



INKOMATI-USUTHU

CATCHMENT MANAGEMENT AGENCY



Water Quality and Quantity Status

Upper Komati Catchment

Tariff consultation Meeting

25 July 2023

RESOURCE MONITORING OBJECTIVES

- **IUCMA** has the following Monitoring Programme(s):
 - ❖ Water Quantity
 - ❖ Water Quality
 - ❖ River Eco-status Monitoring programme (REMP)
- 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.

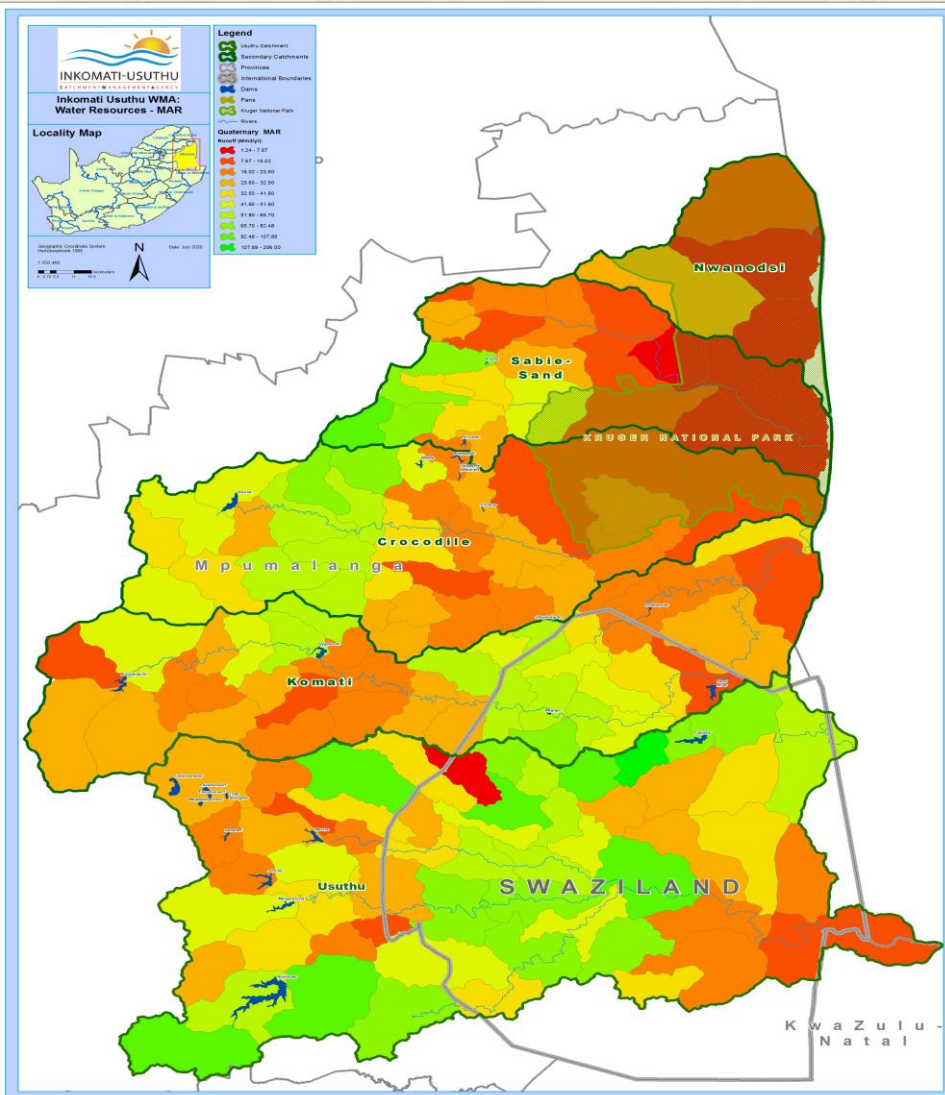
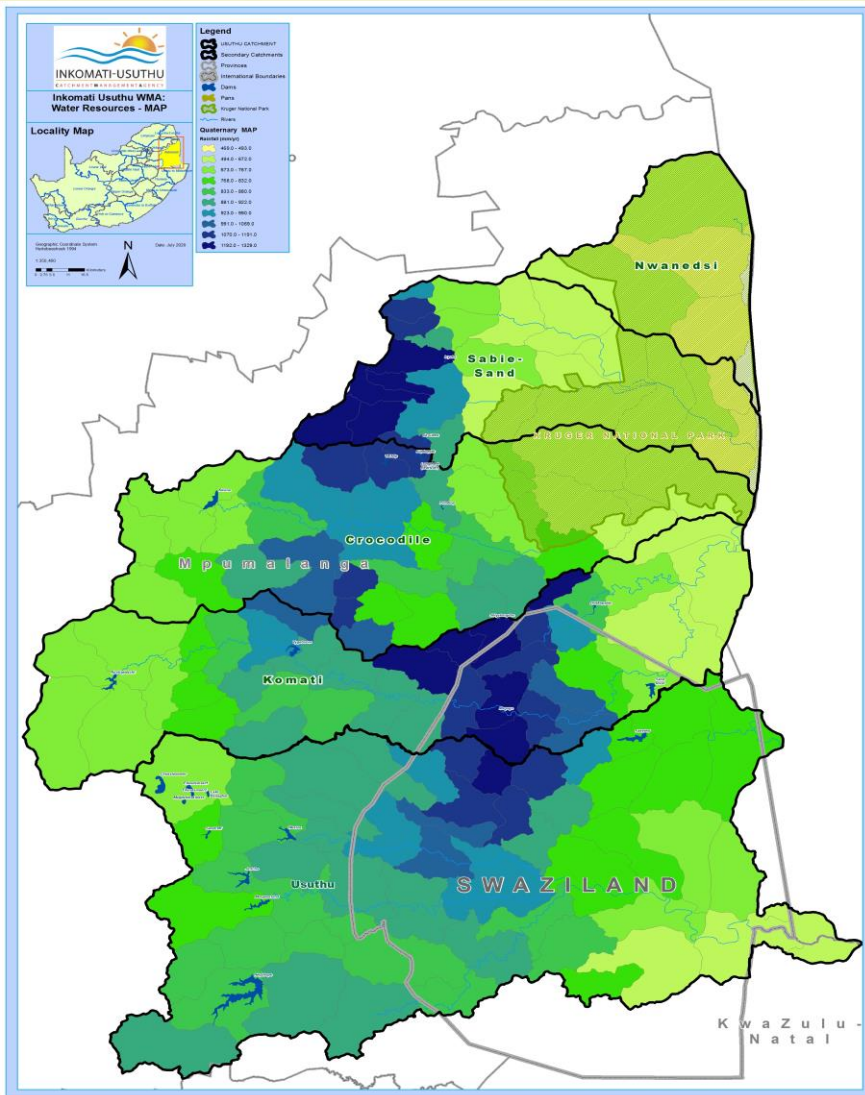


RESOURCE AVAILABILITY STATUS

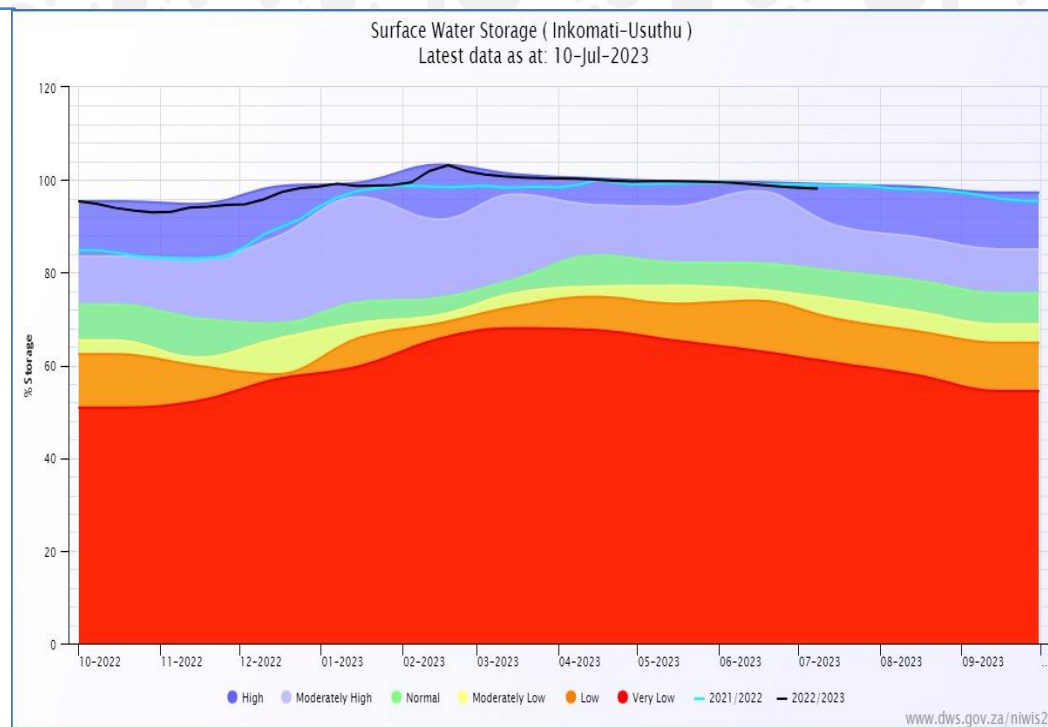
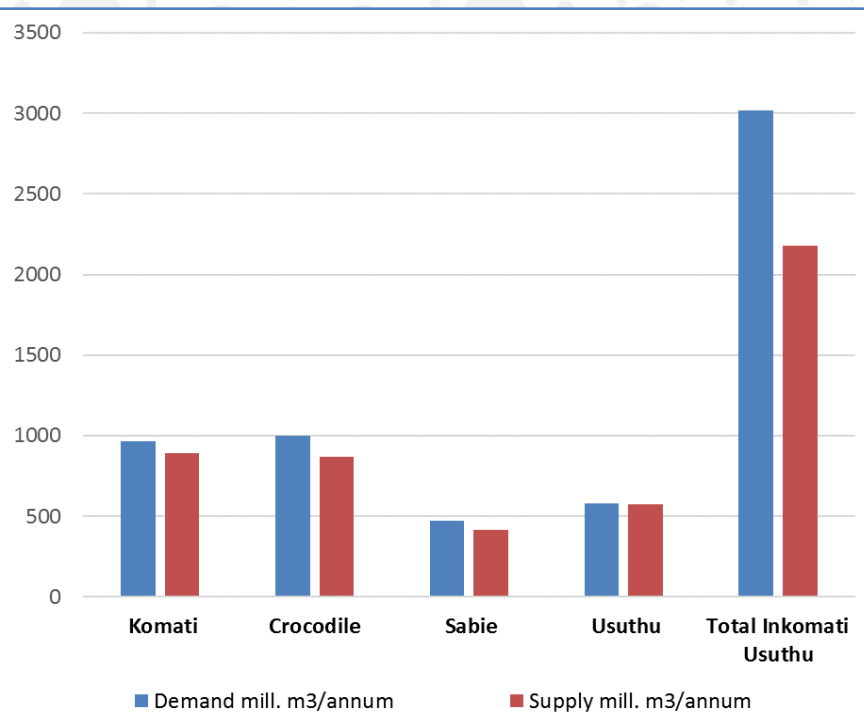
Surface and Groundwater Quantity Status



