



**INKOMATI-USUTHU**

CATCHMENT MANAGEMENT AGENCY



# **Benefits of Earth Observation (EO)/Copernicus for lake water quality management:**

## **An experience from South Africa**

**13 June 2024**

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# Introduction

IUCMA is a water management institution established in terms of section 78 of the National Water Act (NWA).

## Vision

Sufficient, equitable and quality water resources for all.

## Mission

- To effectively manage and protect water resource within the Inkomati-Usuthu Water Management Area (WMA) jurisdiction, which comprises of four Catchments.
- To contribute towards transformation by promoting equal access to quality water for all.

The WMA form part of the Incomati-Maputo River basin, which is shared between three Countries.

Eutrophication management has an important and specific role to play in the advancement of the above stated vision and mission.

**Legend**

**Inkomati Usuthu WMA**

- Sable/Sand
- Crocodile
- Komati
- Usuthu

**Basins**

- Incomati Basin
- Maputo Basin

**Dams**

- Dams

**Rivers**

- 1
- 2
- 3
- 4

**Towns**

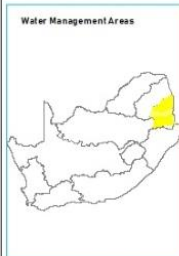
- Towns

**International Border**

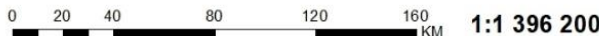
- International Border

**Kruger National Park**

- Kruger National Park



Date: 2022/09/01



# Eutrophication Monitoring

- **Eutrophication** is a traditional ecological term used to describe the process by which a waterbody becomes enriched with plant nutrients. South African goal for eutrophication management is -:

**“To manage eutrophication effectively in order to protect aquatic ecosystems and to secure water resources that are fit-for-use.”**

- You can't manage what you can't measure. Therefore, measurement equals monitoring.
- IUCMA monitors eutrophication through Cyanolakes web and mobile application using Sentinel satellite imagery (derived from multiple sources satellite imagery from the EU Copernicus Program and NASAEO) to enhance the monthly National Eutrophication Monitoring Programme (NEMP).
- IUCMA Eutrophication Monitoring Objectives is to measure, assess and report regularly on eutrophication status of the major reservoirs within the WMA.



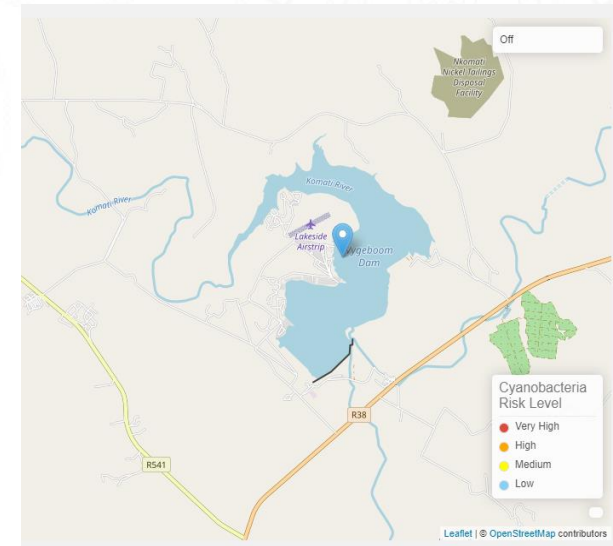
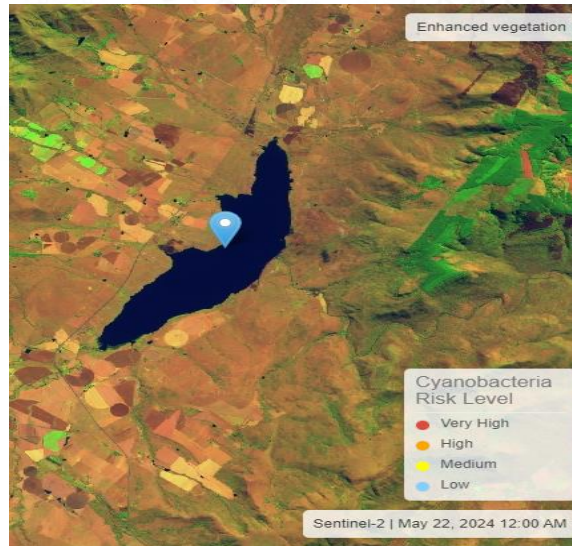
# Eutrophication Monitoring Programme

