HYDRONET
Practical experiences of the Pongola to Umzimkulu proto CMA

Presented at the Hydronet Launch
4 May 2022

PRESENTATION OUTLINE

- Background

- Alignment to the Annual Performance Plan

- Current uses

- Aspirations

- Key considerations in moving forward

water & sanitation
Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

2030
NDP
NATIONAL DEVELOPMENT PLAN
Our Future - make it work

BACKGROUND

- In 2013 the Inkomati-Usuthu Catchment Management Agency (IUCMA), South African Weather Service (SAWS) and HydroLogic joined forces to develop a set of tailored applications known as the Water Control Room Starter Package.

- This began to be rolled out to other CMAs/Proto CMAs as the years progressed.

- HydroNET was introduced to the Pongola to Umzimkulu proto CMA *via* the Kingfisher Programme which ended in 2018.

- Launched at the WISA 2016 Conference.

- Identified Hydronet champions within the Proto CMA.

- This was replaced by the Blue Deal Programme which is a joint programme between Netherlands and RSA from 2019 until 2030.

- The Msunduzi River Improvement Corridor Partnership is one of four of the Blue Deal Projects being implemented in South Africa.

- Hydronet is being piloted in the Msunduzi catchment through the Blue Deal Msunduzi Partnership.

ALIGNMENT TO THE DWS ANNUAL PERFORMANCE PLAN

- Realization that in order to have support and buy-in, there is a need to align HydroNET to the Annual Performance Plan (APP) of the Department.

Department of Water and Sanitation

Programme 2: Water Resources Management

Water Resource Information and Management

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WATER CONTROL ROOM, HYDROVIEW AND HYDROWATCH IN A NUT SHELL

- The Water Control Room offers interactive and personalised dashboards where one can customize the information that needs to be received in order to make the right decisions at the right time.

Connect + View + Watch + Alert + Report

- **HydroView:** View, combine and analyse archived and operational data sets which are connected to HydroNET. Export HydroView graphs or maps to the Water Control Room where they are automatically updated.

- **HydroWatch:** Configure thresholds to add value to all data sources which are connected to HydroNET. Automatically monitor the status of these data sources via traffic light-coloured thematic maps and graphs. Export the HydroWatch graphs and maps to the Water Control Room where they will be automatically updated.

> *"Your water control room"* The Pongola to Umzimkulu proto CMA is able to manage and display some water resources information on HydroNET for use in everyday operation and management of water resources

BLUE DEAL GLOBAL PROGRAMME

Programme between the Ministries of Foreign Affairs and of Infrastructure & Water Management and all the Dutch water authorities

2018 - 2030
BLUE DEAL

Improve the water situation of 20 million people in 40 catchments around the globe by the year 2030.

4 Projects in SA:

- **Pongola-Mtamvuna WMA: Msunduzi River Corridor Improvement**
- Upper Vaal WMA: Blesbokspruit
- Upper Vaal WMA: Vredefort Dome
- Inkomati-Usuthu WMA: Crocodile River

Pongola - Mtamvuna WMA: Msunduzi River Corridor Improvement

Impact 2030: Improvement of the water quality of the Msunduzi River

Partnership: National Partners (DWS, WRC, SALGA, and COGTA / MISA) + **Local Partners** (Msunduzi LM, DUCT, SANBI, UEIP, Umgeni Water)

Piloting Hydronet as part of the **Blue Deal Msunduzi Partnership** – linked to **Key Activity 2** of the Partnership: **"A Living Catchment Management Strategy"** with the initial focus on **data sharing** *via* the **Hydronet system.**

DATA IMPORT
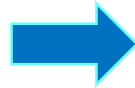
Raw Data ➡ Convert data ➡ Interpret data

Sample Point	RMD006	RMD007	RMD008	RSL003	RMD011	RMD0
ample description	uMrunduze at Caluza Bridge	uMrunduze below Kuapata	uMrunduze at Edendale Weir	Slangrpruit above Duzi confluence	Campz Drift Bridge	uMrundus above Darprpru confl
29-Mar-16	3090	5760	5650	7800	1850	763
05-Apr-16	4352	7701	No access	111990	2247	2187
12-Apr-16	4611	6867	5172	173290	1664	798
19-Apr-16	3076	3255	6867	14210	1223	331
26-Apr-16	5794	5475	4884	6131	199	275
03-May-16	2098	2755	4884	21430	1553	457
10-May-16	4106	2809	19863	241960	24196	4786
17-May-16	5475	2489	>24196	81640	959	3441
24-May-16	14136	19863	410	7980	327	422
31-May-16	12997	10462	8164	11780	1296	408
07-Jun-16	36090	5475	5475	8620	546	1529
14-Jun-16	5200	6867	5172	1480	1050	318
21-Jun-16	4106	9804	5172	173290	4106	341
28-Jun-16	2909	3654	12997	3450	109	331
05-Jul-16	3654	5172	1301	23820	1576	1296
12-Jul-16	8664	7270	7270	8820	4884	520
19-Jul-16	3654	3255	2481	5910	504	327
26-Jul-16	6488	8664	1585	86640	48840	3255
02-Aug-16	3255	5172	4352	4190	2755	231
11-Aug-16	21870	34480	9804	15531	73	236
16-Aug-16	17329	15531	2489	5380	213	228
23-Aug-16	41060	27000	7540	241960	24196	1986
30-Aug-16	46110	38730	573	7701	669	313
06-Sep-16	3410	5475	4352	48840	262	231
13-Sep-16	3090	3890	5475	43520	2063	7270
20-Sep-16	1690	1989	3130	8390	3448	1125
27-Sep-16	77010	52980	4106	1610	413	364
04-Oct-16	203	7890	6131	17230	7701	269
11-Oct-16	3441	10190	3873	22600	657	2359
18-Oct-16	2210	4550	5172	8600	504	408
25-Oct-16	1730	198630	9208	7660	738	227