DISTRIBUTION OF MEAN ANNUAL RAINFALL AND MEAN ANNUAL RUNOFF IN THE WMA



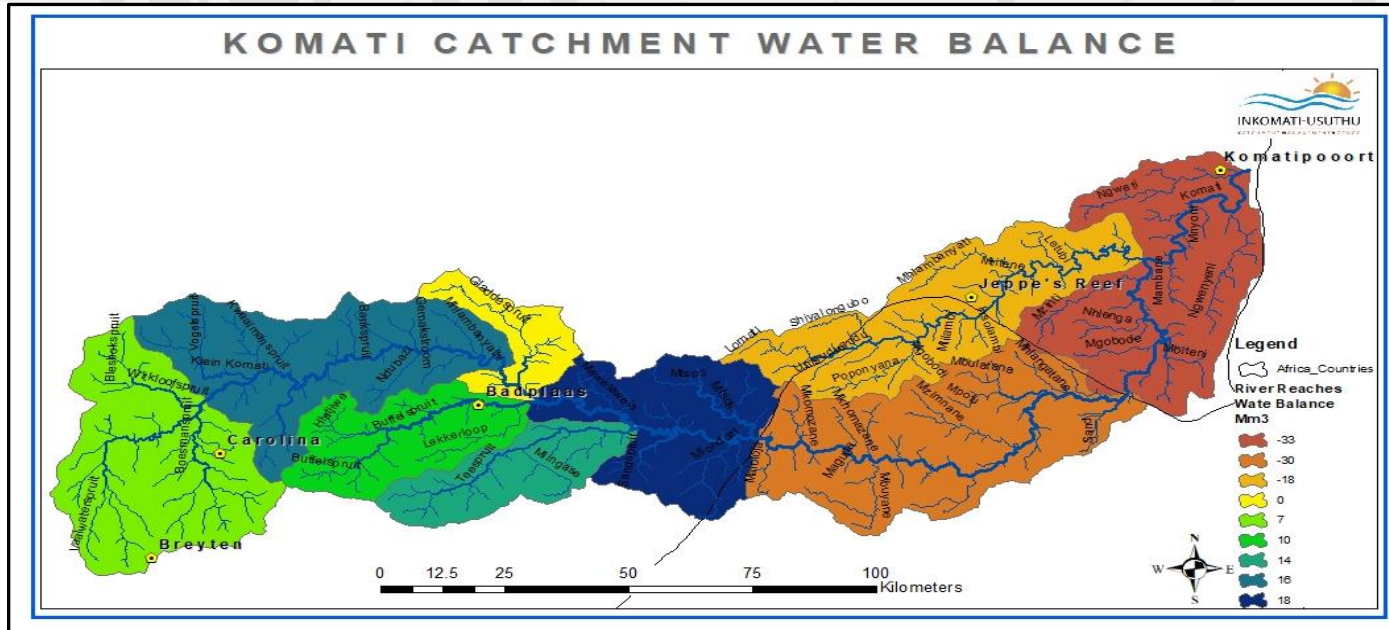
SURFACE WATER RESOURCES STATUS



All dams are above normal, an indication of excess water in the system for annual allocations to different sectors through to next rain season. Effects will be more felt by users relying directly on river flows as the river levels will be dropping until next rainy season.



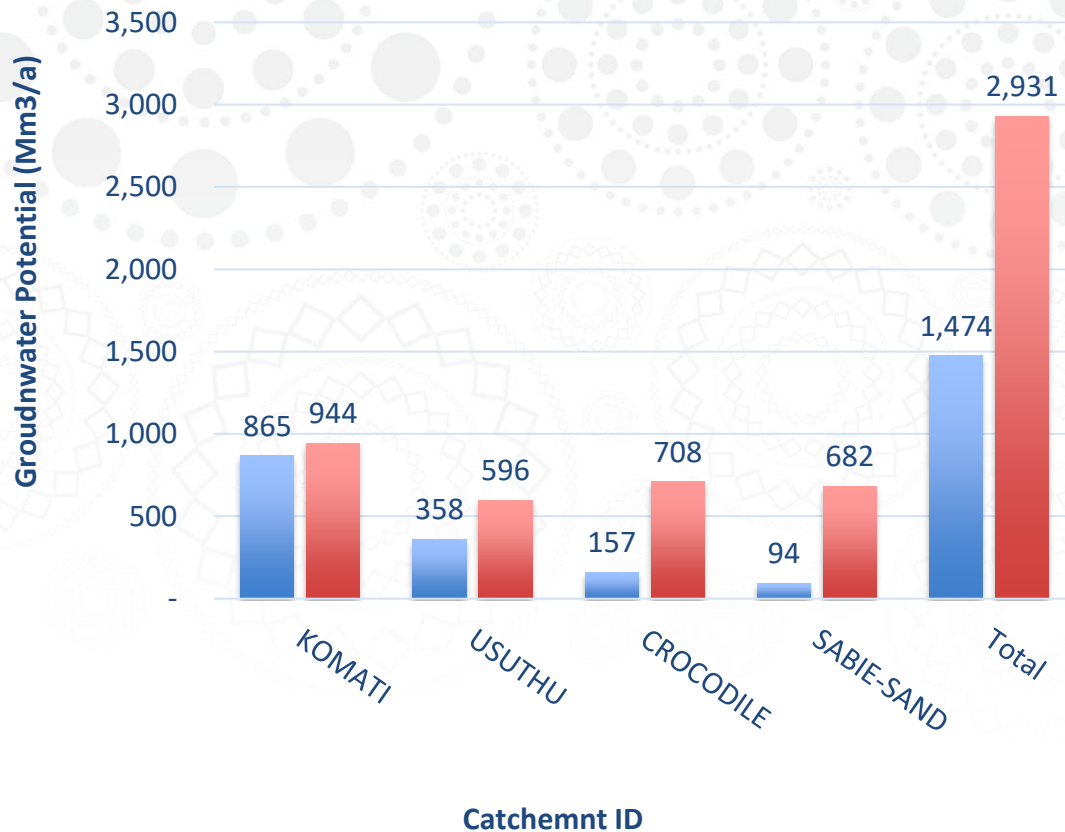
KOMATI SURFACE WATER BALANCE



River Reach/Tributary	Water available at mixed assurance	Water requirement	Balance
Nooitgedacht	47	40	7
Vygeboom	101	85	16
Buffelspruit	11	1	10
Gladdespruit	6	6	0
Theespruit	20	6	14
Upper Komati	25	7	18
Middle Komati	327	357	-30
Lomati	128	146	-18
Lower Komati	206	239	-33
Total	871	887	-16

There is a positive balance in the upper reaches of the Komati Catchment.

GROUNDWATER RESOURCES STATUS

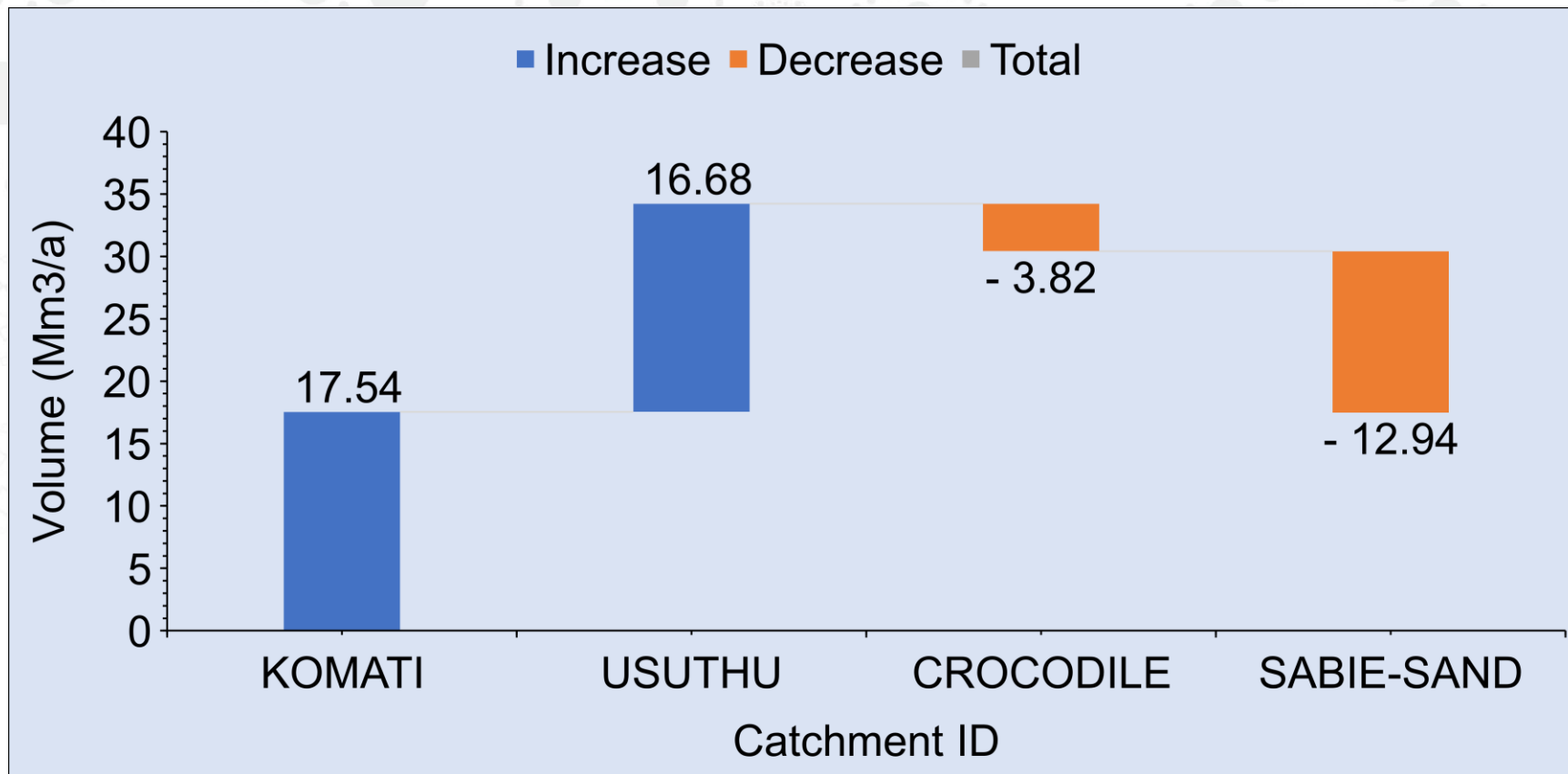


Since 2006 estimates (GRA II), groundwater potential has dropped by approximately:

