INKOMATI-USUTHU

CATCHMENT MANAGEMENT AGENCY

WATER QUALITY AND QUANTITY STATUS

SABIE/SAND CATCHMENT

TARIFF CONSULTATION MEETING

24 JULY 2023

RESOURCE QUALITY MONITORING OBJECTIVES

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

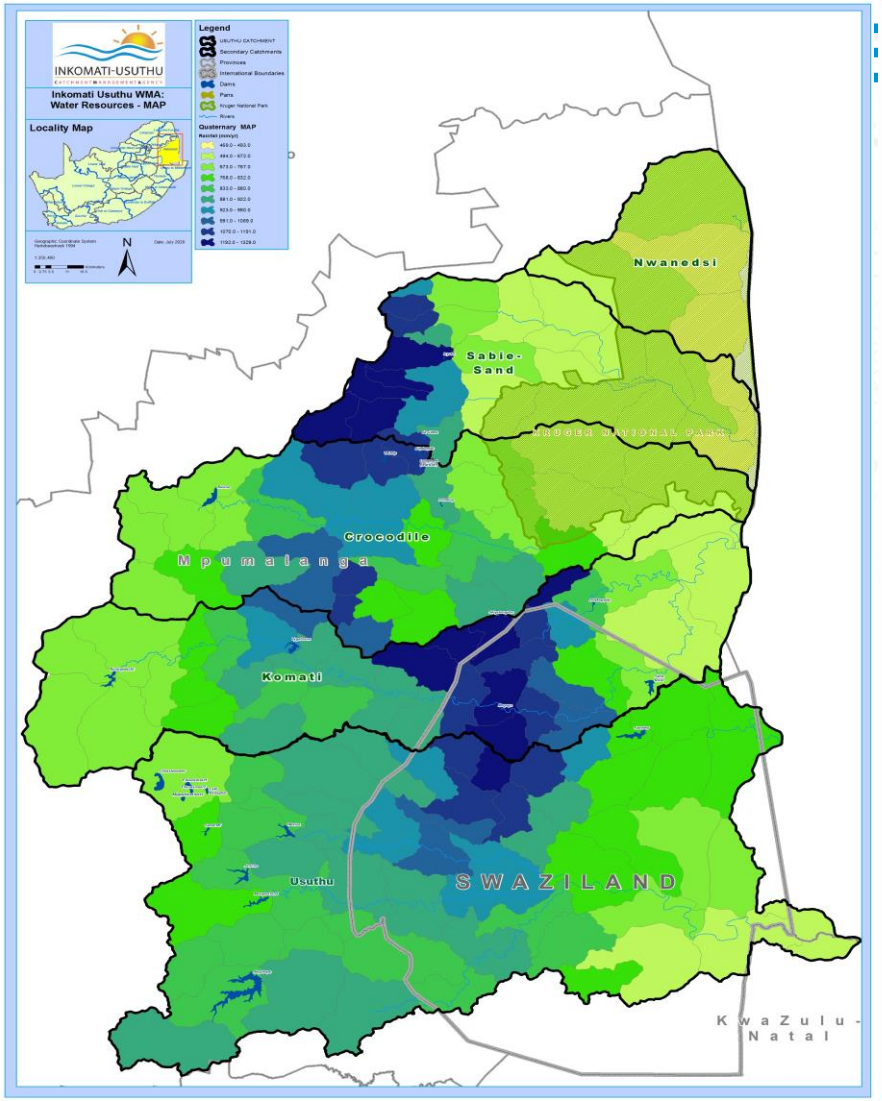
- IUCMA conducts regional monitoring within the Inkomati-Usuthu WMA which feeds into the national monitoring system.

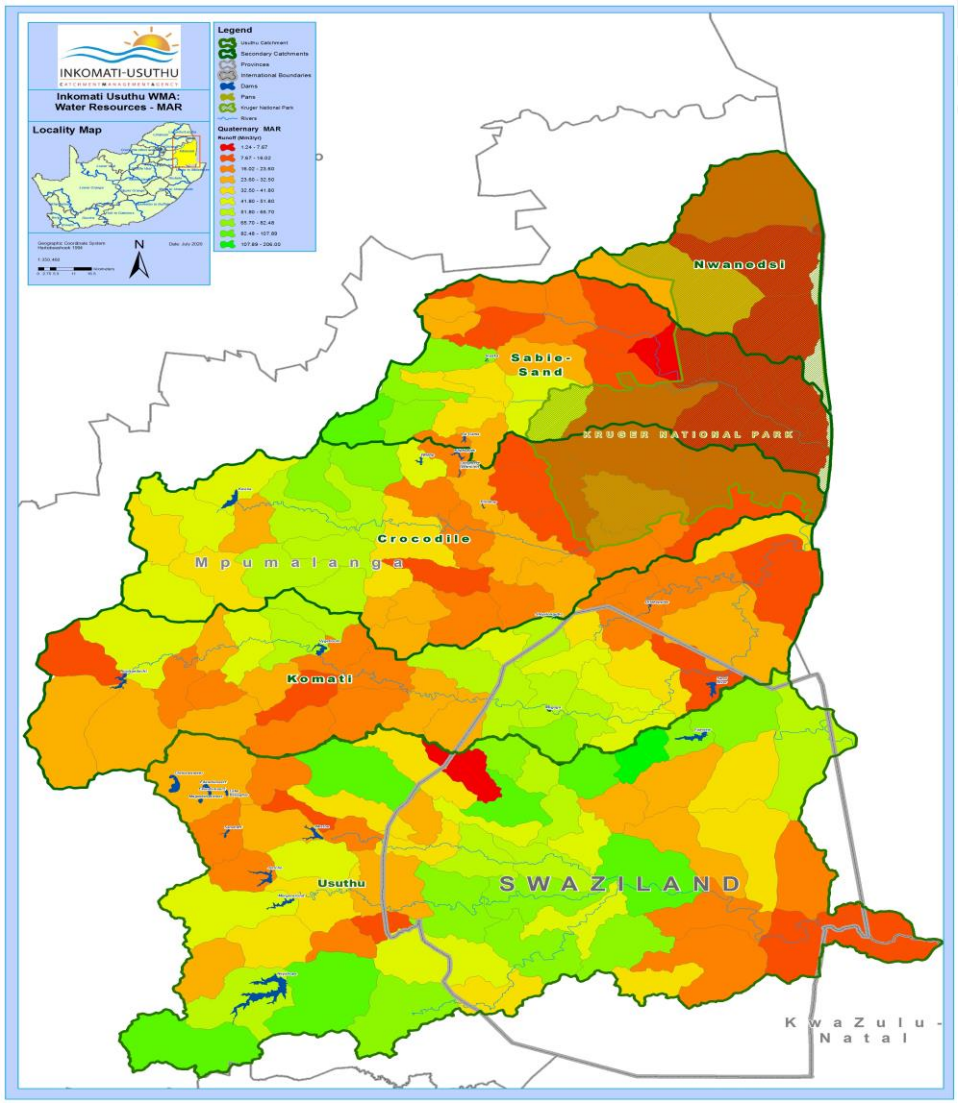
- Regional resource monitoring objectives is to **measure, assess** and **report** on water resource compliance status and trends.

- 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.