Date	Time	Location ID	Determinand	value
05/07/2006	00:00:00	RMD013	E.coli (count per 100ml)	30
05/07/2006	00:00:00	RDS004	E.coli (count per 100ml)	450
05/07/2006	00:00:00	RMD014	E.coli (count per 100ml)	460
05/07/2006	00:00:00	RMD006	E.coli (count per 100ml)	610
05/07/2006	00:00:00	RMD007	E.coli (count per 100ml)	840
05/07/2006	00:00:00	WDV020	E.coli (count per 100ml)	1020
05/07/2006	00:00:00	RDS003	E.coli (count per 100ml)	1080
05/07/2006	00:00:00	RMD008	E.coli (count per 100ml)	2250
05/07/2006	00:00:00	RMD011	E.coli (count per 100ml)	3450
05/07/2006	00:00:00	RBS002	E.coli (count per 100ml)	3600
05/07/2006	00:00:00	RDS005	E.coli (count per 100ml)	3870
05/07/2006	00:00:00	RMD016	E.coli (count per 100ml)	4350
05/07/2006	00:00:00	RMD019	E.coli (count per 100ml)	4350
05/07/2006	00:00:00	RMD017	E.coli (count per 100ml)	4880
05/07/2006	00:00:00	RBS001	E.coli (count per 100ml)	5600
05/07/2006	00:00:00	RMD015	E.coli (count per 100ml)	6870
05/07/2006	00:00:00	RSL003	E.coli (count per 100ml)	7200
05/07/2006	00:00:00	RMD018	E.coli (count per 100ml)	
12/07/2006	00:00:00	WDV020	E.coli (count per 100ml)	20
12/07/2006	00:00:00	RMD013	E.coli (count per 100ml)	70
12/07/2006	00:00:00	RDS004	E.coli (count per 100ml)	260
12/07/2006	00:00:00	RMD016	E.coli (count per 100ml)	600
12/07/2006	00:00:00	RDS003	E.coli (count per 100ml)	760
12/07/2006	00:00:00	RMD007	E.coli (count per 100ml)	860
12/07/2006	00:00:00	RMD014	E.coli (count per 100ml)	880

- Extremely low risk
- Very low risk
- Low, but increasing risk
- Moderate risk (apprx. 1 in 10 may get sick)
- Moderately high canoeing risk (approx. 1 in 5 may get sick)
- High risk (approx. 1 in 3 may get sick)
- Very high canoeing risk (approx. 1 in 2 may get sick). Avoid canoeing

Each point represents the aggregated data for a station – Data from 2006 to 2021 (continuous monitoring)

