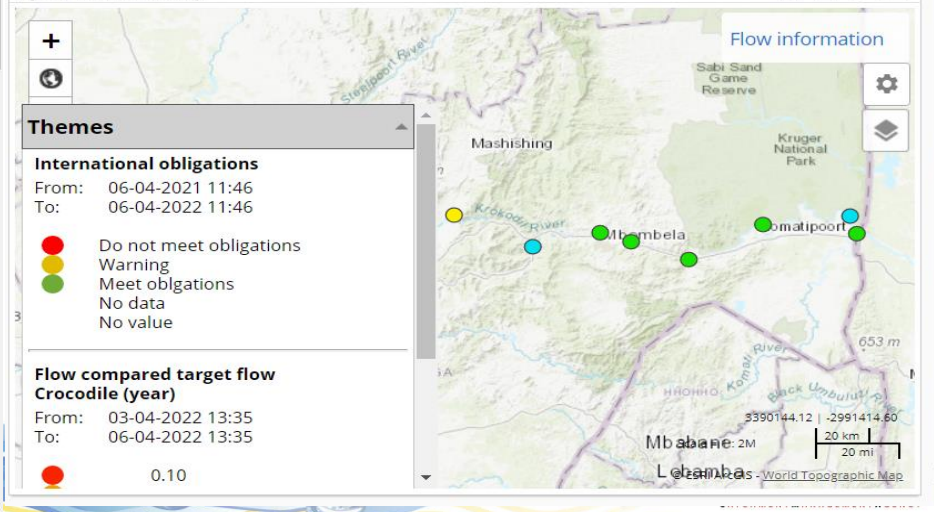
Temperature Forecast



HydroWatch 2.0 Map



Hydrowatch 2.0 map



# IUCMA WATER EARLY WARNING SYSTEM

IUCMA Water Early Warning - Data Analyses and Reporting Engine

**Dashboard**

- Info
- About

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- Dashboard
- Floods
- Droughts
- Water Quality
- Communication
- DARE configuration
- User administration

## IUCMA Water Early Warning

Data Analyses and Reporting Engine

version: 4.2.8183.44440

**Module :** PostgreSQL

Web uploads enabled.

File based indicators enabled.

FloodWatch indicators disabled.