□ approximately **8%** for Komati

- 2022 IUCMA Resource Potential
- 2006 GRA II Resource Potential

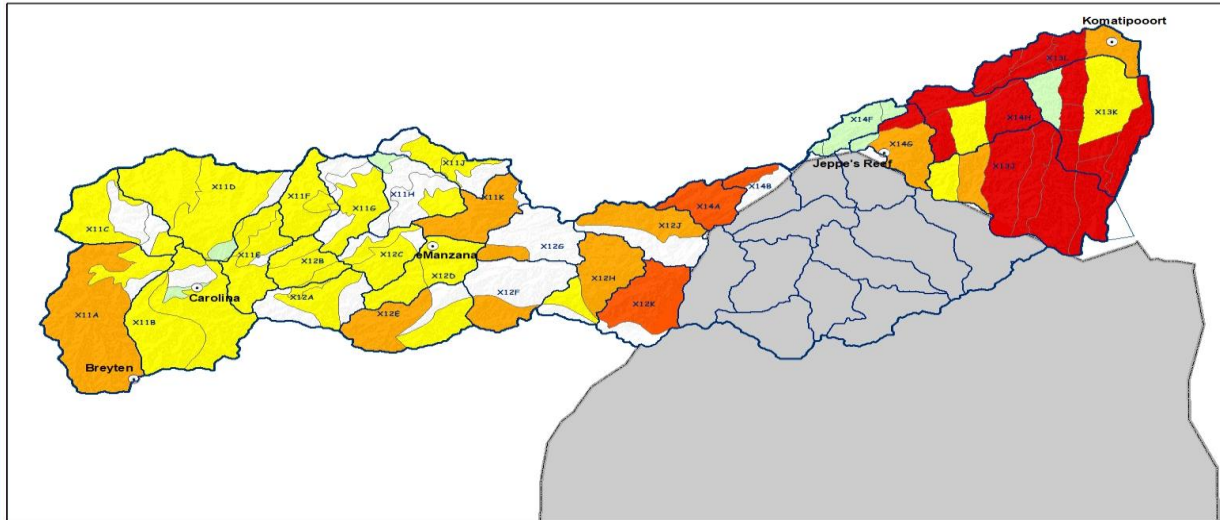
GROUNDWATER STORAGE CHANGE



- Due to moderate stress condition, change in groundwater storage for Komati is positive because groundwater use is sustainable.
- The recharge currently exceeds the groundwater use in the Komati Catchment (mainly upper Komati) thus there is still groundwater potential.

GROUNDWATER STRESS INDEX

KOMATI CATCHMENT : GROUND WATER STRESS LEVEL



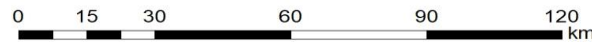
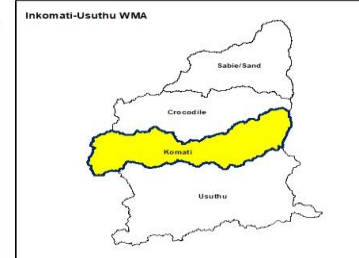
Legend

- Komati Catchment
- Quaternaries
- Towns
- eSwatini

% OF GU STRESS LEVEL FOR KOMATI CATCHMENT

PRESENT STATUS CATEGORY	DESCRIPTION	STRESS INDEX (groundwater abstraction / recharge - baseflow)
A	Unstressed or low levels of stress	< 0.05
B		0.05-0.20
C	Moderate levels of stress	0.20-0.50
D		0.50-0.75
E	Stressed	0.75-0.95
F	Critically stressed	> 0.95

Date: 2023/07/06



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In the Upper Komati catchment (e.g., in Badplaas and Caroline), there is still potential for groundwater development due to moderate stress condition

Surface Water Quality Status

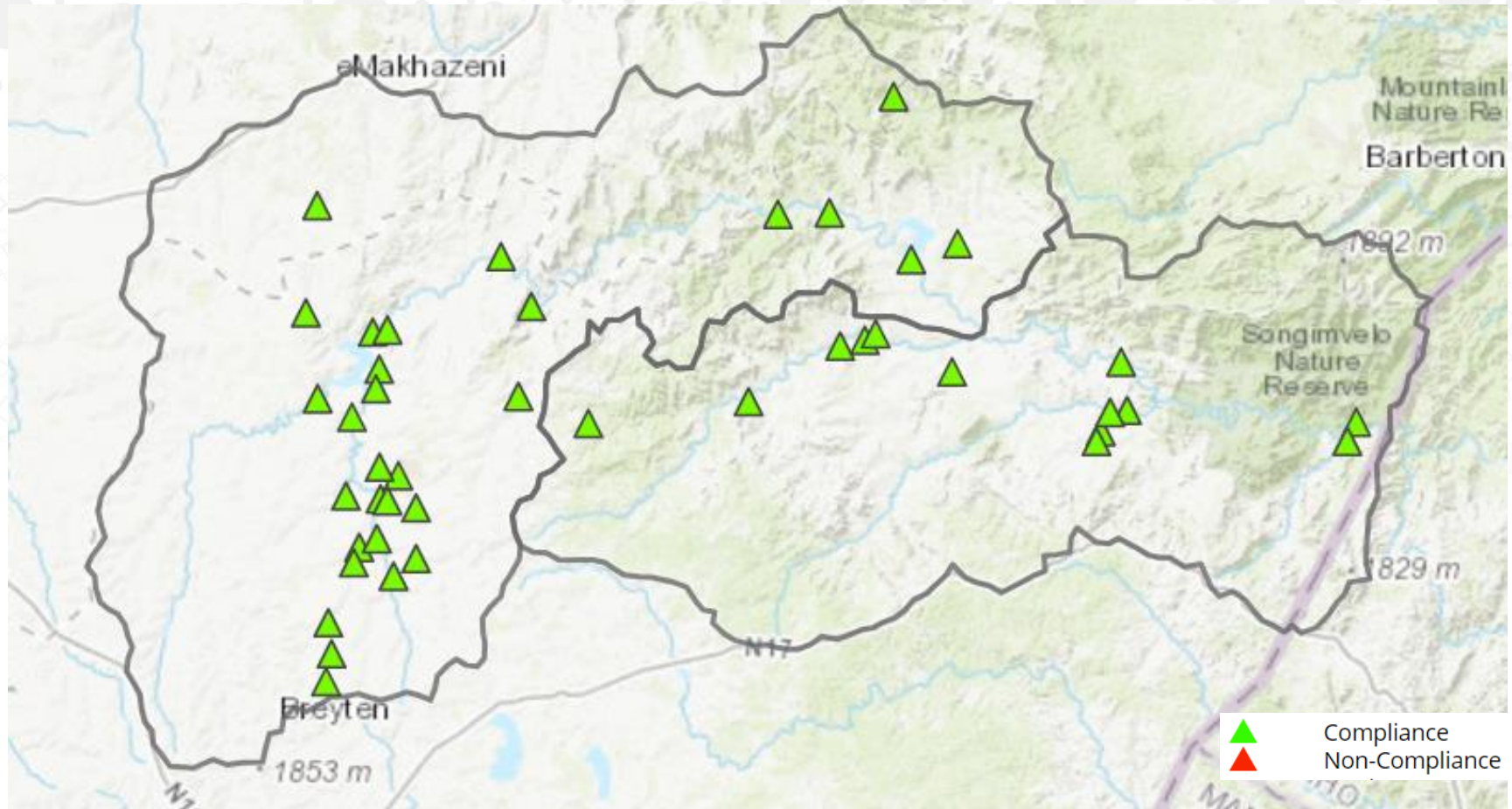


WATER QUALITY DATA REPORTED

- The data reported for Sabie Sand Catchment ranges between April 2022–March 2023 within the WMA.
- The compliance of indicator variables tabulated were compared with Resource Quality Objectives (RQOs) published in a Government Gazette dated 30 December 2016, and where RQOs were not available TWQG were used.
- The selected indicator variables are as tabulated below:

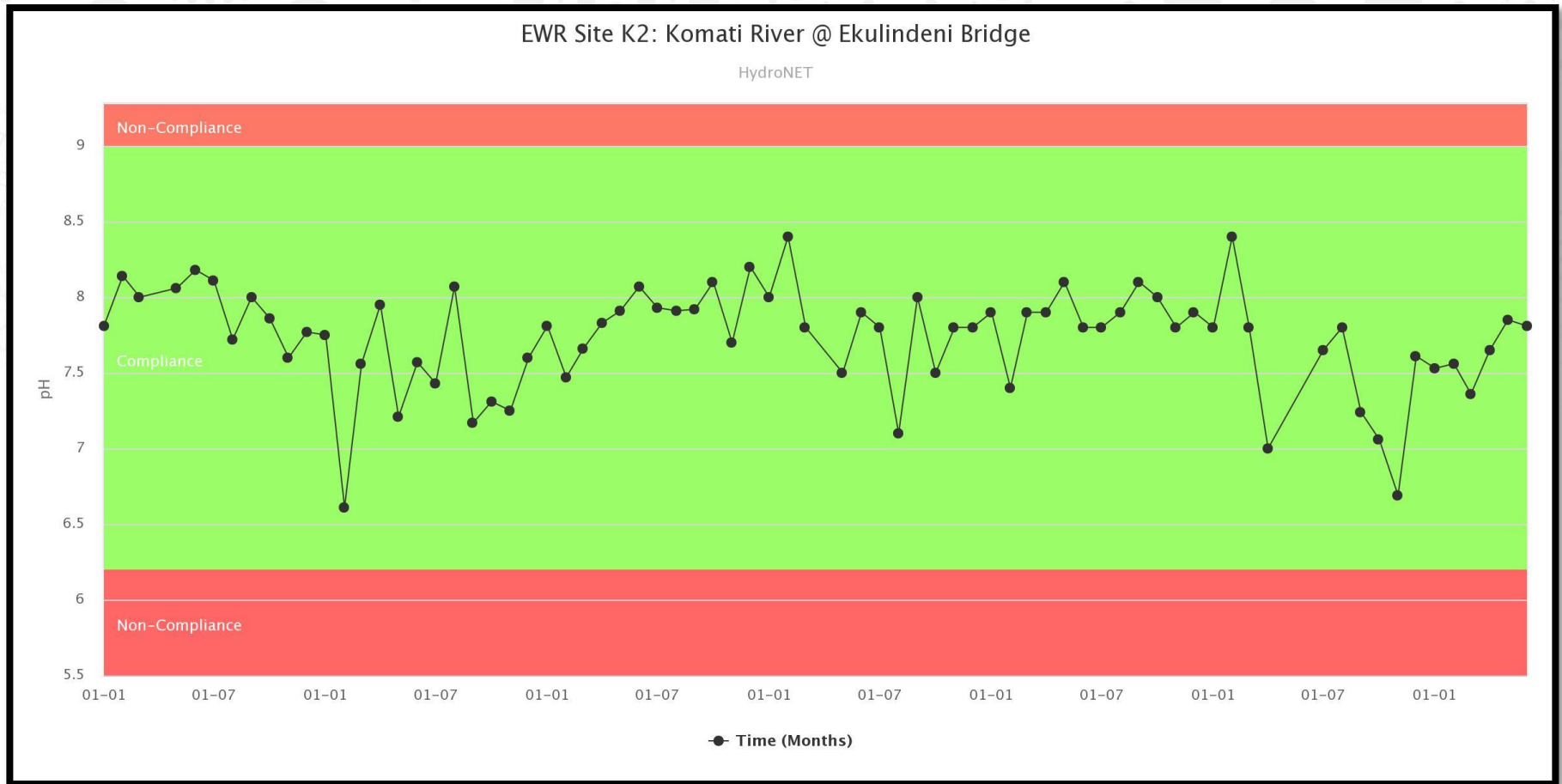
Classified Water quality variables	Indicator Variables	Statistical analysis of data
System variable	pH	Average
Salts	Electrical Conductivity	Average
Nutrients	Phosphate	Median
Microbial	E coli	Average
Eutrophication	Chlorophyll-a and Total Phosphorus	Median

WATER QUALITY STATUS: PH

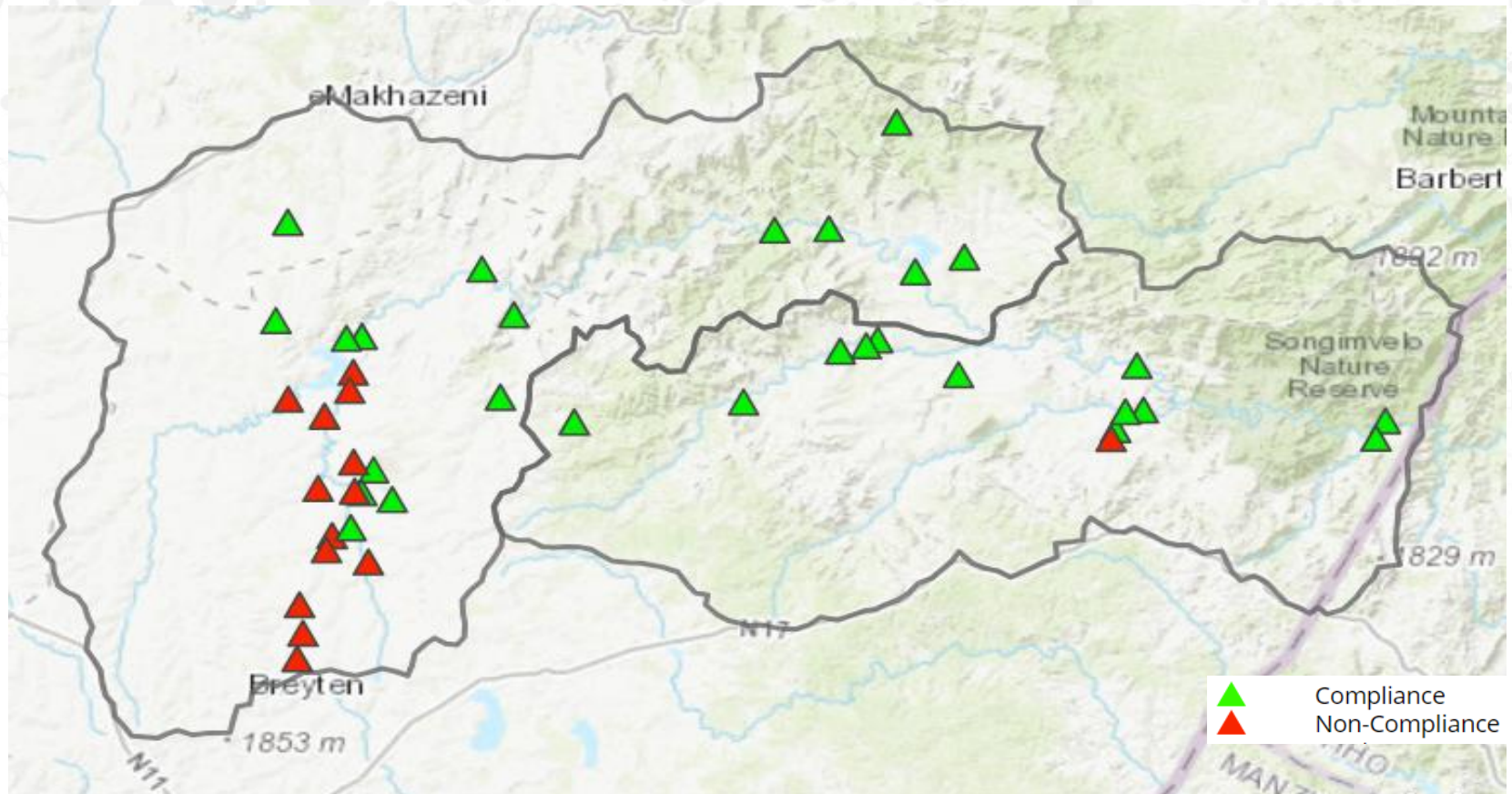


pH complied with the TWQG throughout the reporting time within the upper Komati Catchment.

TRENDS: PH (*EKULINDENI BRIDGE*)