WATER QUALITY
UMGENI WATER *E. coli* DATA: THE GOOD
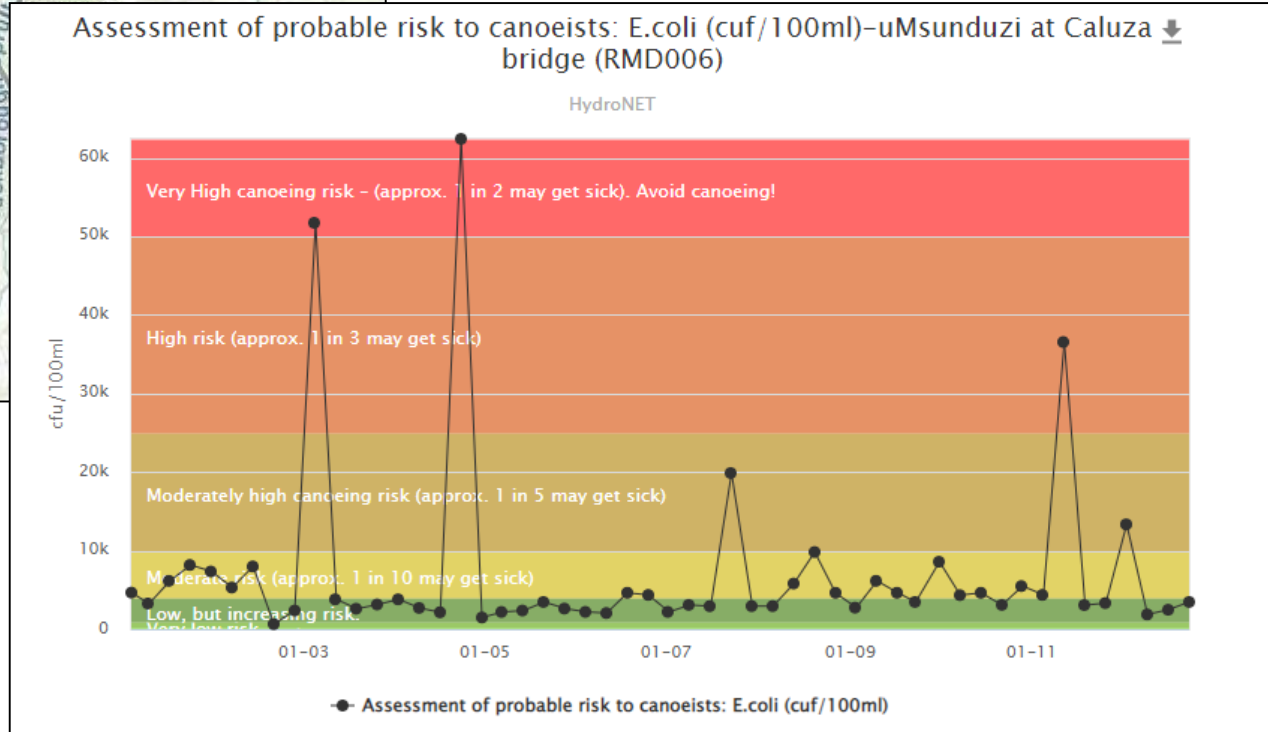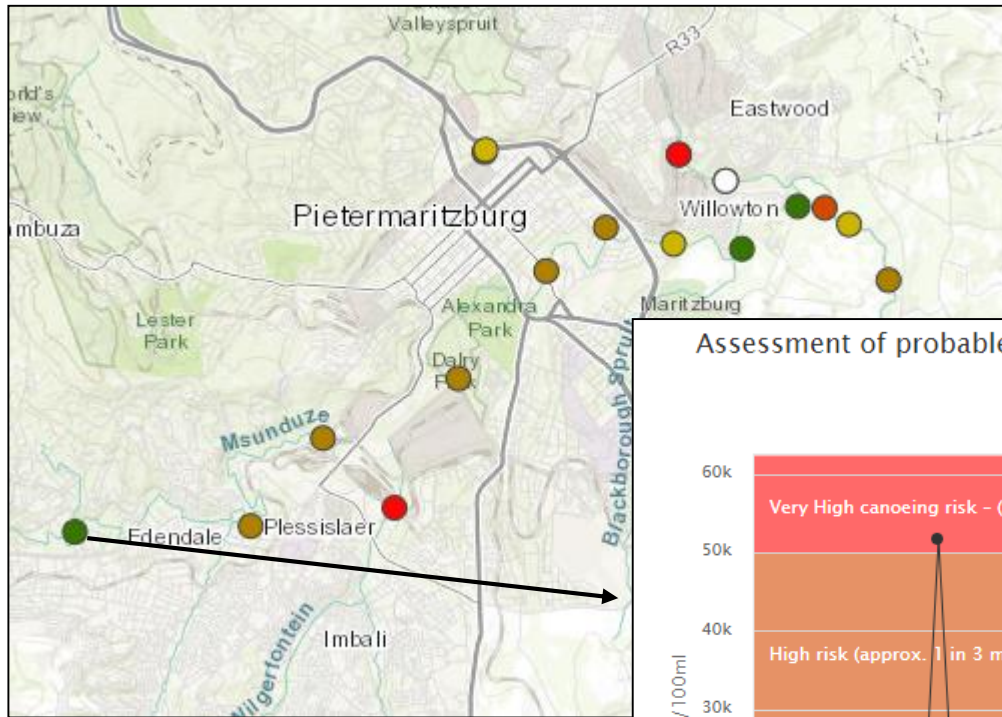
☑ **Assessment of probable risk to canoeists: E.coli (cuf/100ml)**