**Latest Assessments**

**Floods**

**Drought**

**Water quality**

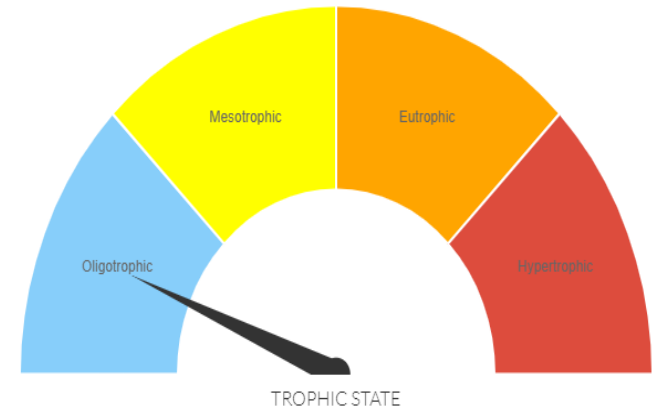
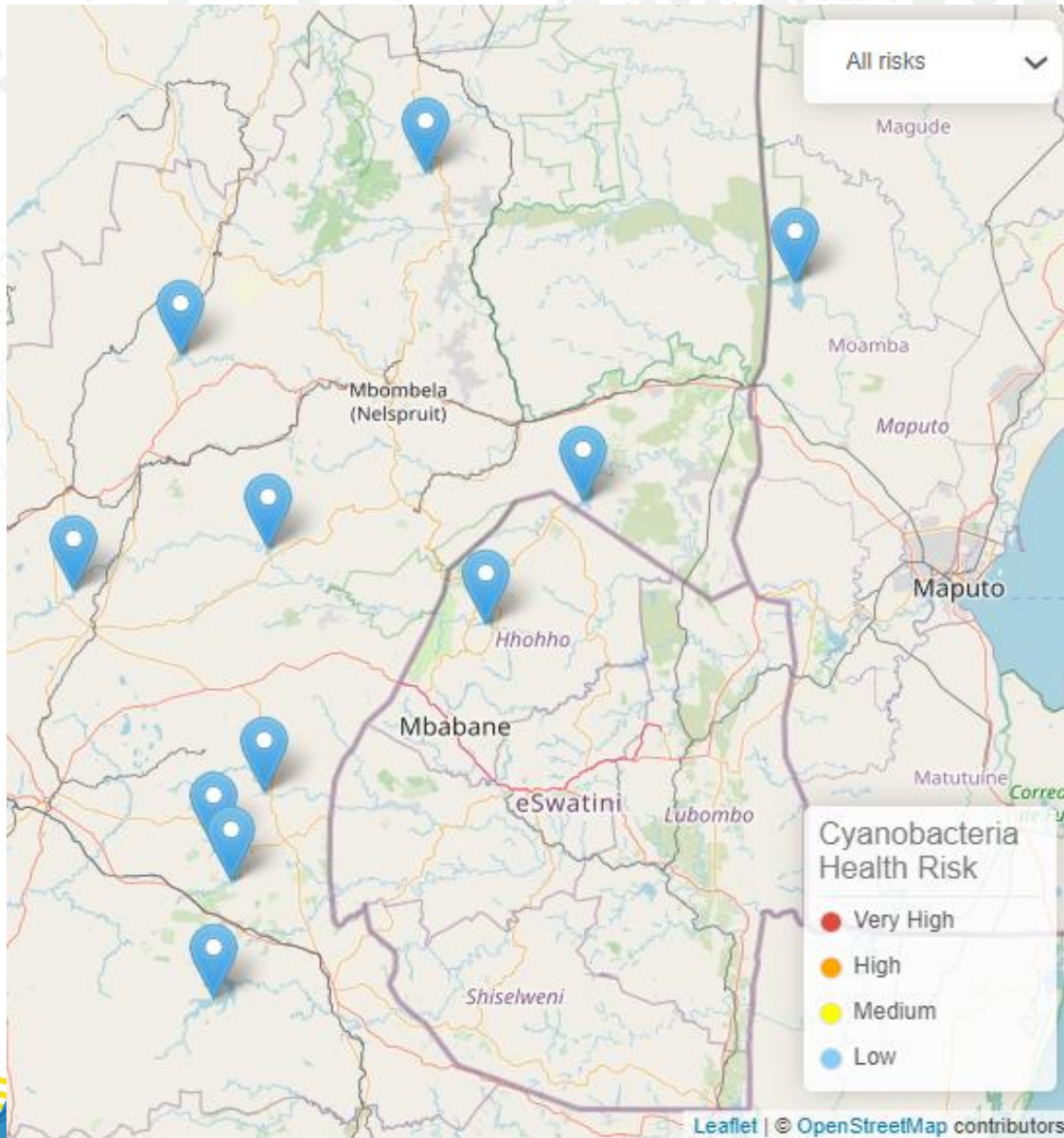
<p><b>Basin : IUCMA</b></p> <p><b>Assessment approved : 11/11/2022 6:21:33 AM</b></p> <table border="0" style="width: 100%; font-size: 0.8em;"> <tr><td>Upper Komati</td><td>Moderate Flooding</td></tr> <tr><td>Crocodile</td><td>Flood Watch</td></tr> <tr><td>Sabie-Sand</td><td>Flood Watch</td></tr> <tr><td>N'wanetsi</td><td>All Clear</td></tr> <tr><td>Upper Usuthu</td><td>Moderate Flooding</td></tr> <tr><td>Lower Komati</td><td>Moderate Flooding</td></tr> </table>	Upper Komati	Moderate Flooding	Crocodile	Flood Watch	Sabie-Sand	Flood Watch	N'wanetsi	All Clear	Upper Usuthu	Moderate Flooding	Lower Komati	Moderate Flooding	<p><b>Basin : IUCMA</b></p> <p><b>Assessment approved : 9/5/2022 12:41:35 PM</b></p> <table border="0" style="width: 100%; font-size: 0.8em;"> <tr><td>Upper Komati</td><td>Normal Conditions</td></tr> <tr><td>Crocodile</td><td>Normal Conditions</td></tr> <tr><td>Sabie-Sand</td><td>Normal Conditions</td></tr> <tr><td>N'wanetsi</td><td>Normal Conditions</td></tr> <tr><td>Upper Usuthu</td><td>Normal Conditions</td></tr> <tr><td>Lower Komati</td><td>Normal Conditions</td></tr> </table>	Upper Komati	Normal Conditions	Crocodile	Normal Conditions	Sabie-Sand	Normal Conditions	N'wanetsi	Normal Conditions	Upper Usuthu	Normal Conditions	Lower Komati	Normal Conditions
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**Assessment approved : 5/26/2022 7:38:10 AM**

Upper Komati	Water Quality Watch
Crocodile	All Clear
Sabie-Sand	Not assessed
N'wanetsi	Not assessed
Upper Usuthu	Not assessed
Lower Komati	Not assessed

**INKOMATI-USUTHU**  
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# CYANOLAKES APPLICATION: CYANOBACTERIA



The Dams' trophic status as of the 22<sup>nd</sup> of November 2022 stands at **Oligotrophic**, meaning it is **low** in nutrients and not productive in terms of aquatic and animal plant life.