Surface and Groundwater Quantity Status

DISTRIBUTION OF MEAN ANNUAL RAINFALL AND MEAN ANNUAL RUNOFF





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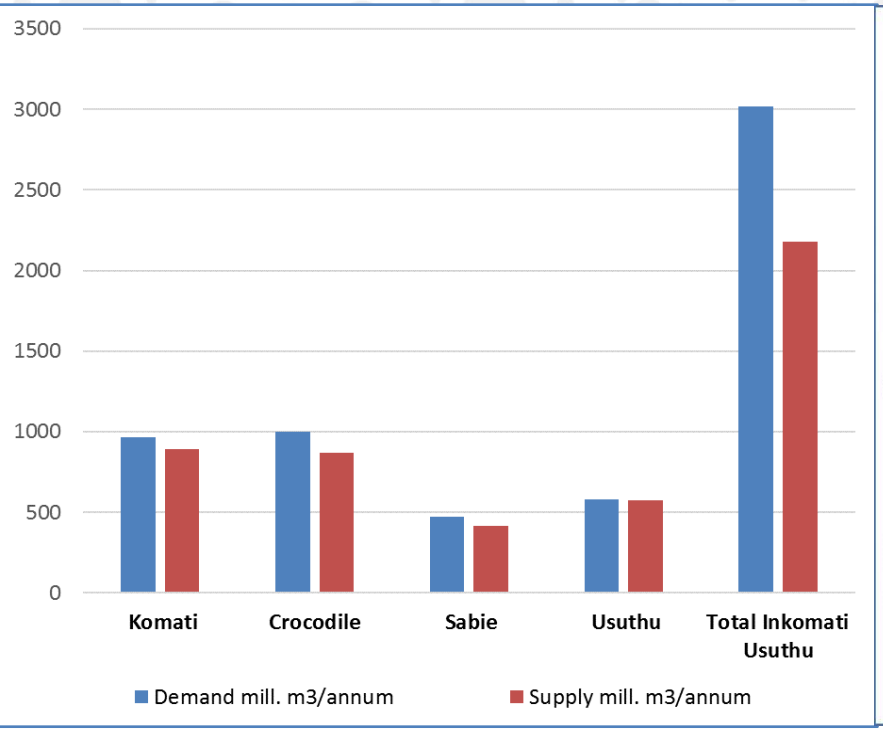
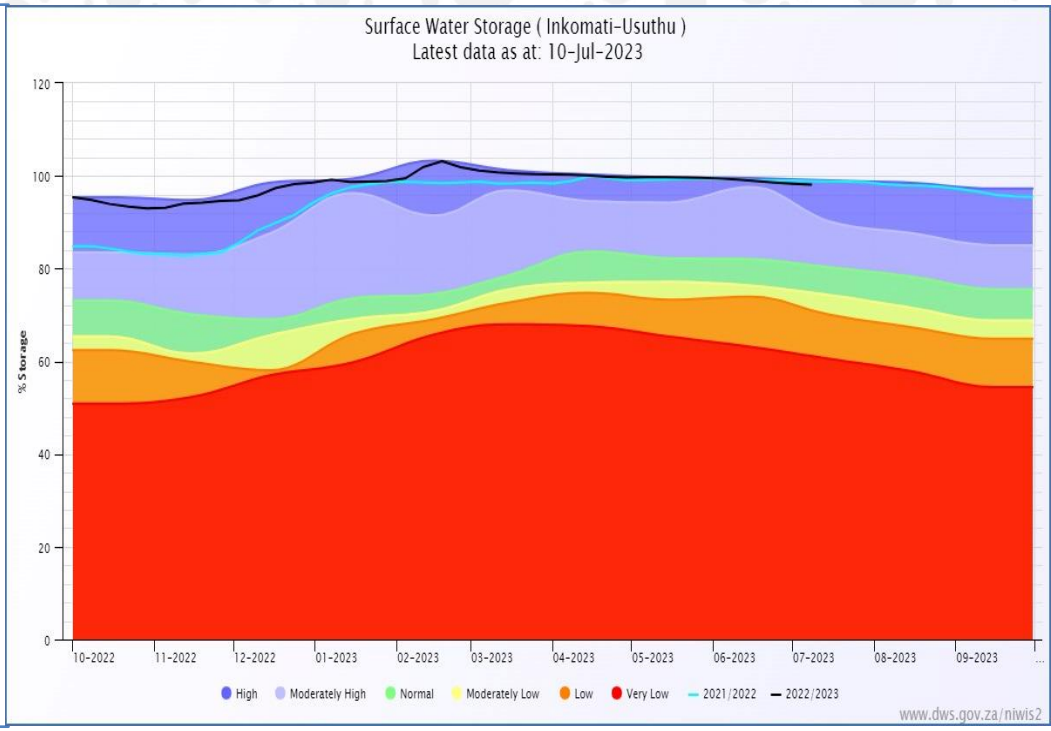
SURFACE WATER RESOURCES STATUS





- All dams are above normal, an indication of excess water in the system for annual allocations to different sectors through to next rain season. However, those who rely directly on river flows will still be affected as the river levels will be dropping until next rainy season.

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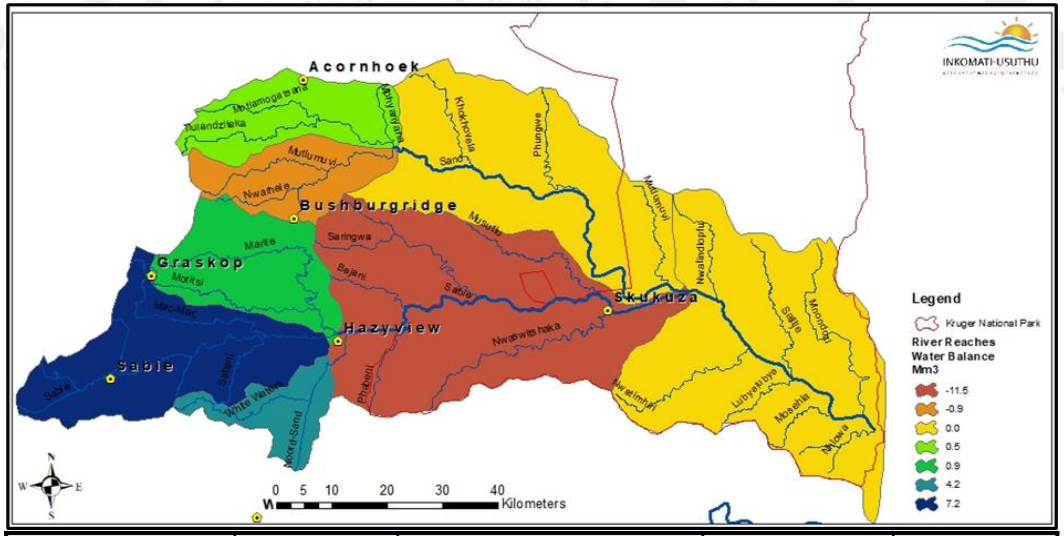
SABIE-SAND SURFACE WATER BALANCE



River Reach/Tributary	Water available at mixed assurance	Transfers		Water requirement	Balance
		Out	In		
Upper Sabie	56.2			49.0	7.2
Marite	33.4	25.0		13.1	0.9
White Waters	39.0			29.2	4.2
Middle Sabie	26.0			37.5	-11.5
Klein Sand	10.0			29.2	0.5
Matlamuva	9.7		20.5	15.5	-0.9
Sand	0.0		4.5	0.0	0.0
Lower Sabie	0.0			0.0	0.0
Total	174.3			173.5	0.8

Upper reaches of Sabie have positive water balance while middle Sabie shows negative balance. Sand river demands are met through transfers from Inyaka Dam

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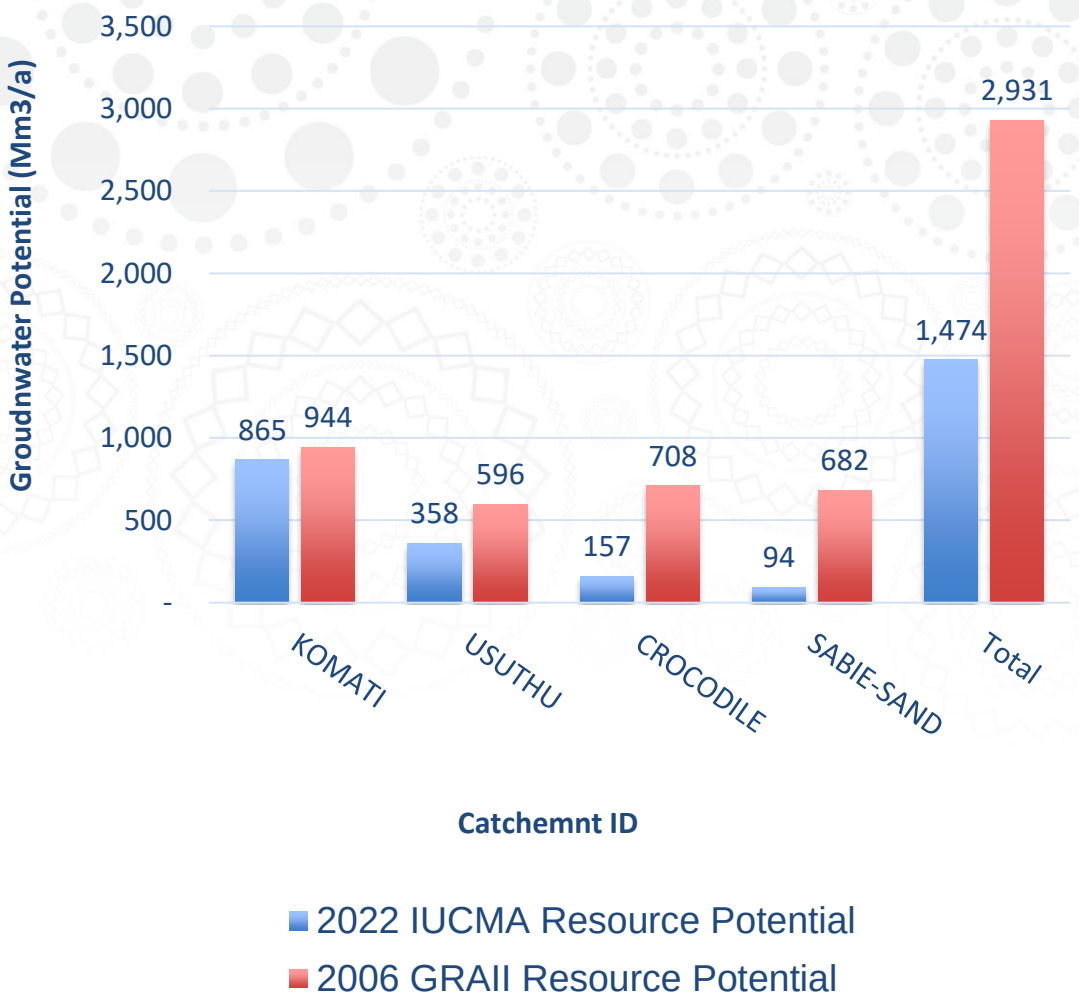
GROUNDWATER RESOURCES STATUS