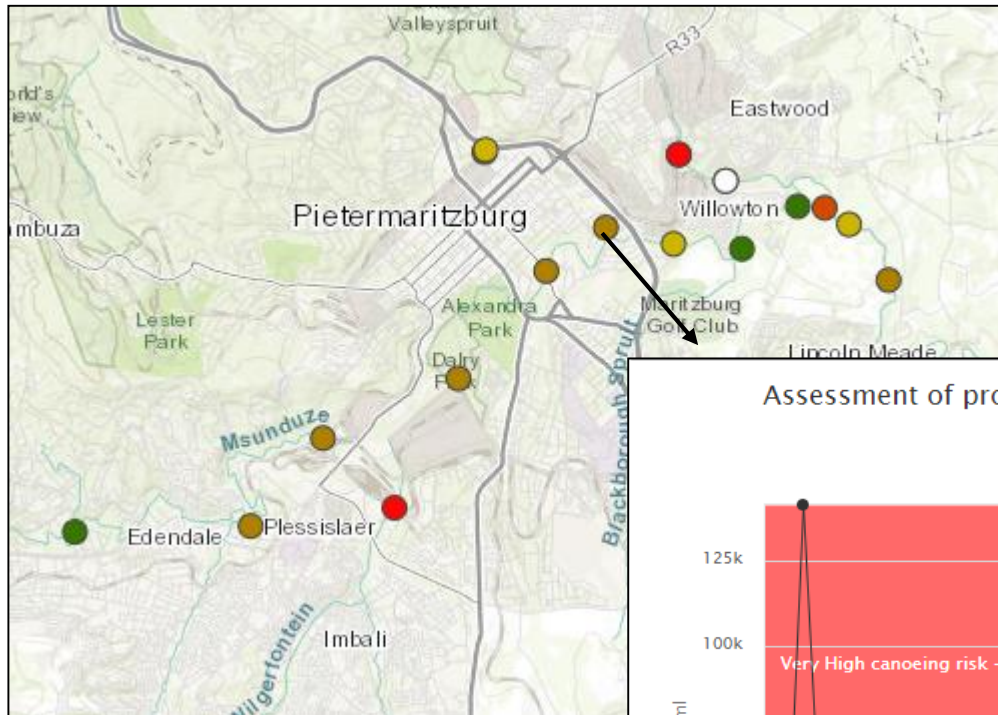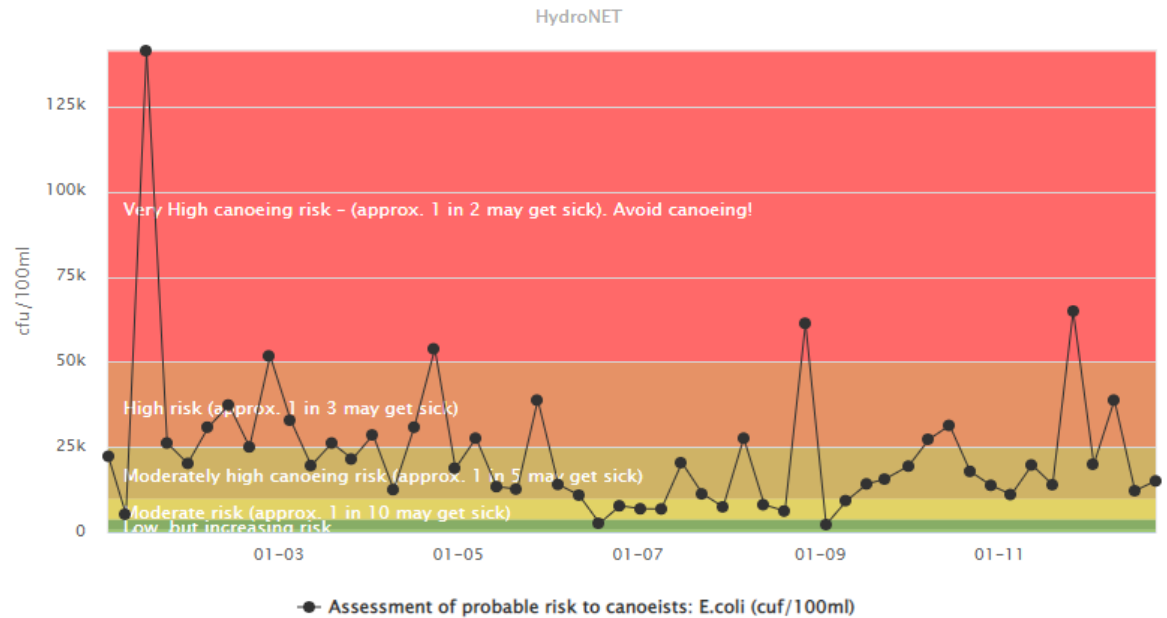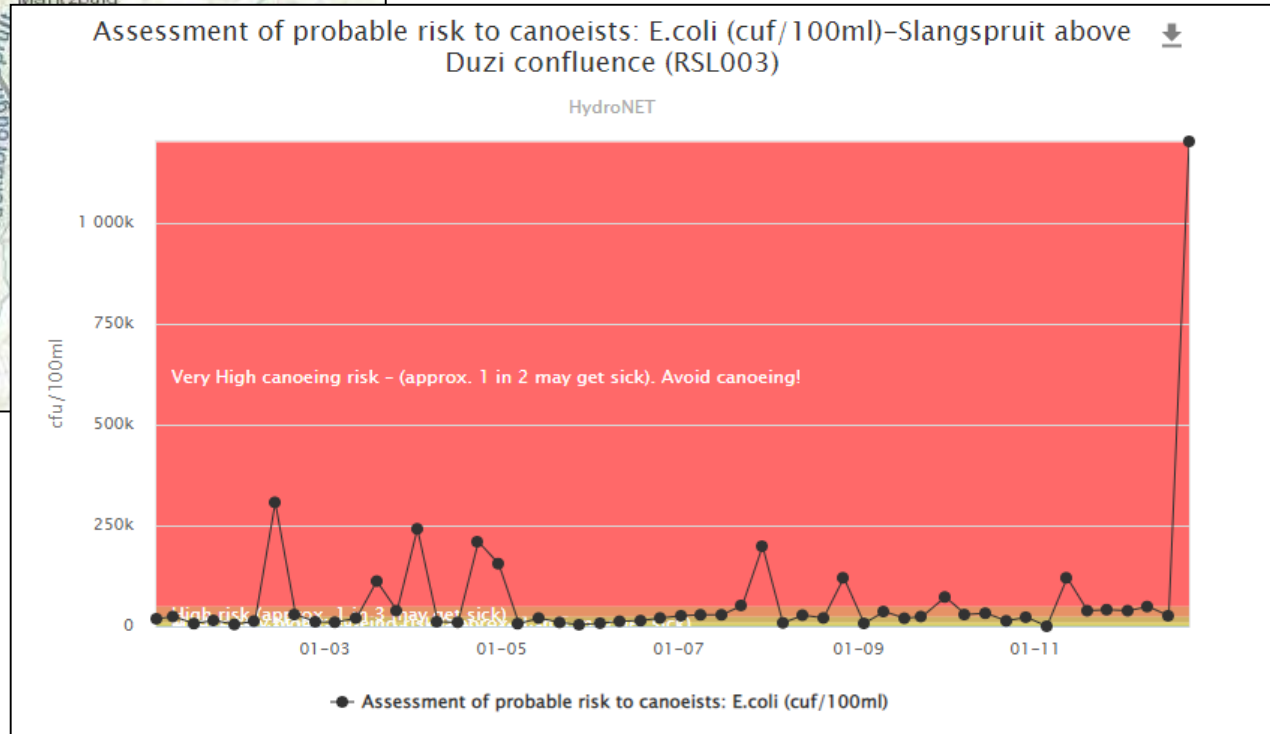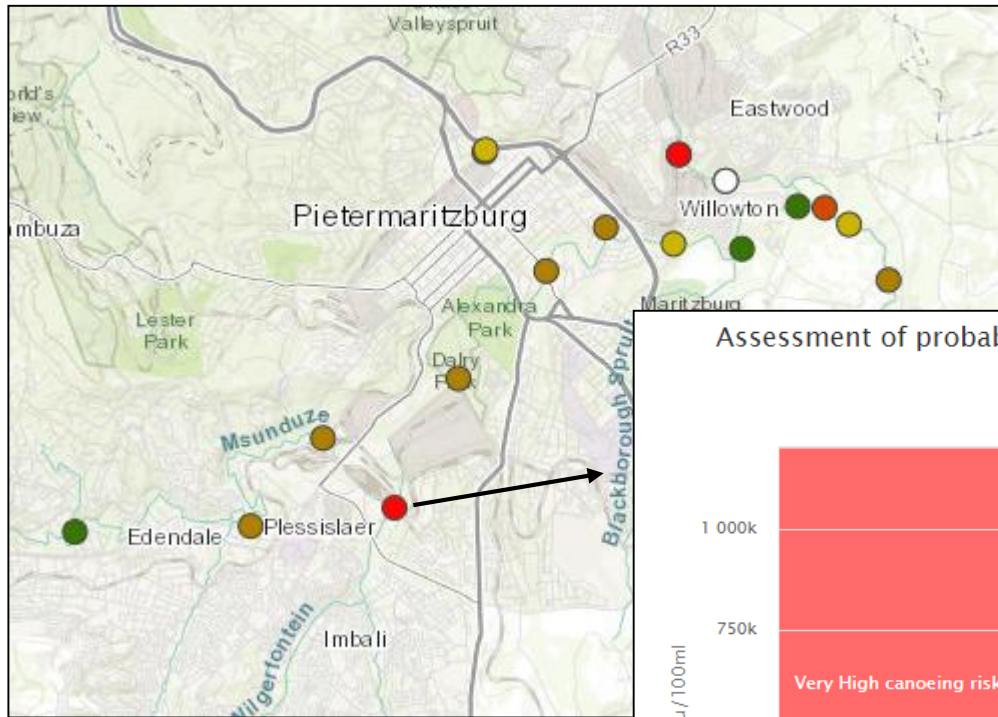
From: 01-01-2019 00:00
To: 31-12-2019 00:00