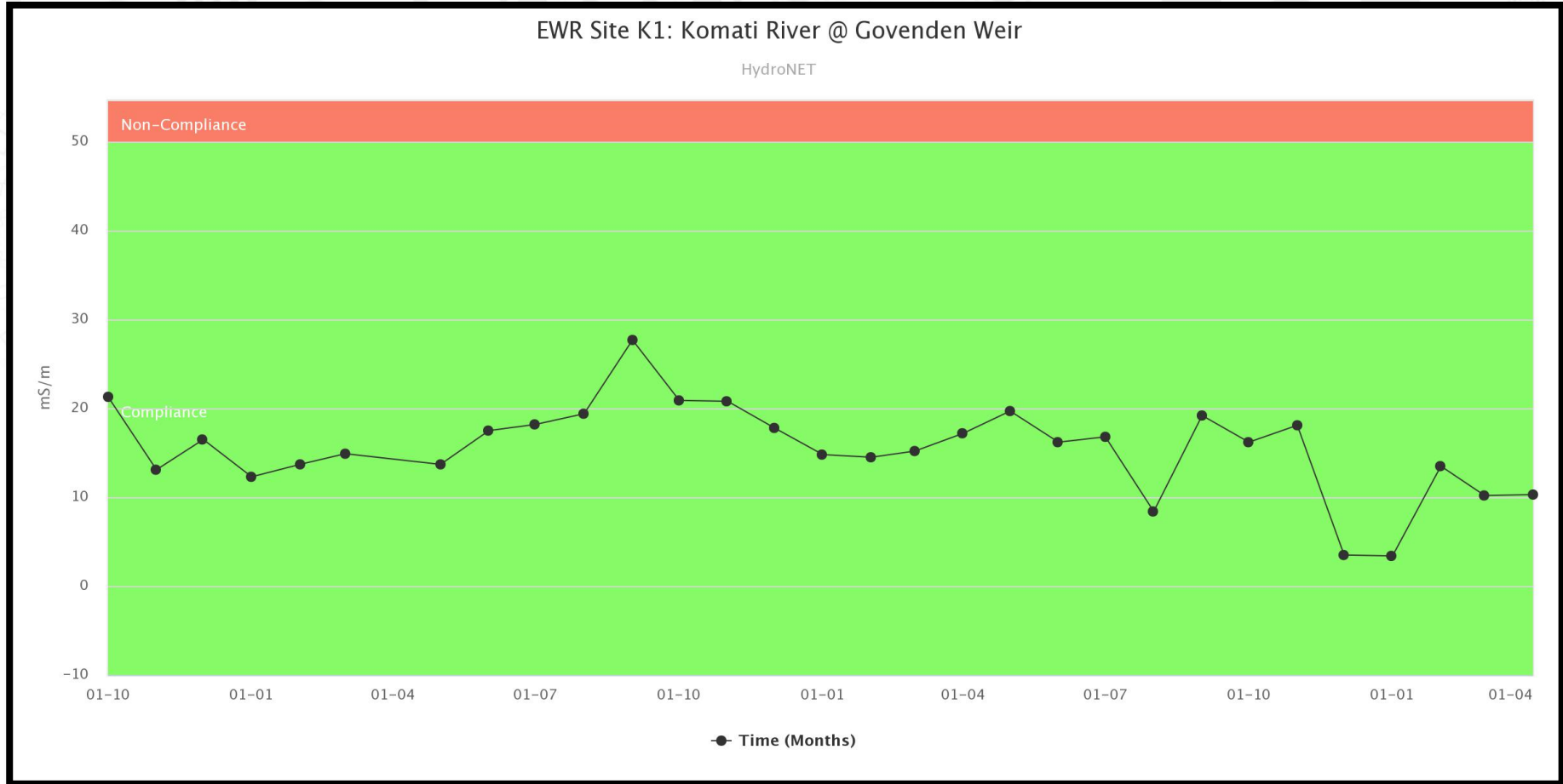


WATER QUALITY STATUS: ELECTRICAL CONDUCTIVITY

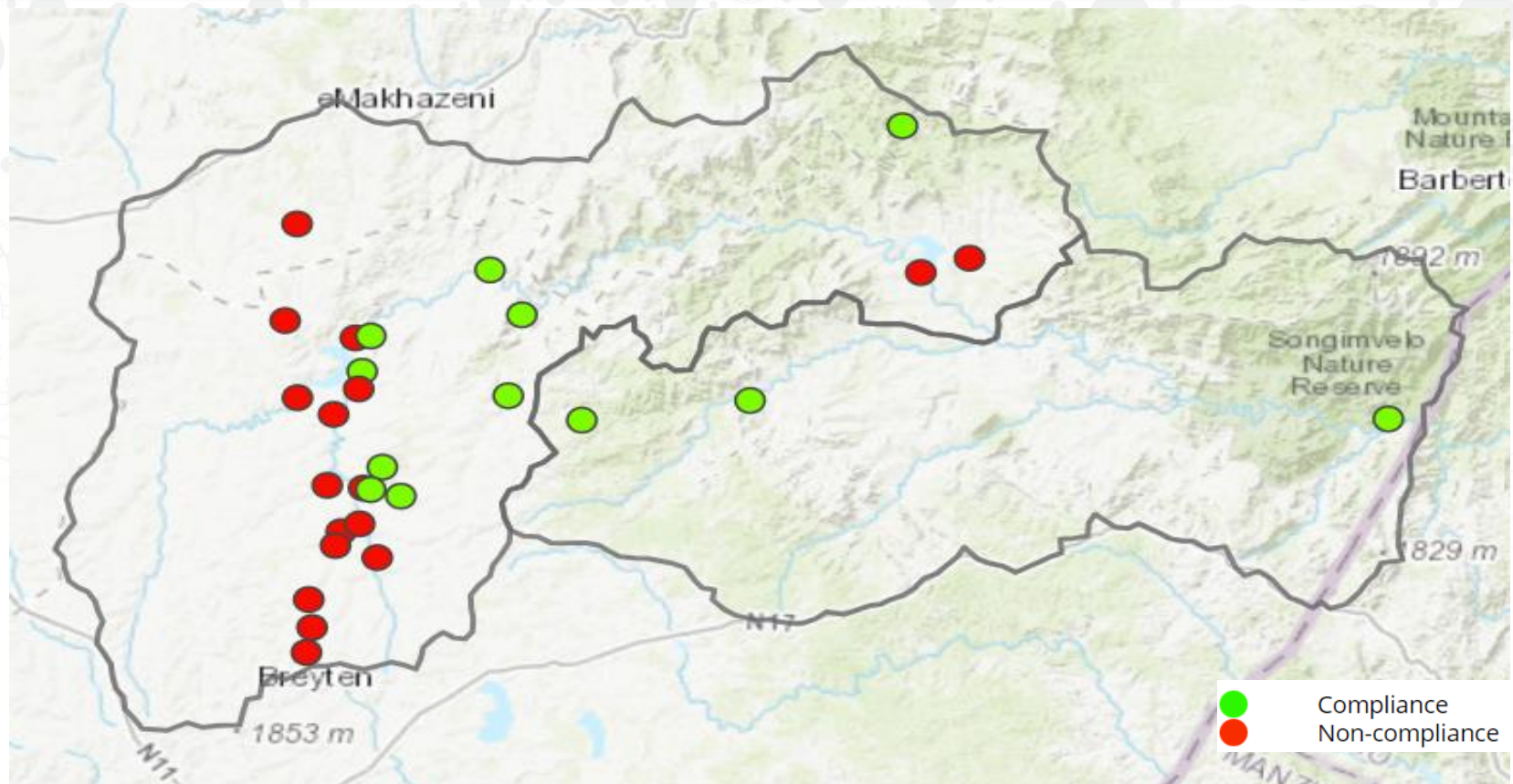


EC complied with the RQO throughout the reporting time within the Upper Komati Catchment, except for Boesmanspruit and Vaalwaterspruit (around Carolina Area) due to coal mining activities and Teespruit (Elukwatini Area) due to impacts from semi rural settlement.

TRENDS: ELECTRICAL CONDUCTIVITY (GOVENDEN WEIR)