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

- 86% for Sabie-Sand

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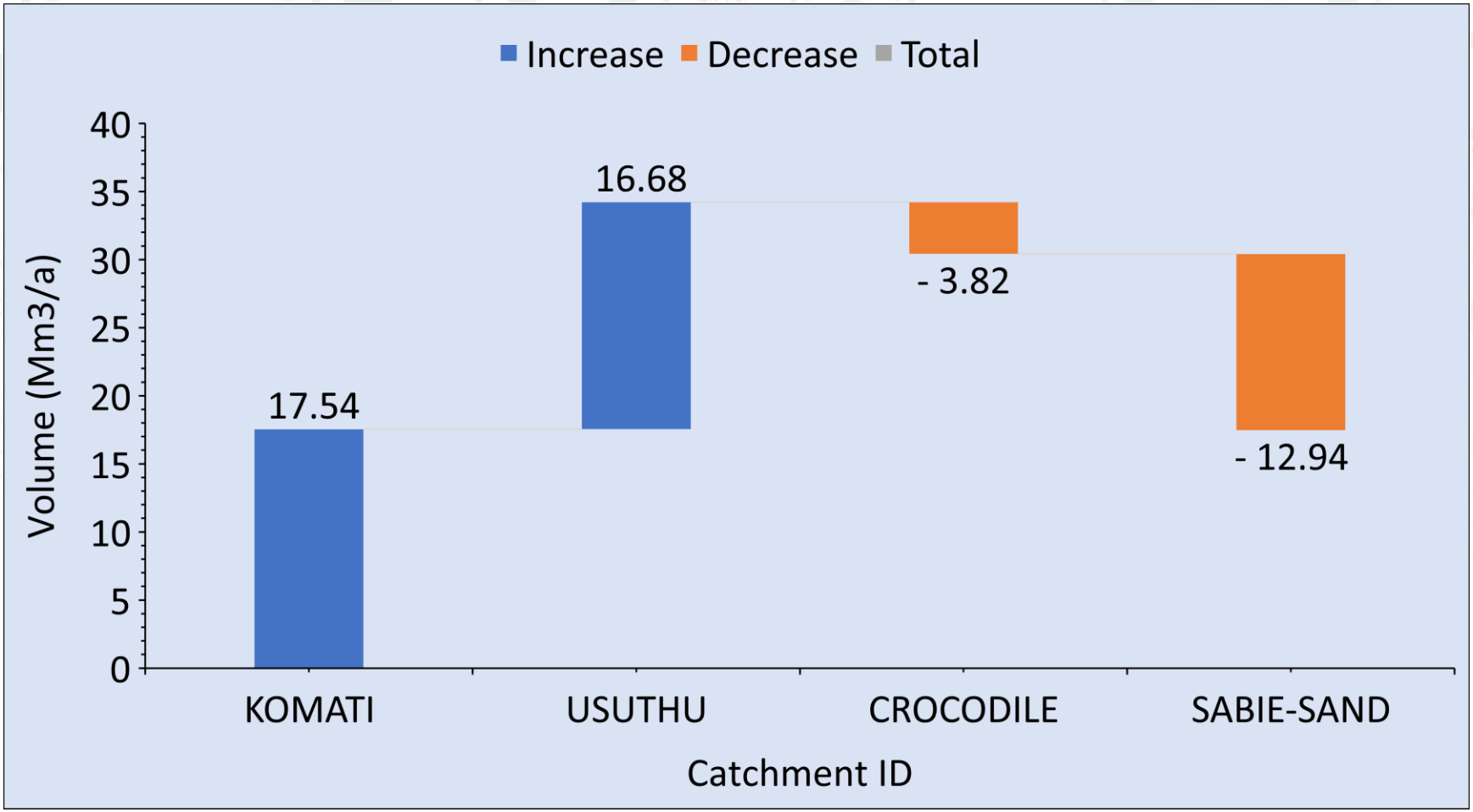
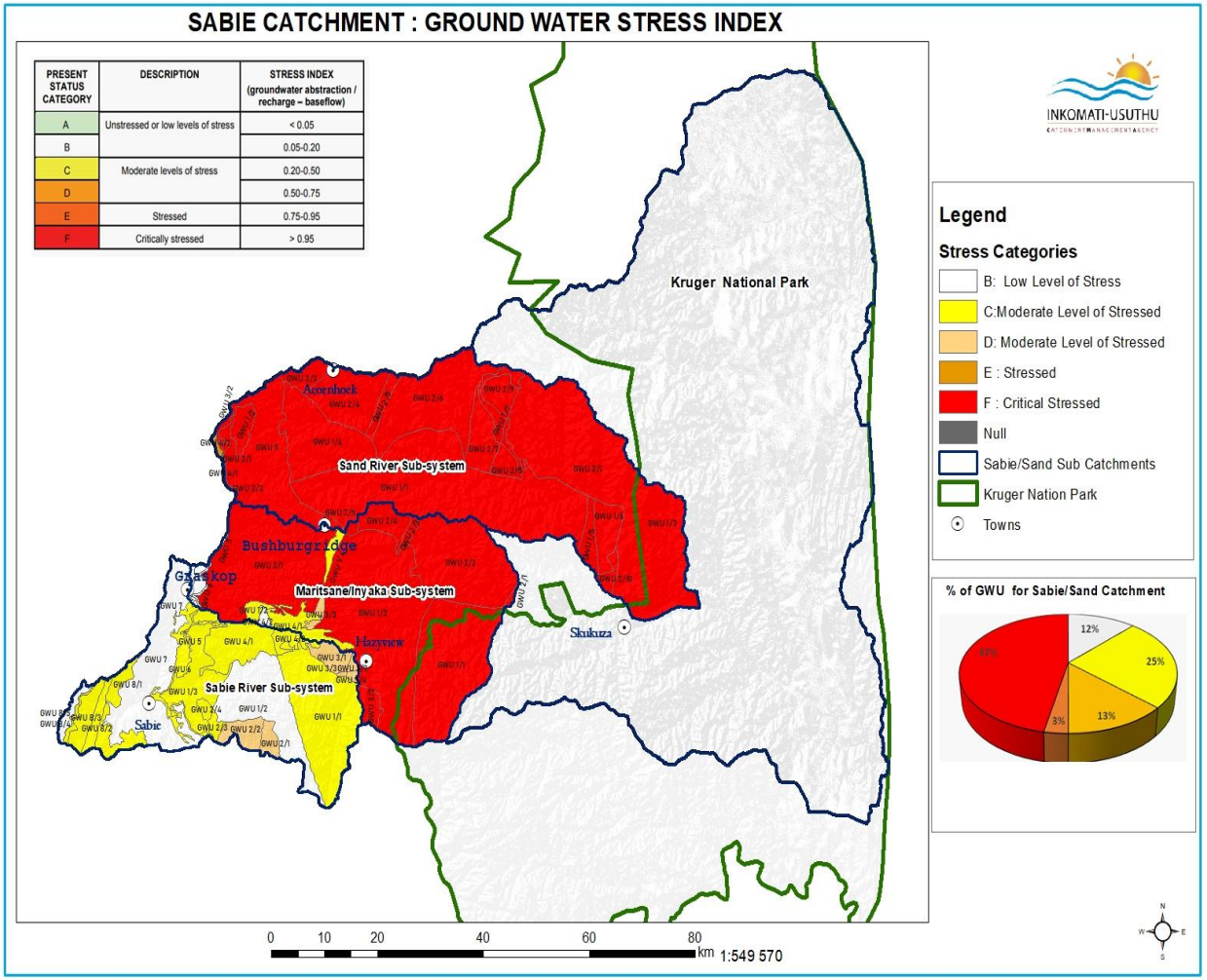
GROUNDWATER STORAGE CHANGE



- In general, the change in groundwater storage for Sabie-Sand is negative: Groundwater **use** is excessive and storage loss occurs.