- 🟢 Extremely low risk
- 🟢 Very low risk
- 🟢 Low, but increasing risk.
- 🟡 Moderate risk (approx. 1 in 10 may get sick)
- 🟠 Moderately high canoeing risk (approx. 1 in 5 may get sick)
- 🔴 High risk (approx. 1 in 3 may get sick)
- 🔴 Very High canoeing risk – (approx. 1 in 2 may get sick). Avoid canoeing!
- No data
- No value

Assessment of probable risk to canoeists: E.coli (cuf/100ml)–uMsunduzi at Caluza bridge (RMD006)

HydroNET

LOW, BUT INCREASKING RISK!

WATER QUALITY
UMGENI WATER *E. coli* DATA: THE BAD

Assessment of probable risk to canoeists: E.coli (cuf/100ml)

From: 01-01-2019 00:00
To: 31-12-2019 00:00

- 🟢 Extremely low risk
- 🟢 Very low risk
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- 🔴 High risk (approx. 1 in 3 may get sick)
- 🔴 Very High canoeing risk – (approx. 1 in 2 may get sick). Avoid canoeing!
- No data
- No value

Assessment of probable risk to canoeists: E.coli (cuf/100ml)–Dorpspruit Ohrtmann Road (RDS005)

HydroNET

Very High canoeing risk – (approx. 1 in 2 may get sick). Avoid canoeing!