Monitoring Programme	NEMP	Cynolakes web application
Locations	10 Dams	11 Dams
Frequency	Monthly	3- 5 days per week
Variables	Chlorophyll-a, Suspended solids, Algal identification and Macro (Total Phosphorus and more)	Chlorophyll-a, Turbidity, Cyanobacteria, Alga bloom
Sampling procedures	Integrated or grab sampling	Satellite imagery
Data management	Water Management System (WMS)	Web-based - IUCMA server (API data download)
Data assessment and reporting	Excel and report the status on Annual Resource Quality Report.	The application assess data and reported as customized i.e., weekly, and monthly basis.



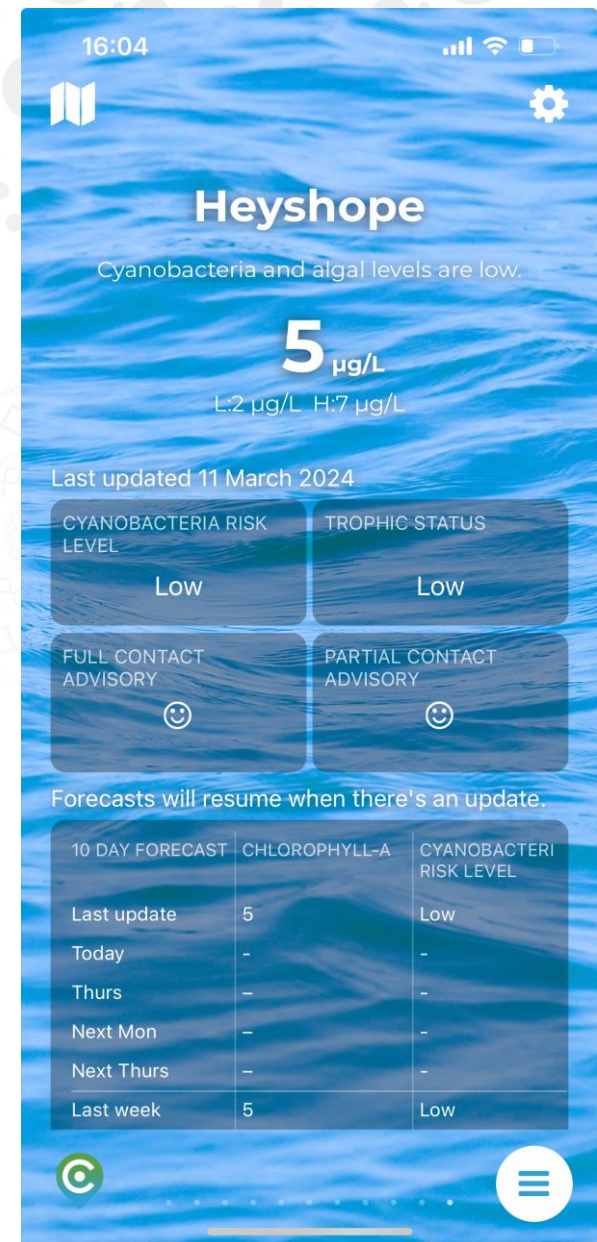
# Features of Cyanolakes web and mobile application

- Dashboard which display the eutrophication and cyanobacteria health risk current and forecast status, and
- With access the latest high-definition satellite imagery and GIS including maps to monitor:
  - Cyanobacteria
  - Algal blooms,
  - Aquatic weeds and
  - Vegetation, and
  - Water Colour;
- Receive notification and updates on cyanobacteria risk level alerts via email and on the phone.
- API data download.
- Validation tool.
- Get premium access to the mobile app and with high resolution satellite imagery and notifications for use in the field.