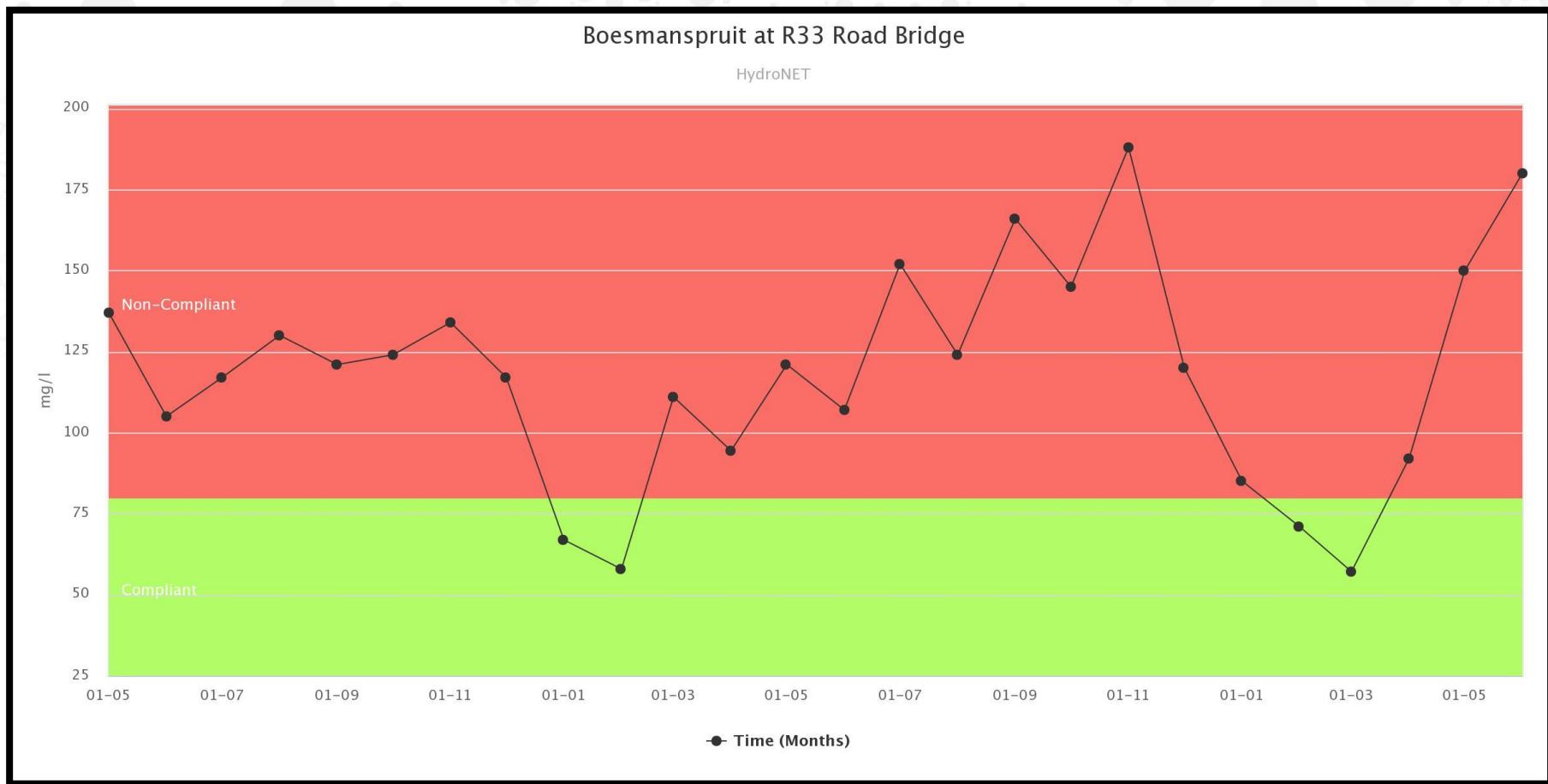


WATER QUALITY STATUS: SULPHATE

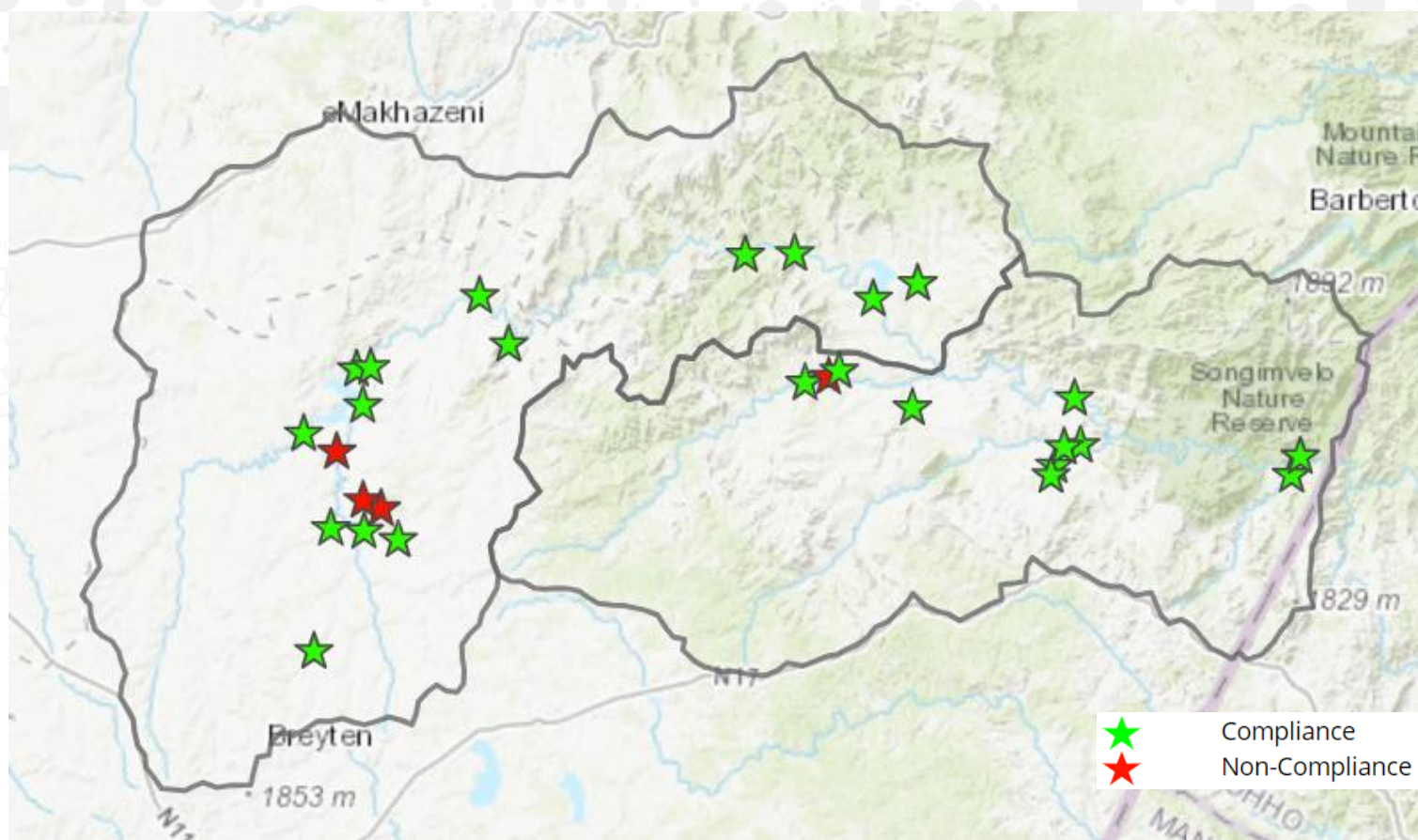


SO₄ complied with the RQO throughout the reporting time within the upper Komati Catchment, **except** for Boesmanspruit, Vaalwaterspruit, Witkloofspruit and Klein Komati (Carolina Area) and Gladderspruit (eMazana previously known as Badplaas) due to mining activities in the area.

TRENDS: SULPHATE (*BOESMANSPRUIT*)

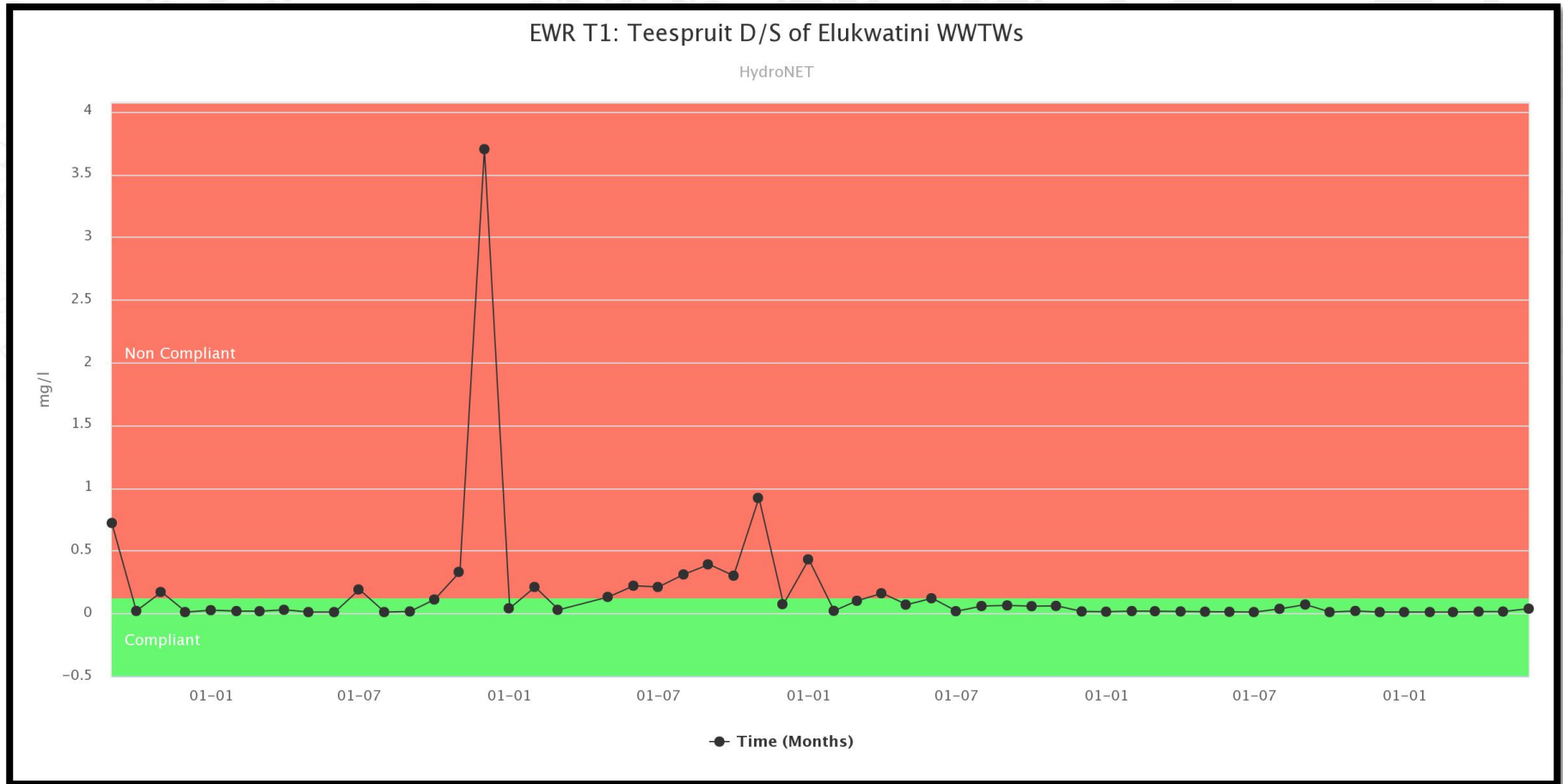


WATER QUALITY STATUS: PHOSPHATE

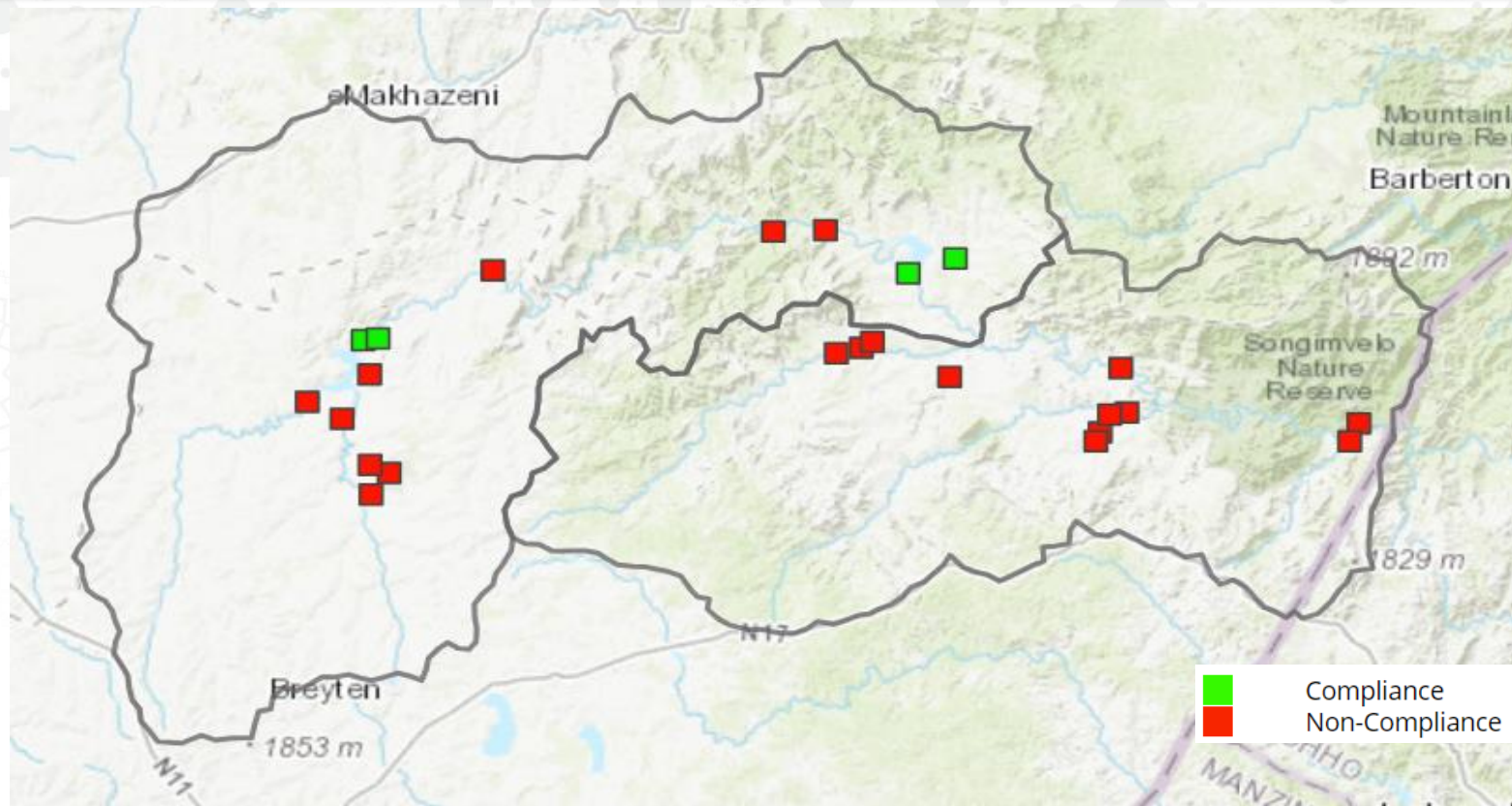


PO4 complied with the RQO throughout the reporting time within the upper Komati Catchment, **except** for Tributary of Boesmanspruit (Carolina Town) and Tributary of Serkoeispruit (eMazana previously known as Badplaas) due to WWTWs and its associated infrastructure.