SABIE SAND GROUNDWATER STRESS INDEX



- **Groundwater use requires to be managed strictly in the Sabie-Sand, as the catchment is critically stressed.**
- **Maritsane/Inyaka: the majority of Ground Water Units are critically stressed, with a few unstressed Ground Water Units in the upper reaches & few moderately stressed in the middle**
- **Concern: where Surface Water is in deficit, Ground Water is also stressed.**

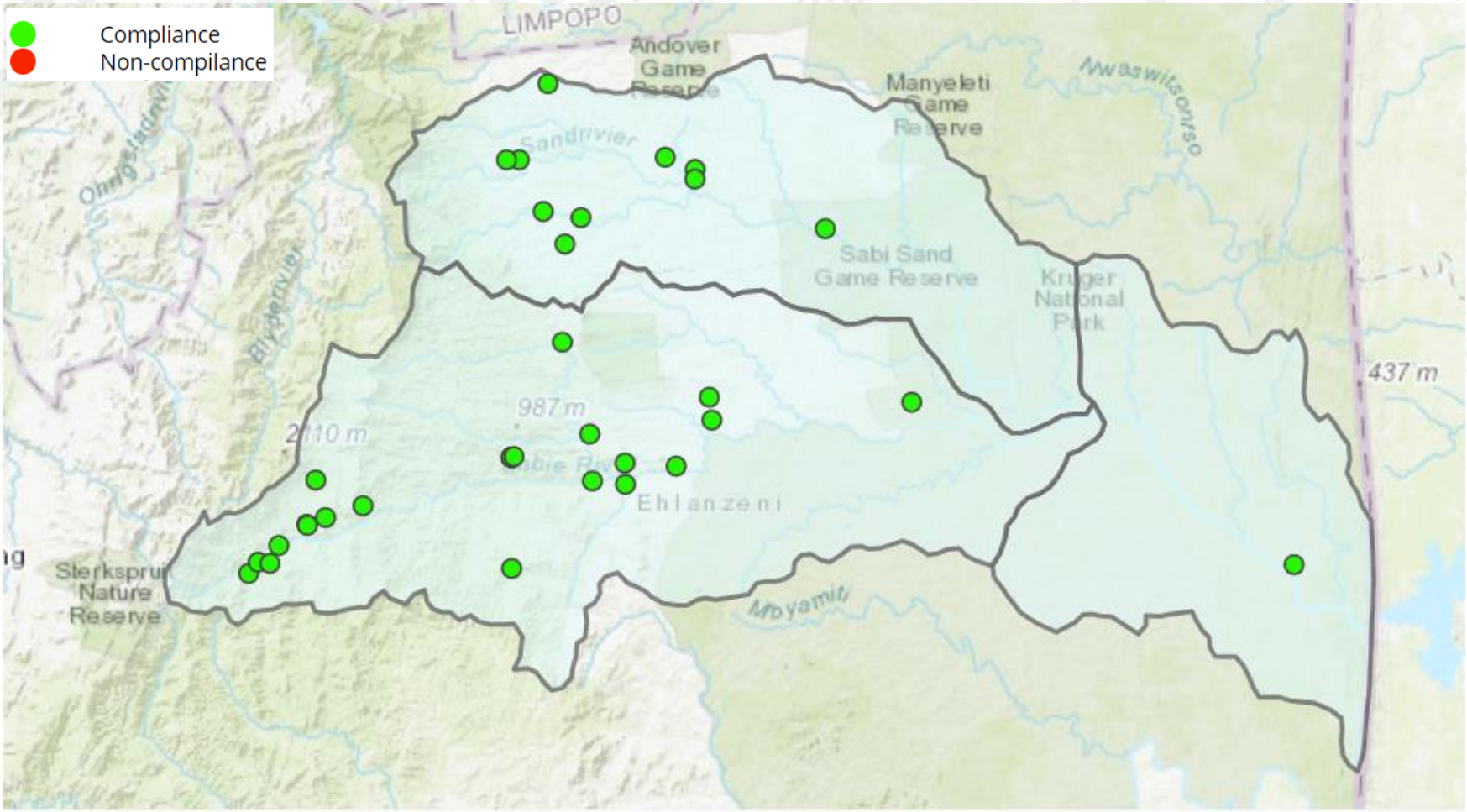
Surface Water Quality Status

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 Sabie Sand Catchment.