High risk (approx. 1 in 3 may get sick)

Moderately high canoeing risk (approx. 1 in 5 may get sick)

Moderate risk (approx. 1 in 10 may get sick)

Low, but increasing risk

-●- Assessment of probable risk to canoeists: E.coli (cuf/100ml)

MODERATELY HIGH CANOEING RISK!

WATER QUALITY
UMGENI WATER *E. coli* DATA: THE UGLY

HIGH RISK TO VERY HIGH CANOEING RISK!

WATER QUALITY
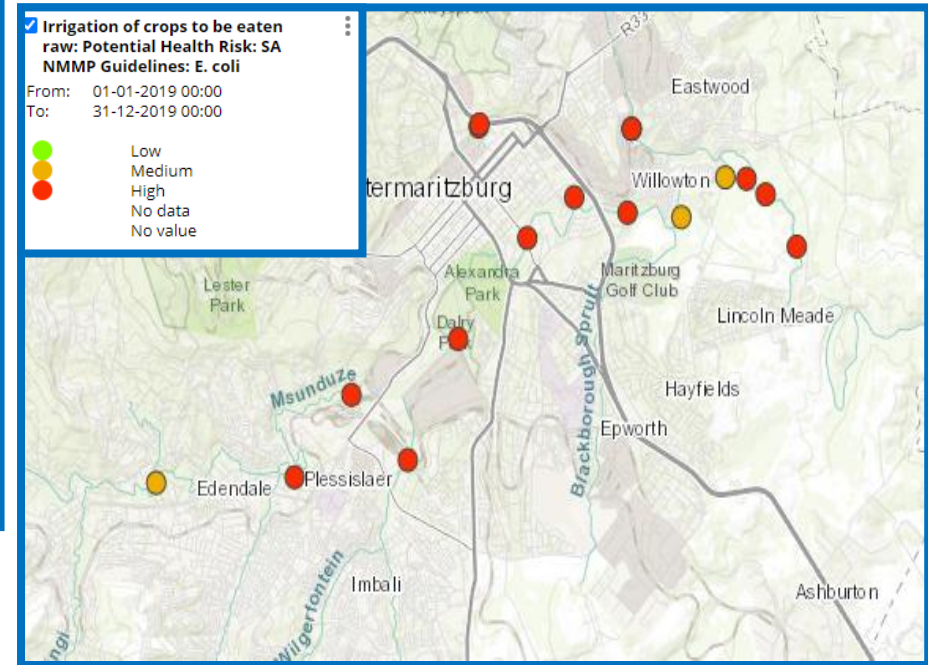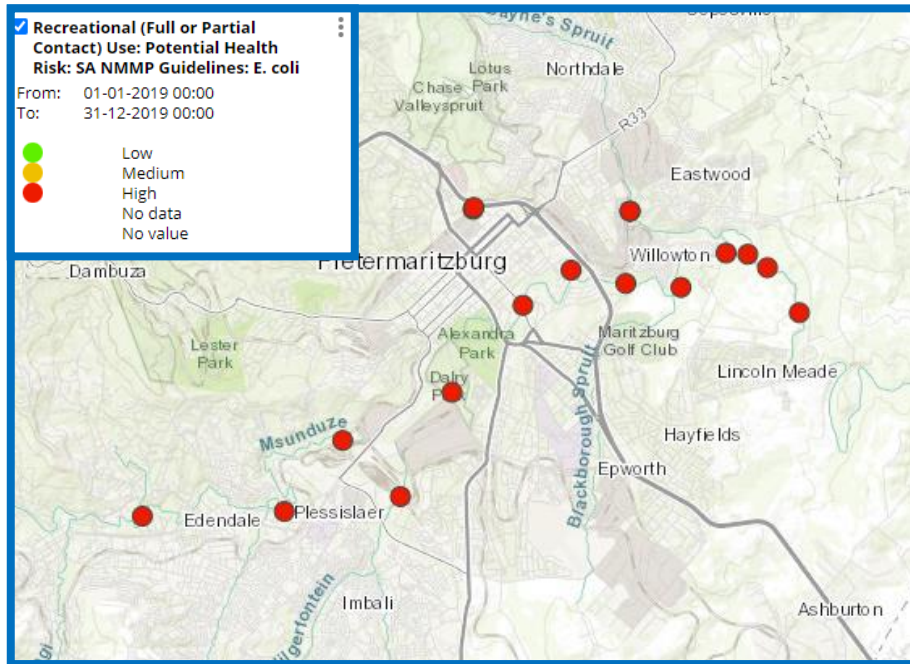## UMGENI WATER DATA AVAILABLE ON HYDRONET
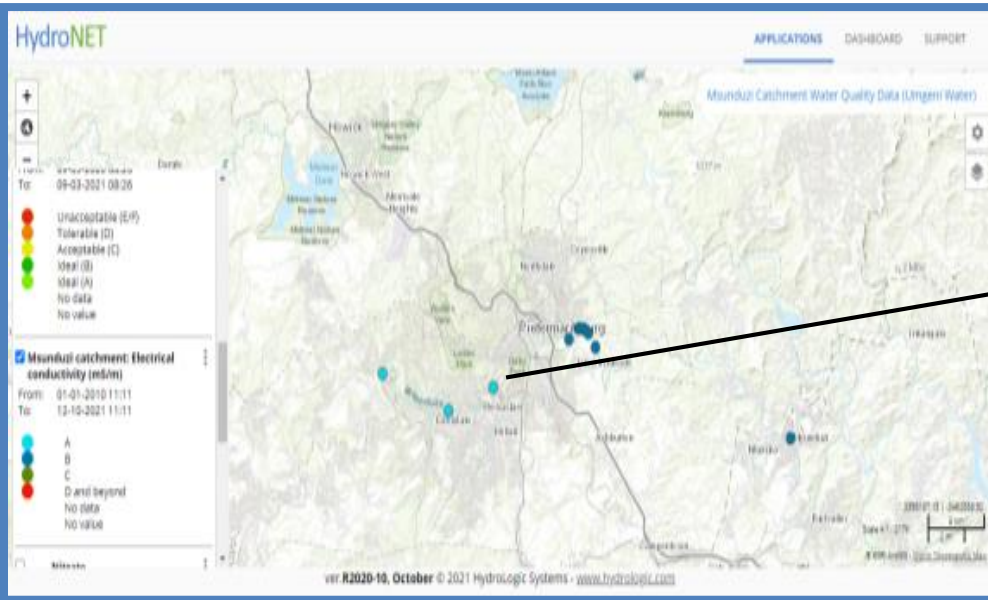
Electrical Conductivity
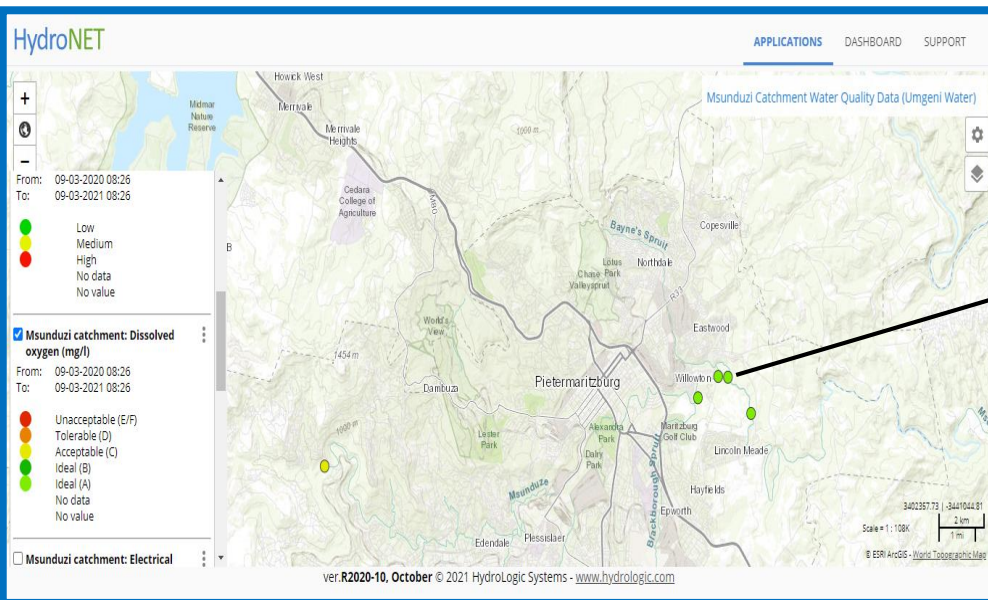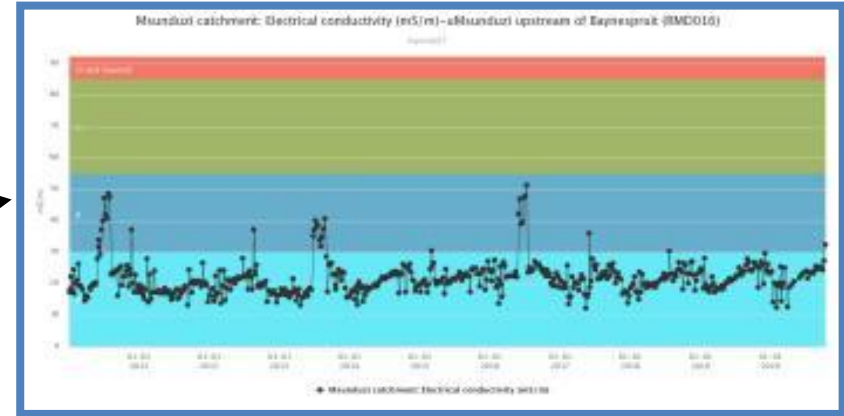
Dissolved oxygen
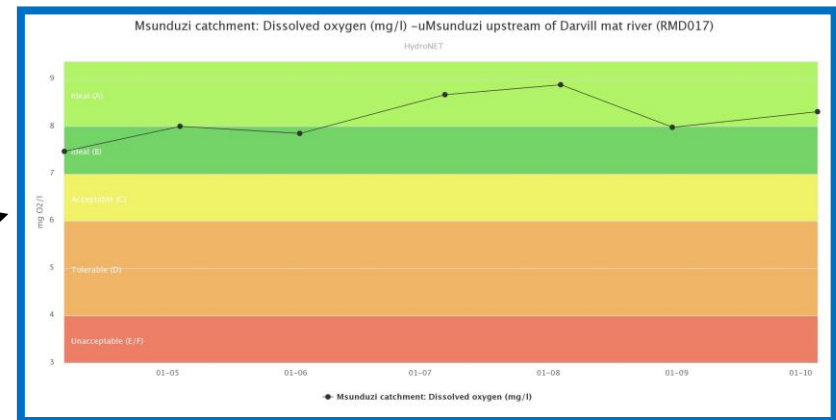
CONFIGURATION OF DATA