TRENDS: PHOSPHATE (TEESPRUIT)

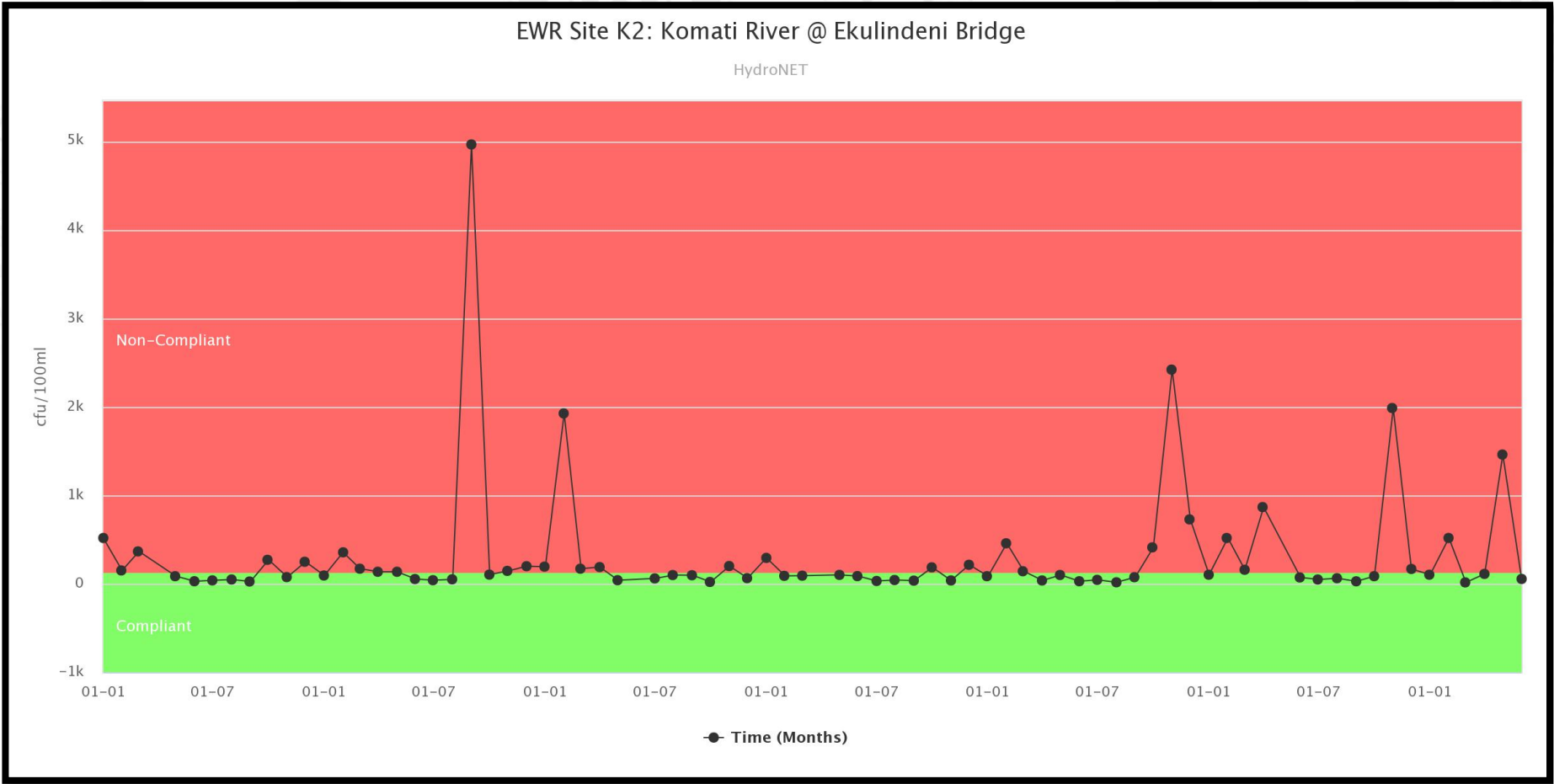


WATER QUALITY STATUS: E COLI



E. coli counts **did not comply** with the set RQOs for most of the monitoring sites, with high concentrations within residential areas, except for major dams (Nooitgedacht and Vygeboom) and the tributary of Komati River (downstream of Nooitgedacht Dam) and Gladderspruit before confluence with Komati River (downstream of Vygeboom Dam).

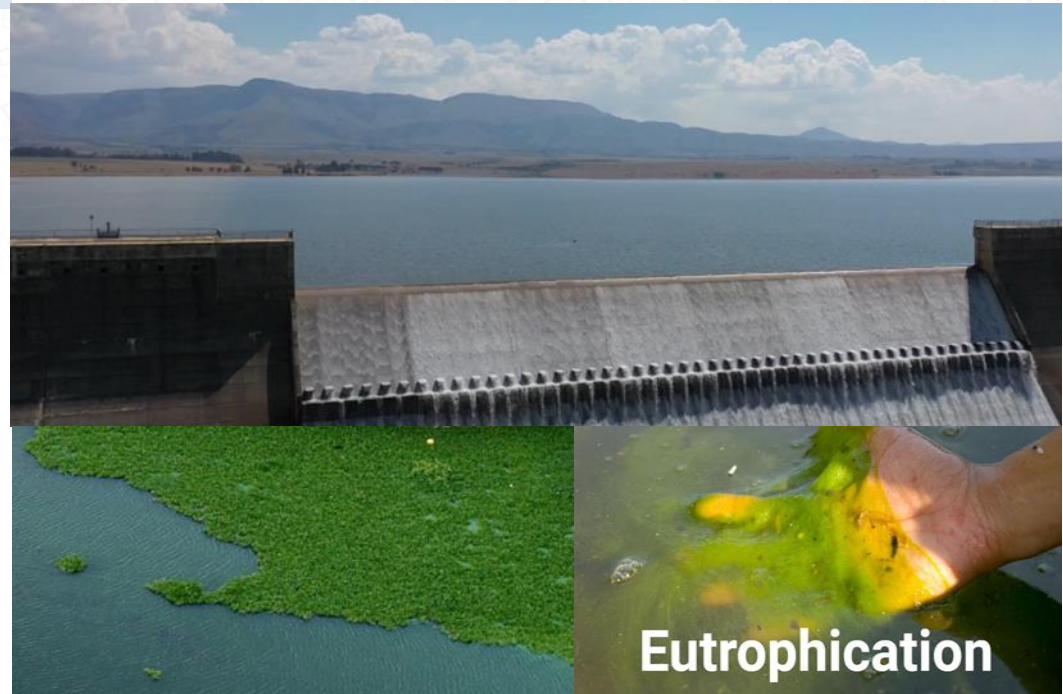
TRENDS: E COLI (EKULINDENI)



WATER QUALITY DATA FOR EWR SITES-KOMATI CATCHMENT

EWR Site	Turbidity (NTU)		EC (mS/m)		PO ₄ (mg/l)		TIN		E coli (cfu/100ml)		Ammonia		Flow (m ³ /s)	
	RQO	Results	RQOs	Results	RQOs	Results	RQO	Results	RQOs	Results	RQOs	Results	RQOs	Compliance %
EWR K-1	NR	25.9	50	15.9	0.02	0	NA	0.10	130*	825	0.015	0.102		VA
EWR G-1	NA	7.1	40*	13.7	0.02	0.01	NA	0.28	130*	841	0.015	0.285		VA
EWR K-2	NA	6.7	55	17.7	0.02	0	NA	0.09	130	163	*0.015	0.095	1.02	100%
EWR T-1	NA	5.9	40*	34.1	0.125	0	NA	0.07	130	196	*0.015	0.073		VA
EWR L-1	NA	14.9	30	33.2	0.015	0	1	0.07	130	816	0.015	0.078		VA
EWR K-3	NR	9.0	85	30.11	0.125	0	1	0.07	130	732	0.015	0.070	1.84	100%