# DATA AND INFORMATION DISSEMINATION

- The Resource Quality Status Reports are compiled and published on IUCMA website.

<https://iucma.co.za/iucma-documents>

- IUCMA hydrological monitoring data is available from the river operations website: <http://riverops.inkomaticma.co.za/>
- Resource Quality status is presented in Forums and Committees.



# DATA AND INFORMATION DISSEMINATION

Water quantity(flow and storage), Rainfall, Water quality, Groundwater data are available at [riverops.inkomaticma.co.za](http://riverops.inkomaticma.co.za).



INKOMATI-USUTHU  
CATCHMENT MANAGEMENT AGENCY

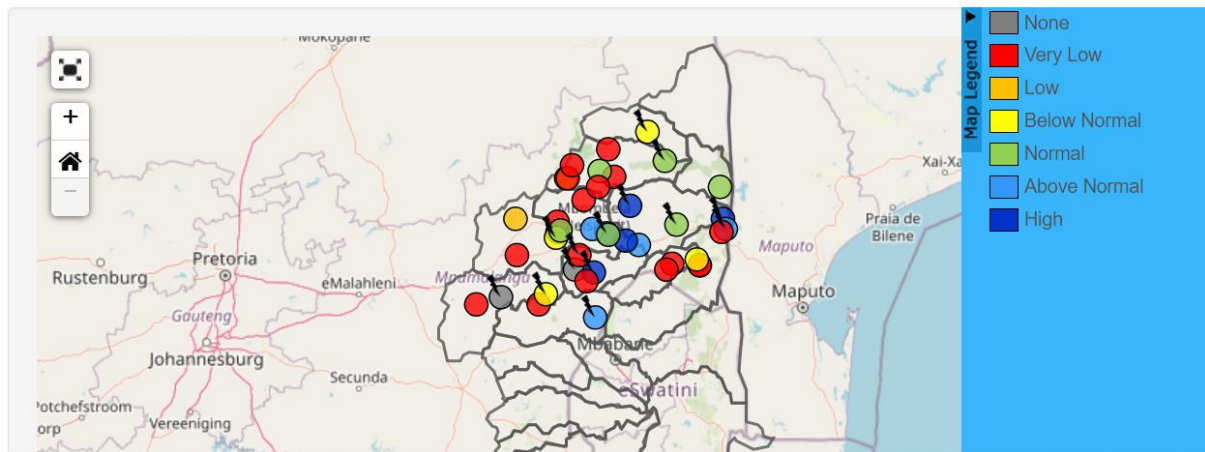
WATER RESOURCES INFORMATION MANAGEMENT  
DASHBOARDS

Current Status   Historical Information   Catchment Rainfall   Planning Analysis   MIKE11 Results   Admin   Login

Flow Gauges   Reservoirs   Rainfall  
Water Quality   Reserve   Groundwater

Map   Chart   Table

Station	Value Date	Value	Unit
(X1H001) Kor	2022-10-06 12:36:00	3.76	m <sup>3</sup> /s
(X1H003) Kor	2022-11-21 17:48:00	3.78	m <sup>3</sup> /s
(X1H014) Mlu	2022-11-21 12:00:00	0.44	m <sup>3</sup> /s
(X1H016) Buf	2022-11-21 12:00:00	2.25	m <sup>3</sup> /s
(X1H017) Kor			m <sup>3</sup> /s
(X1H023) Car	2022-11-21 18:00:00	0.39	m <sup>3</sup> /s
(X1H033) Kor	2022-11-21 12:00:00	1.10	m <sup>3</sup> /s
(X1H036) Kor	2022-07-15 11:00:00	5.21	m <sup>3</sup> /s
(X1H049) Lon	2022-11-21 18:00:00	2.66	m <sup>3</sup> /s
(X1H052) Mlu	2022-11-21 18:00:00	1.66	m <sup>3</sup> /s



# BENEFITS

- Data and Information management enable water managers to react more quickly:
  - During crisis-events like pollution,
  - Water shortages or flooding events.
- Stakeholders and water managers need accurate data or information to make informed decisions.
- HydroNet display data and information in clear GIS maps and graphs:
  - To explain why decisions were made and
  - Enables accountability towards stakeholders and water managers.
  - Visually helpful to stakeholders.
  - Help to display compliance with legal requirements.





# CHALLENGES AND RECOMMENDATIONS

## Challenges

- The HydroNET application cannot:
  - ✓ Calculate percentiles for WQ.
  - ✓ Plot Water Quality Trends.

## Recommendations

- Water Disaster Information Management System for transboundary cooperation (Swaziland, South Africa, Mozambique).
- To link HydroNET system to IUCMA Hydstra database.



**THANK YOU**