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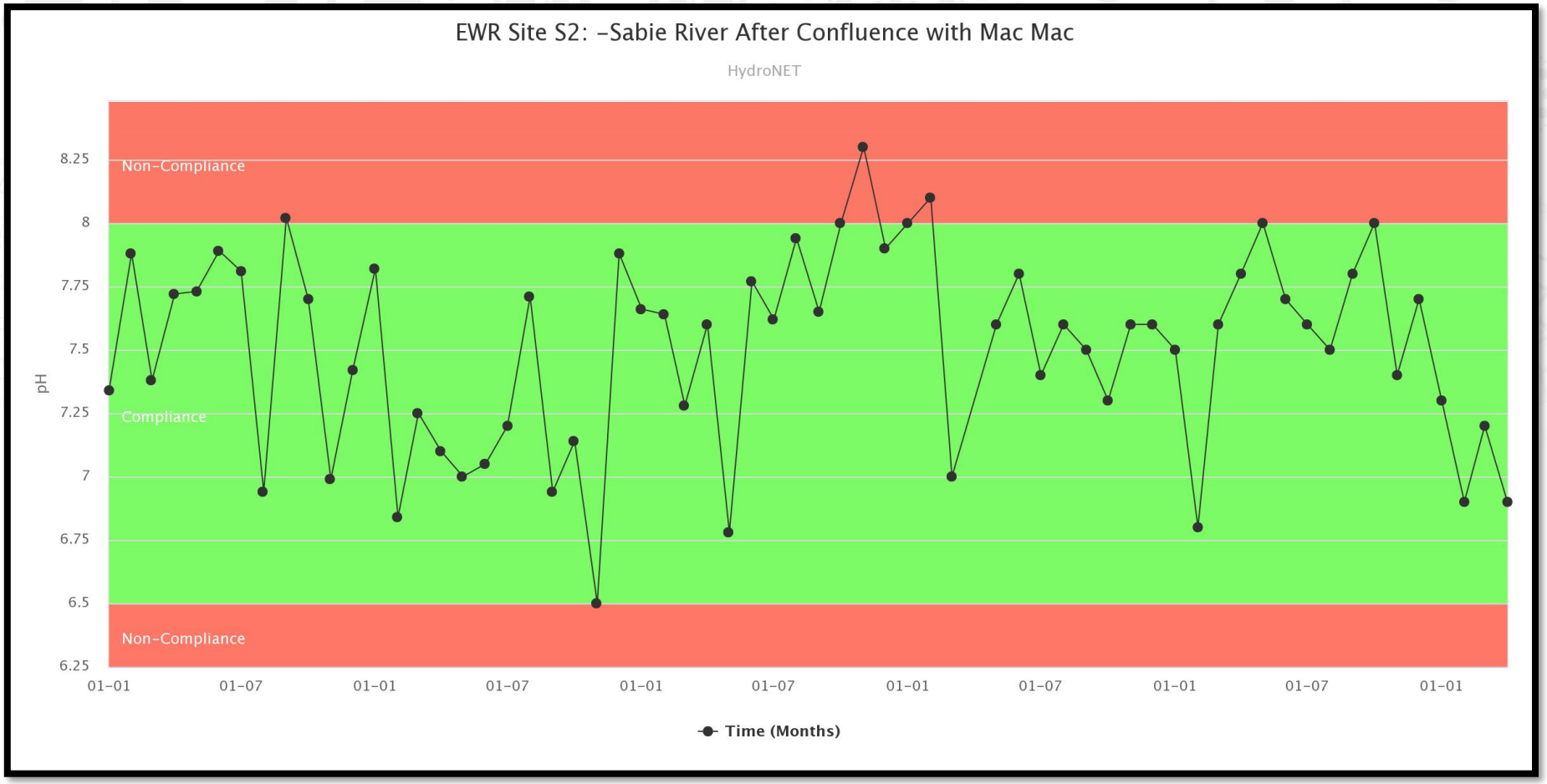
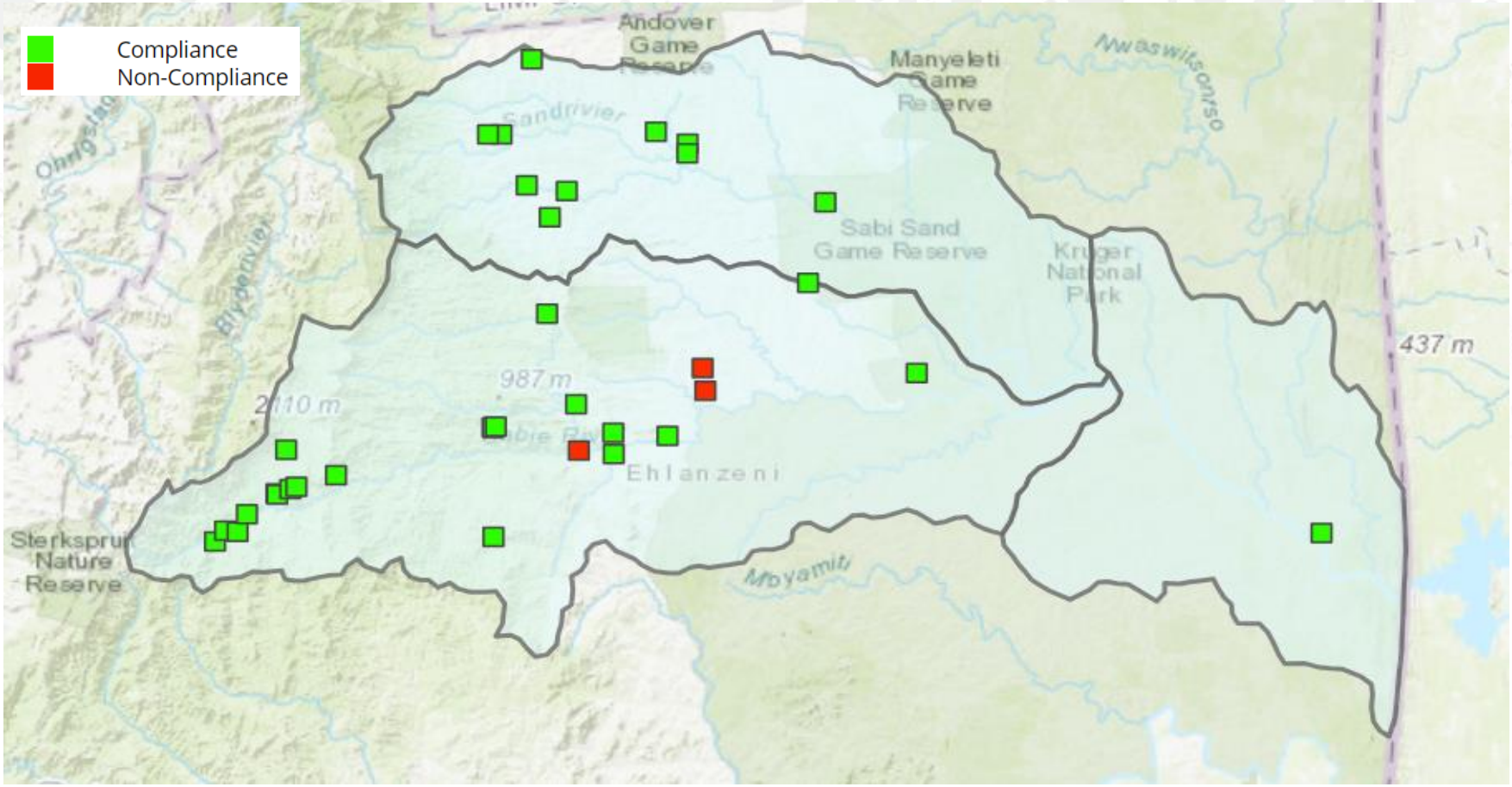
TRENDS: PH (AFTER CONFLUENCE WITH MAC MAC)

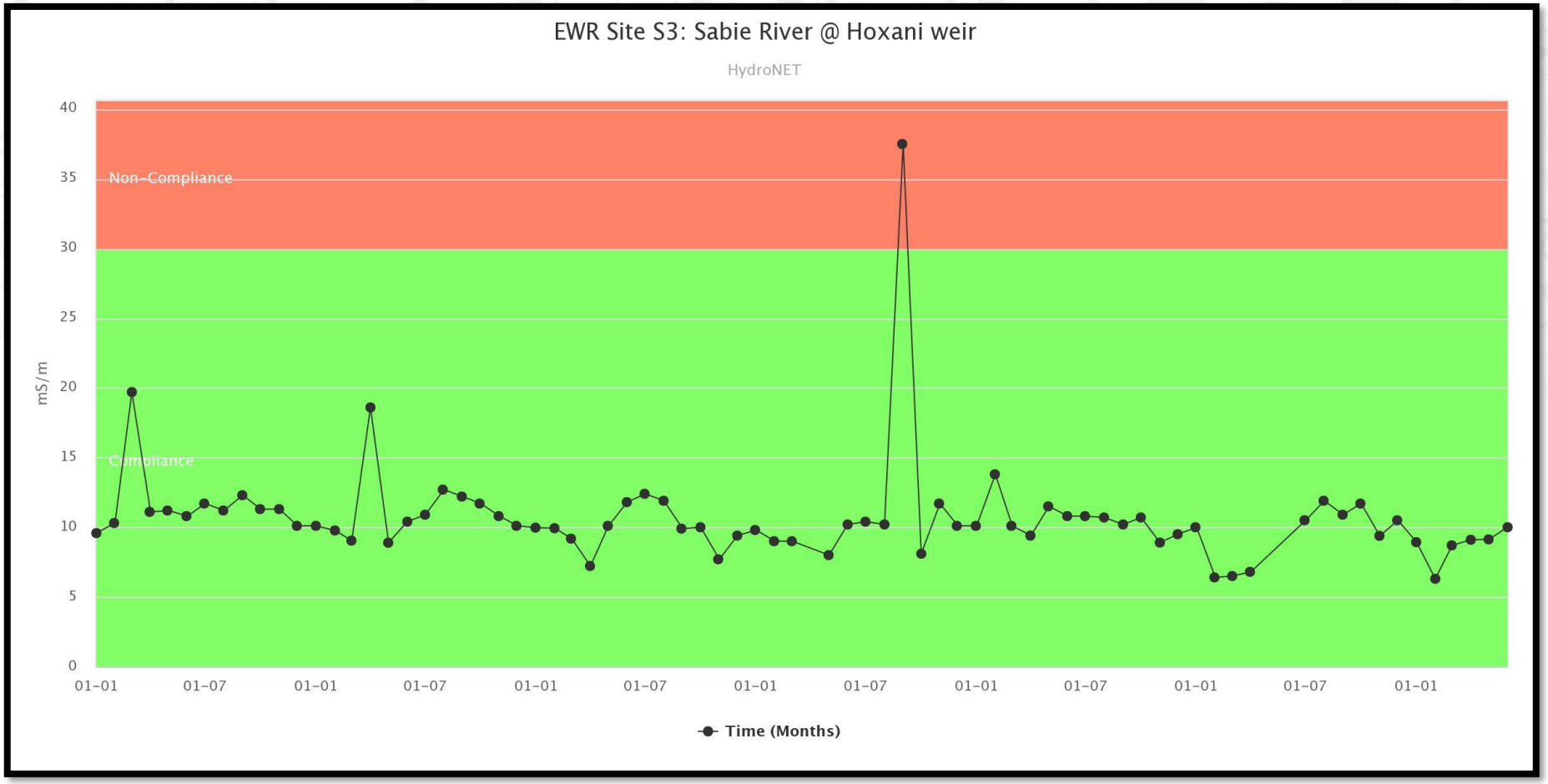


WATER QUALITY STATUS: ELECTRICAL CONDUCTIVITY



EC complied with the RQO throughout the reporting time within the Sabie Sand Catchment, **except** for Langspruit (Hazyview area), Bega River and Ngwenjameni River (Mkhuhlu area).