EUTROPHICATION STATUS OF THE MAJOR DAMS WITHIN THE WMA



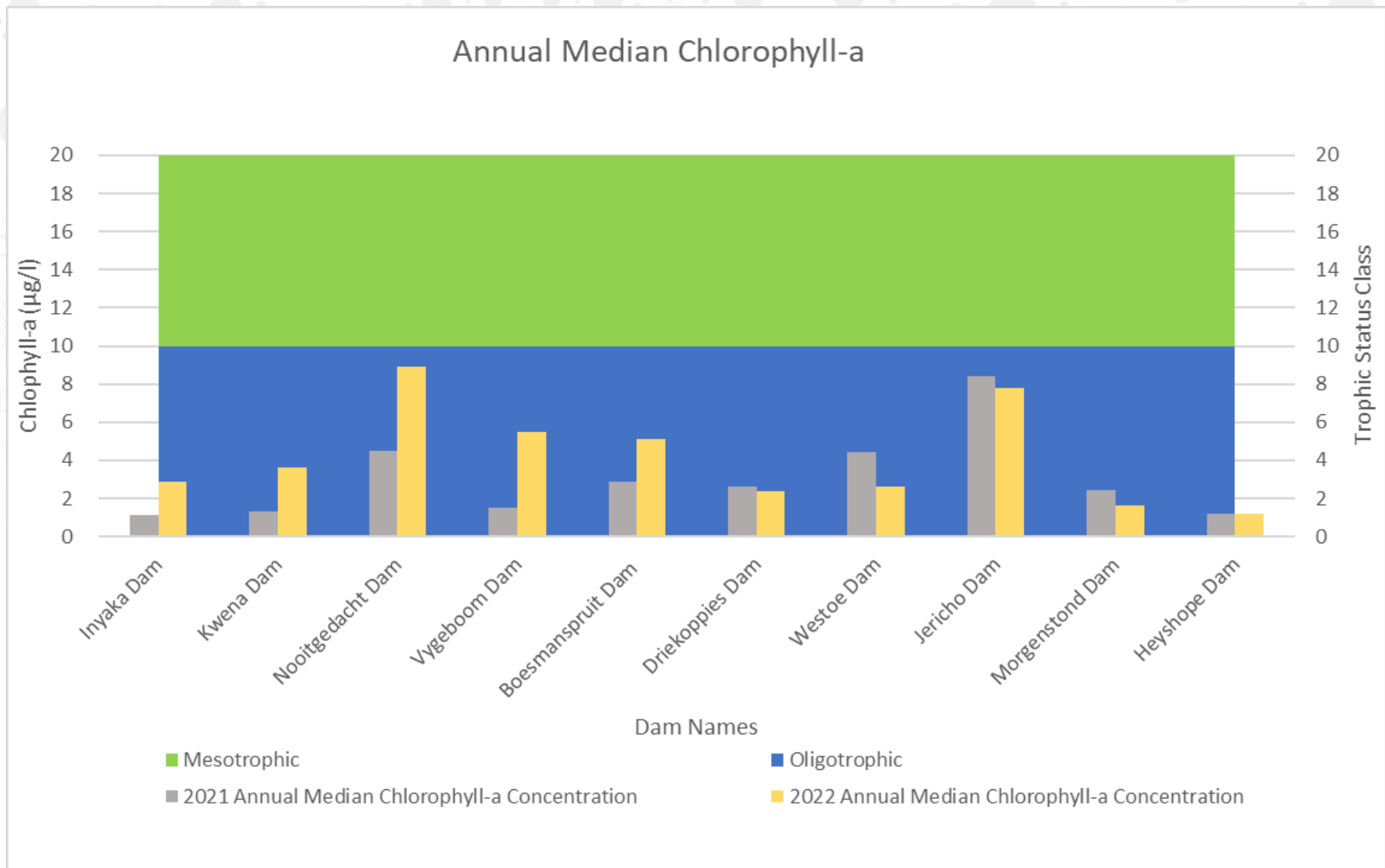
TROPHIC STATUS

- **Trophic Status** is the degree of nutrient enrichment and of the associated eutrophication problems of an aquatic ecosystem.
- Trophic status classes used for assessment of dams in South Africa.

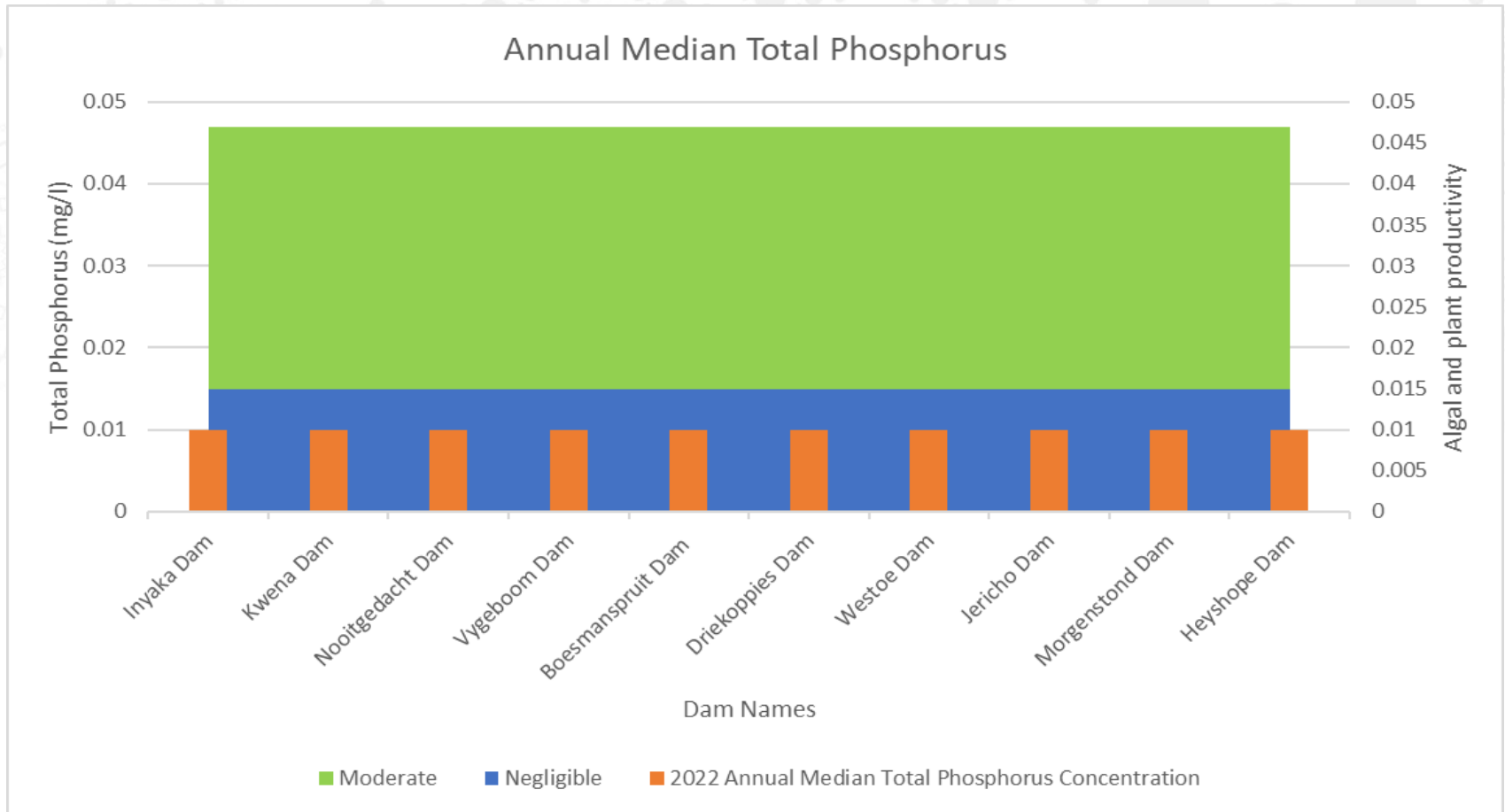
1. Oligotrophic	low in nutrients and not productive in terms of aquatic and animal plant life;
2. Mesotrophic	intermediate levels of nutrients, fairly productive in terms of aquatic animal and plant life and showing emerging signs of water quality problems;
3. Eutrophic	rich in nutrients, very productive in terms of aquatic animal and plant life and showing increasing signs of water quality problems; and
4. Hypertrophic	Very high nutrient concentrations where plant growth is determined by physical factors. Water quality problems are serious and can be continuous.



EUTROPHICATION STATUS: CHLOROPHYLL-A



EUTROPHICATION STATUS: TOTAL PHOSPHORUS



KEY ISSUES RAISED BY STAKEHOLDERS: 2022/23 CMF

No.	Issue raised	Sub-catchment	Proposed Action	Progress and recommendations
1.	The sulphate content that is alleged to be going into the Boesmanspruit river.	Upper Komati	Stakeholders requested feedback on action taken by the IUCMA against the mines impacting on the water resources? The IUCMA (CME) to investigate and take actions against the mines and to conduct water quality reports assessments including data provided by the mines. The IUCMA to further assess the water quality status of the mines around Boesmanspruit.	The IUCMA is conducting water quality assessments and Feedback to be provided in the next CMF meetings. Msobo Coal to finalise and submit their water quality reports for their mines within the Boesmanspruit.
2.	The abandoned mines at Witrand was raised as a serious concern as no rehabilitation was conducted.	Upper Komati	Stakeholders to sit around the table to discuss what plans are in place to deal with this situation. The IUCMA to coordinate this engagement with all the affected stakeholders including the DMRE	The IUCMA is engaging all the relevant parties and the DMRE to get the historical data on the mine operations and future plans on rehabilitation.
3.	Wetlands around Witrand area, Breyton and Klippand farm to Wonderfontein where the ponds have dried up and it is suspected that this could be due to the mine blasting in the area.	Upper Komati	The CME will make a follow up and provide feedback in due course	The IUCMA following up on the matter and feedback will be provided to the stakeholders



KEY ISSUES RAISED BY STAKEHOLDERS: 2022/23 CMF

No.	Issue raised	Sub-catchment	Proposed Action	Progress and recommendations
4.	Concern on the issue of Illegal dumping of waste	Upper Komati	The Chief albert Luthuli Local Municipality (CALM) to present their long -term plan to address illegal dumping in the Municipal jurisdiction.	Chief albert Luthuli Local Municipality (CALM) to provide feedback during the next CMF meeting
5.	Delayed invoice to the mines	Upper Komati	Revenue Management from IUCMA to take details of the mine and compare them with the contact details used for sending invoice. The affected mines were also advised to register in the IUCMA Portal.	Revenue Management to provide feedback in the next CMF Meeting
6.	Issue of the Septic Tanks upstream, spilling into Vygeboom Dam.	Upper Komati	CME to investigate and report back to the forum.	CME is investigating and to provide feedback in the next CMF meeting
7.	The issue of the wastewater treatment plants (WWTPs), manhole and sewer spillage were raised as a resinous concern and that notices issued against the Municipality does not yield any positive results.	Upper Komati	CME to follow up on the progress made by the Municipality if no progress made. The forum Chairperson proposed a meeting with the Municipal Technical Department and CME to facilitate that meeting.	Meeting planned and CME to provide feedback in the next CMF meeting

CONCLUSIONS AND RECOMMENDATIONS

Water Quantity:

- The Upper Komati catchment is approximately in balance with some surplus.
- The surplus is for low-assurance water in the upper reaches of the catchment
- More measures can be used to enhance the yield in the catchment:
 - I. Construct off-channel dams and fill these dams when there is surplus water available (wet season).
 - II. Construct in-channel dams, but the release of water is required to ensure that downstream users are not negatively impacted.
 - III. Promote Groundwater use in parts of the catchment where this does not impact the baseflow.



CONCLUSIONS AND RECOMMENDATIONS

Water Quality:

- Water quality in the upper Komati is generally good but punctuated by microbial (E. coli) pollution and Salts (EC and Sulphate) which indicated non-compliance at various sites due to WWTWs & its associated infrastructure and mining activities.
- Eutrophication status for all the dams within the WMA is good.
- It is recommended that the land use activities impacting on water resources quality be efficiently controlled by all relevant stakeholders / users through Source Directed Controls (SDC) as per the provision.
- Municipalities, mines to implement long term solution to resolve noncompliant poorly operated and maintained WWTW's and its associated infrastructure i.e., sewer pump stations, manhole.



THANK YOU