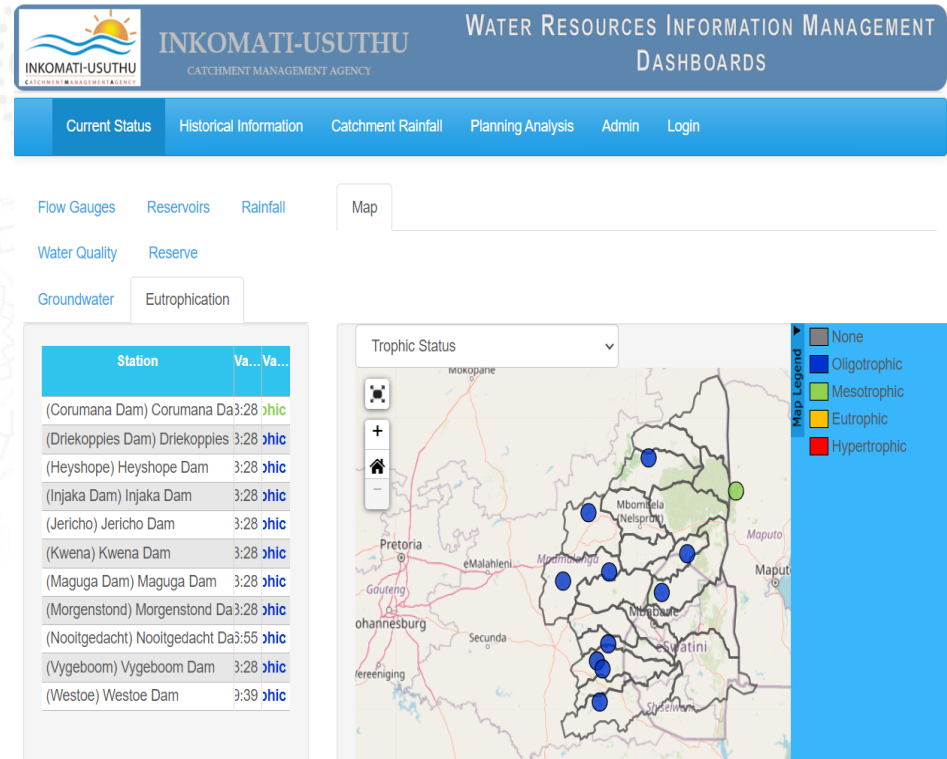
# Uses of Cyanolakes Web and Mobile Application

- Cyanolakes application is used to **measure** the eutrophication and cyanobacteria health risk status via sentinel satellite imagery for effective management of eutrophication of major dams.
- The application is used to **forecasts** high-risk blooms by processing historical data and current data (up to 80% accurate 1-week in advance).
- Used to **assess** compliance status with legal requirements and guidelines.
- Used to **report** on eutrophication and cyanobacteria health risk status to local disaster management forums, National government, international partners and water users.



# Uses of Cyanolakes Web and Mobile Application

- Used to **inform** stakeholders for recreational advisory to improve the health and safety of recreational water users.
- The use of the application inform and improved **support decisions making** in respect of local, national and internationally on eutrophication management to:
  - Control anthropogenic nutrient-loading of water resources;
  - protect aquatic ecosystems and their biological diversity;
  - secure water resources that are fit-for-use on a continuous basis; and
  - support ecologically sustainable development and justifiable socio-economic growth.



**INFORMATION CAN BE ACCESSED BY  
STAKEHOLDERS ON THE IUCMA WEBSITE**

[HTTPS://RIVEROPS.IUCMA.CO.ZA/](https://riverops.iucma.co.za/)

# Benefits Of Cyanolakes Web And Mobile Application

- Data and information enable water managers to react more quickly and improve eutrophication management and strategies to health risks (support decisions making).
- Reduced routine monitoring frequency from bi-monthly to monthly, subsequently reducing long-term monitoring costs.
- Enhanced routine monitoring as the satellite imagery is updated 2 and 3 times per week (increased monitoring frequency).
- Easy to generate customized report(s) from the Cyanolakes application (Improved reporting frequently from quarterly to monthly).
- Help to display compliance with legal requirements and guidelines.
- Near real-time alerts for blooms and the forecast help to prevent, detect and manage health risks.
- Improve the health and safety of recreational water users.
- Visually helpful to stakeholders.

**THANK YOU**