TRENDS: ELECTRICAL CONDUCTIVITY



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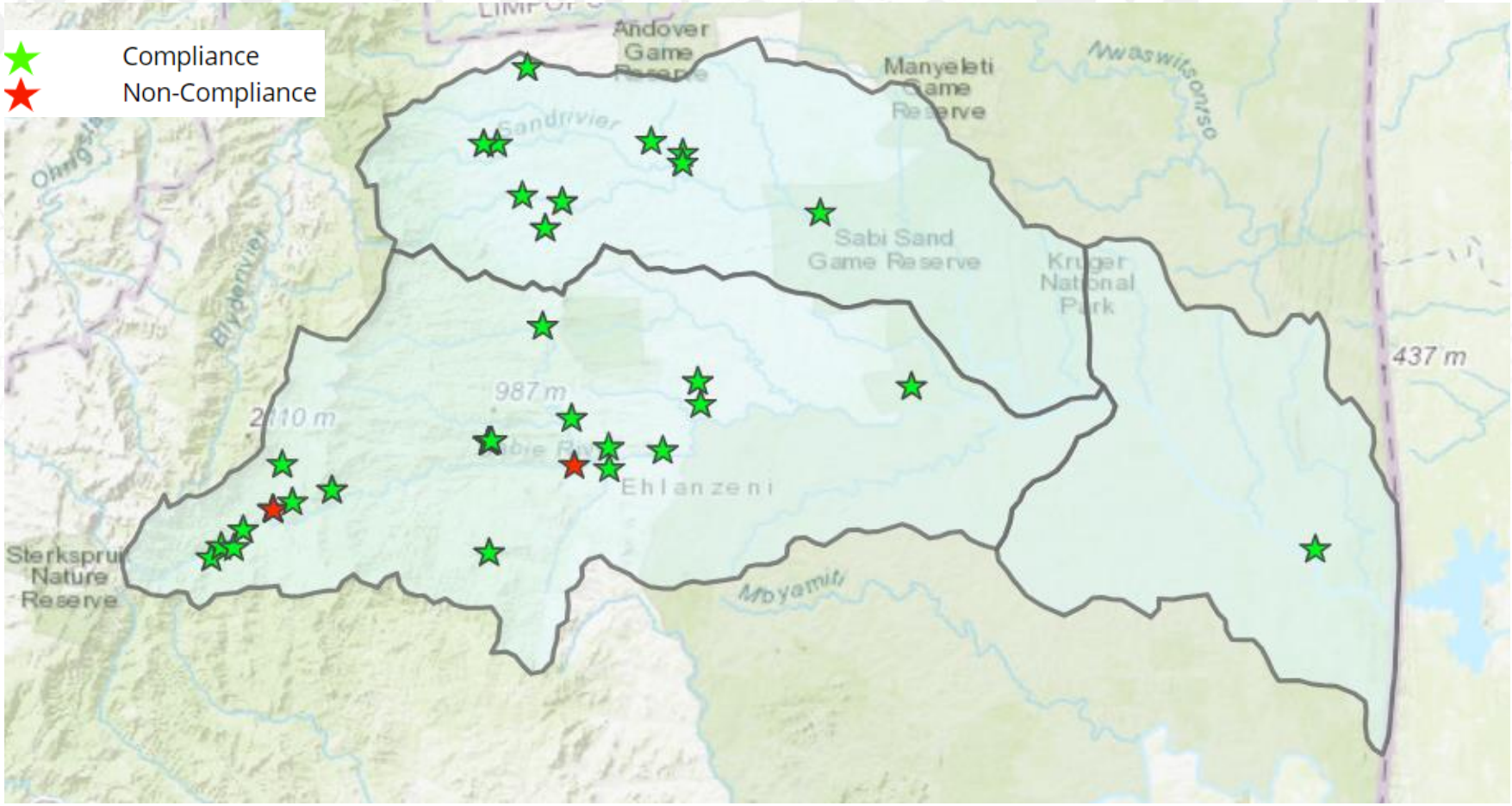
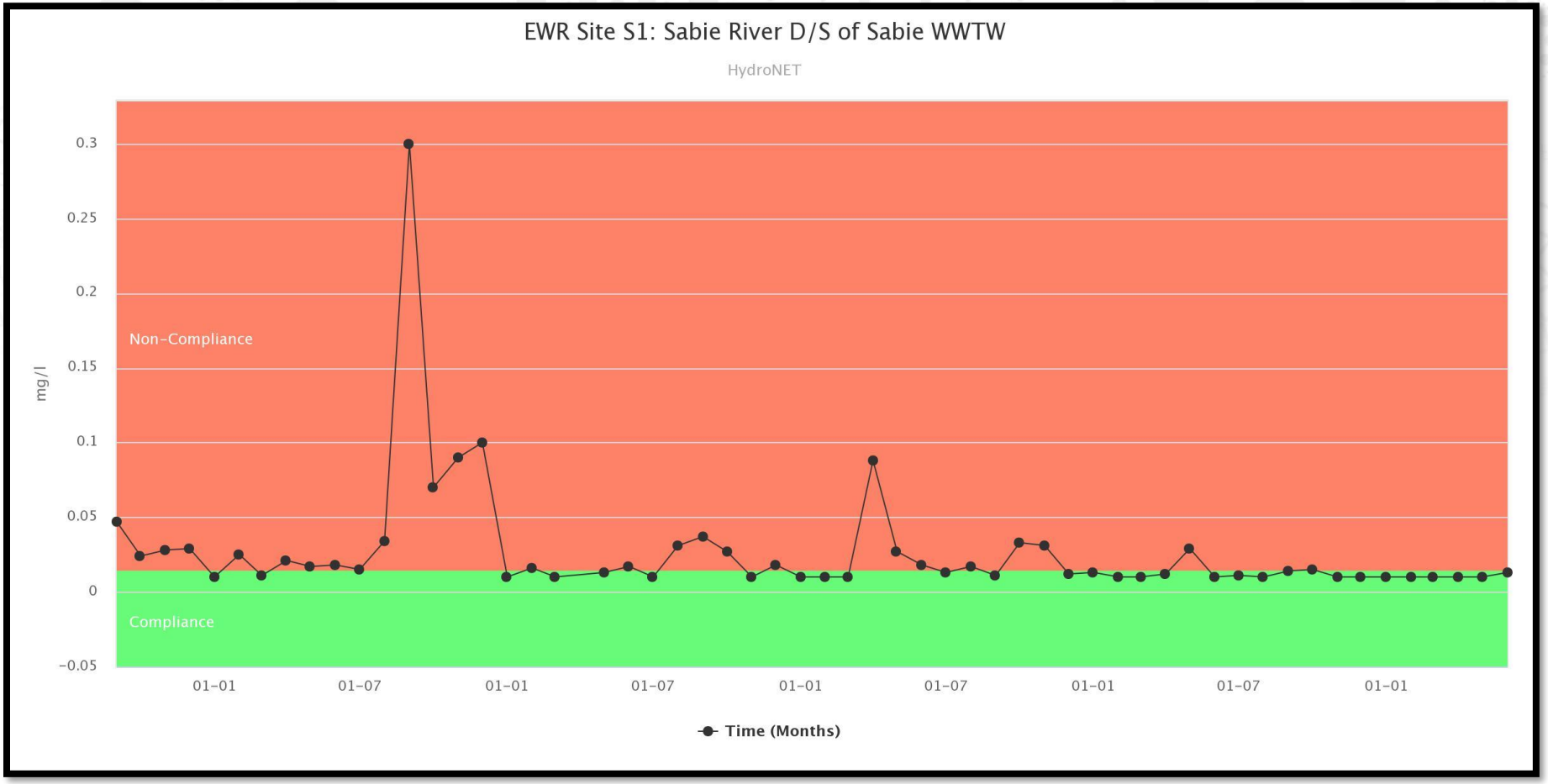
WATER QUALITY STATUS: PHOSPHATE

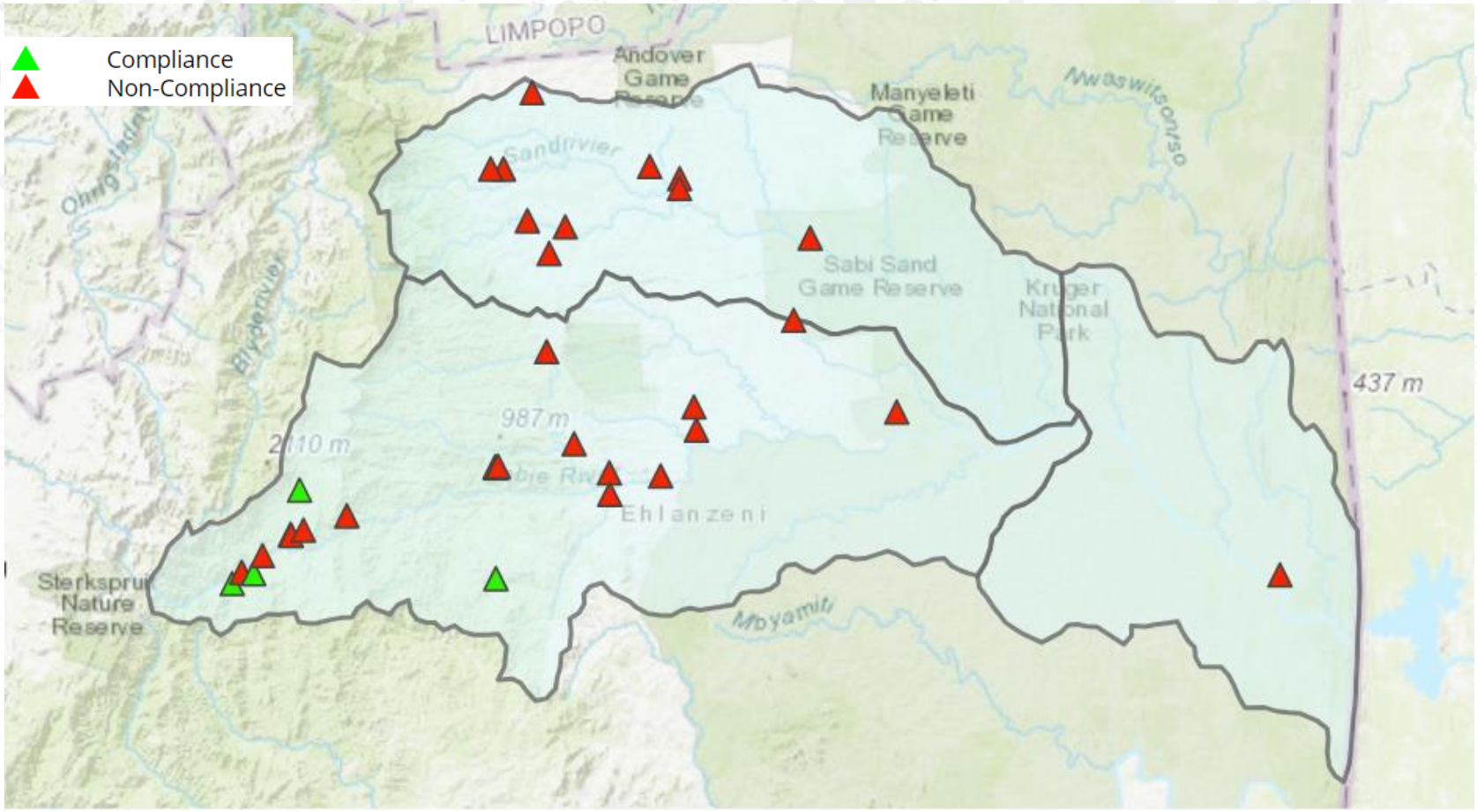


PO4 complied with the RQO throughout the reporting time within the Sabie Sand Catchment, except for Klein Sabie River (Sabie Town at Tweefontein) and Langspruit (Hazyview area).

TRENDS: PHOSPHATE

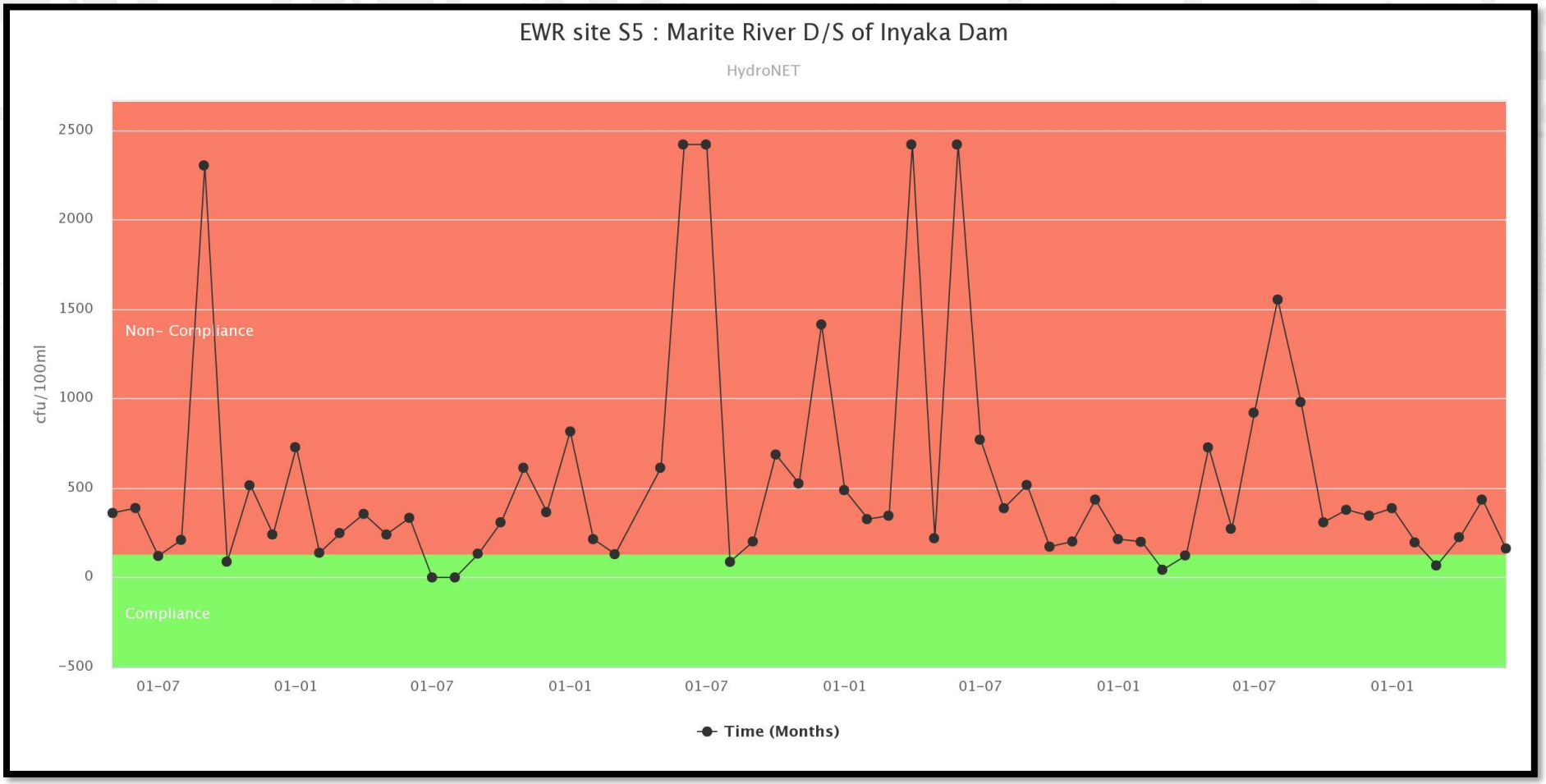


WATER QUALITY STATUS: E COLI



E. coli counts did not comply with the set RQOs for most of the monitoring sites, with high concentrations within residential areas, except for Da-Gama Dam and headwater of Sabie River and Klein Sabie as well as the tributary of Sabie River (Upstream of Sabie Town).

TRENDS: E COLI



WATER QUALITY DATA FOR KOMATI EWR SITES

EWR Site	Turbidity (NTU)		EC (mS/m)		PO_4 (mg/l)		*E coli* (cfu/100ml)		Ammonia		Flows (m^3/s)	
	RQO	Results	RQOs	Results	RQOs	Results	RQOs	Results	RQOs	Results	RQO	Compliance %
EWR S-1	NR	**8.52**	30	**10.8**	0.015	**0**	130	**1541**	**0.015**	**0.065**	**1.0**	**100**
EWR S-2	NR	**9.16**	30	**10.1**	0.015	**0**	130	**863**	**0.015**	**0.130**	**0.93**	**100**
EWR S-3	NA	**7.63**	30	**9.9**	0.015	**0**	130	**830**	**0.015**	**0.086**	**3.2**	**100**
EWR S-4	NA	**6.25**	40*	**10.3**	0.025*	**0.01**	130*	**834**	**0.015***	**0.118**		**VA**
EWR S-5	NR	**8.37**	30	**15.21**	0.015	**0**	130	**274**	**0.015**	**0.070**		**VA**
EWR S-6	NR	**27.68**	55	**12.3**	0.125	**0.02**	130	**953**	**0.015**	**0.279**		**VA**
EWR S-7	NA	**16.66**	42	**8.0**	0.125	**0**	130	**1225**	**0.0.15**	**0.091**		**VA**
EWR S-8	NR	**41.34**	40*	**17.3**	0.125	**0.04**	130	**1626**	**0.015***	**0.162**	**0.35**	**100**

RESOURCE QUALITY STATUS

EUTROPHICATION STATUS OF THE MAJOR DAMS WITHIN THE WMA

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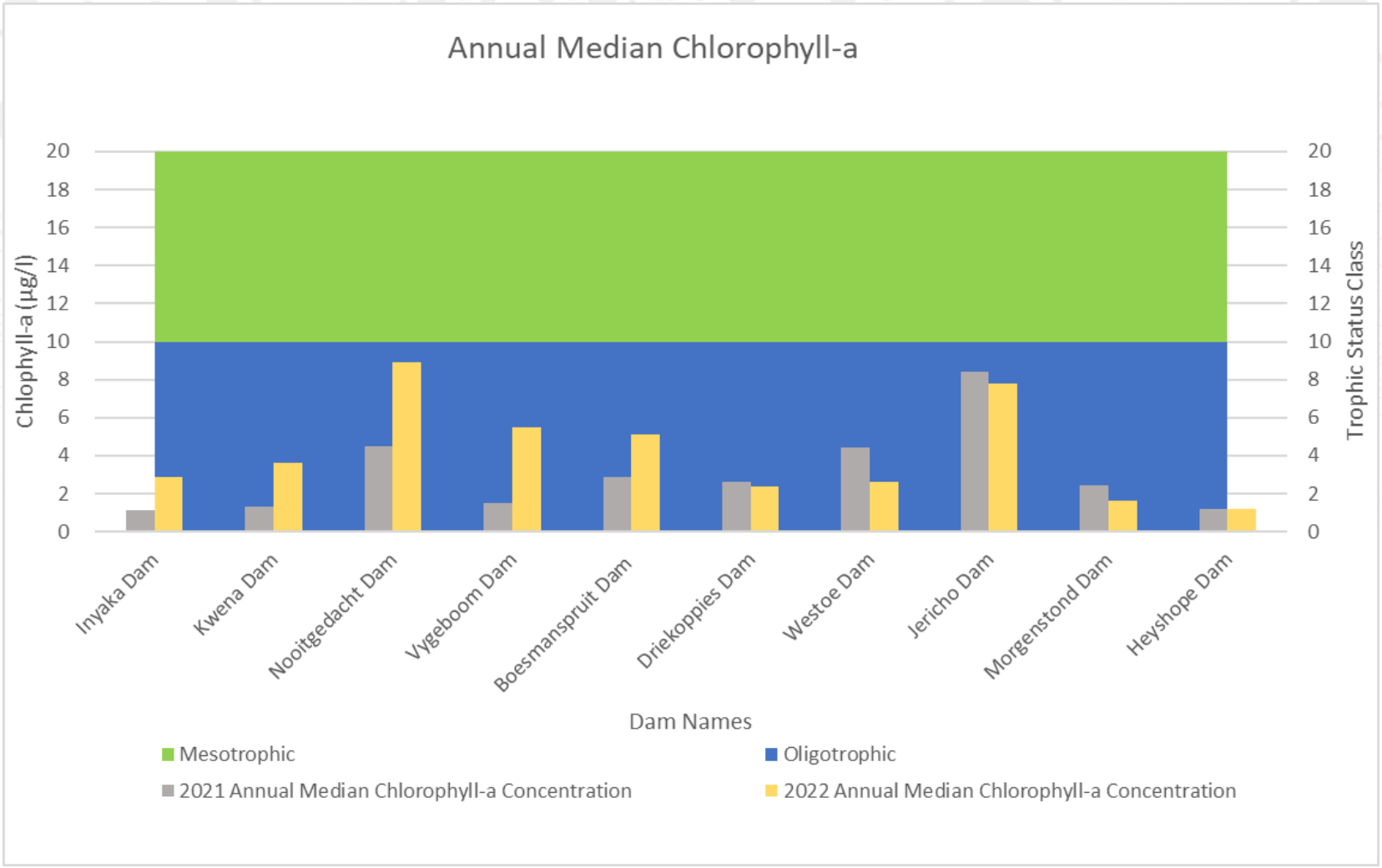
TROPHIC STATUS

- **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



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KEY ISSUES RAISED BY STAKEHOLDERS: CMF 2022/23 SABIE/SAND

No.	Issue raised	Sub-catchment	Proposed Action	Progress and recommendations
1.	Disparity between the forestry tariff seen to be lower than domestic while forestry is consuming a lot of water e.g. Eucalyptus over planted in the Sabie-Sand sub-catchment	Sabie and Sand	The matter to be kept on the rudder and engage the DWS for consideration during the initial stages of the Pricing Strategy and consultation processes for tariff determination.	Engagements with the Mpumalanga Water Caucus were initiated by the IUCMA and advice from the DWS was sought. The SA Forestry and DWS Court Judgement was also an impediment on the final resolution of this matter. The historical documents regarding the old Ministerial (Kader Asmal) Directive to reduce the plantations along the riparian zones could not be found since the forestry mandate is now with a new ministry.
2.	Water users in the Sabie and Hoxani requested to have their own canal because they were not getting enough allocation from the Sabie River. A similar request from water users in Saringwa Scheme are also requesting to have their own canal for irrigation water supply.	Sabie and Sand	The IUCMA (RPO &WUA) are engaging other relevant departments such as the DWS and Department of Agriculture to explore support mechanism on infrastructure development and plans in place.	There are ongoing interactions between the IUCMA and DARDLEA where an MOU has been signed and support programmes identified as action plans.

KEY ISSUES RAISED BY STAKEHOLDERS: CMF 2022/23 SABIE/SAND

No.	Issue raised	Sub-catchment	Proposed Action	Progress and recommendations
3.	Stakeholders have been requesting the Bushbuckridge Local Municipality Waste Management Division to share their service provision plans in the Municipal jurisdiction.	Sabie Sand	The IUCMA to engage the Municipal Manager's intervention	A commitment was made to make the information available in the CMF meetings going forward
4.	Compliance issues regarding the Bushbuckridge clay bricks company next to Casteel Dam.	Sabie Sand	The IUCMA was to investigate compliance with regulations on the facility.	The investigation was conducted, and operations had ceased at the facility.
5.	Invitation of Traditional Authorities to attend the CMF meetings	Sabie Sand	Invitations should be extended to the traditional leaders who were not represented.	Rotational holding of CMF meetings at Traditional Councils should be revived as it was done in the past before the Covid 19 outbreak.
	A concerned stakeholder reported an alleged illegal construction of a canal by some farmers and put a pipe near the Hebron Forestry station to divert water out of the river to farm.	Sabie Sand	The issue was referred to CME on 27/10/2022	CME has investigated the matter and the findings were that the Brooklyn community project was stopped because no consultation was done with the Craigieburn community. Basically, this matter has been resolved and reported back to the concerned stakeholder who reported the matter.

CONCLUSIONS AND RECOMMENDATIONS

Water Quantity:

- The Sabie-Sand catchment is in balance.
- The water resource lies mostly in the Sabie River with the Inyaka Dam providing high assurance yield and releasing water to meet the EWR.
- Most of the high assurance yield from the Inyaka Dam is transferred to the Sand River catchment, without which the catchment would be in deficit.
- In the **Sabie-Sand Catchment** there is no more water available for new allocations. The underlisted measures require to be considered to enhance the yield of the catchment:
    I. WC/WDM;
    II. Development of groundwater (Sabie town);
    III. New Regional Dam; and
    IV. Reduction of lawful forestry (SFRA) and conversion of Streamflow Reduction to other use. This will normally need to be accompanied by off-channel storage.
- Groundwater development in the Sabie-Sand catchment to be controlled.

CONCLUSIONS AND RECOMMENDATIONS

Water Quality:

- Water Quality in the Sabie Sand is generally good but punctuated by microbial (*E. coli*) pollution) which indicated non-compliance at various sites due to WWTWs and its associated infrastructure and urban/rural settlement.
- 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 through Source Directed Controls (SDC) as per the provision(s) of the NWA.
- Key stakeholders encouraged to address poor operation and maintenance of WWTW's and its associated infrastructure i.e., sewer pump stations, manhole etc.
- Municipalities to provide sustainable and adequate waste management and sanitation services to urban and rural settlement

THANK YOU

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