- Consider which standards/limits will be used and for what purpose.
- Different users have different water quality needs.
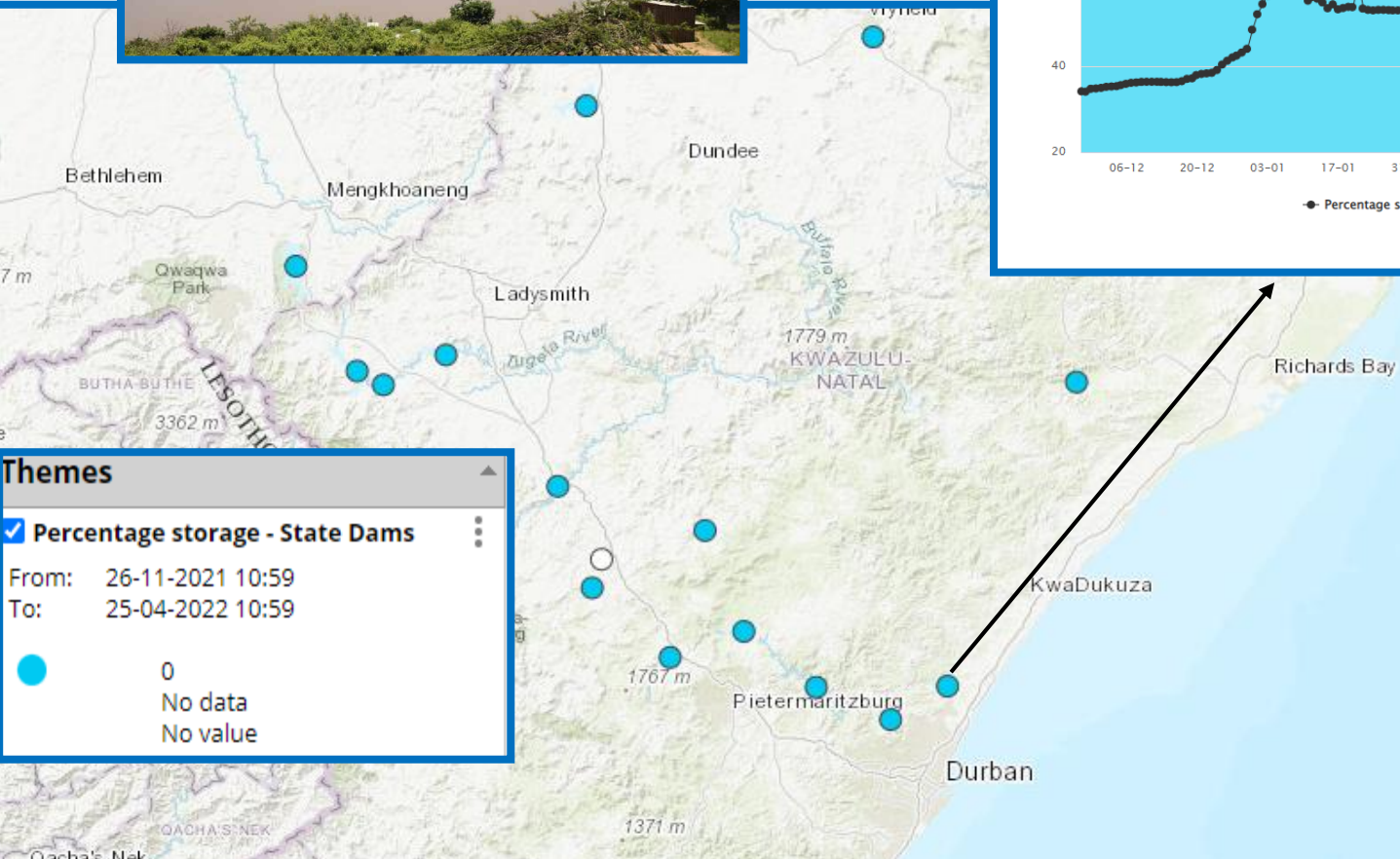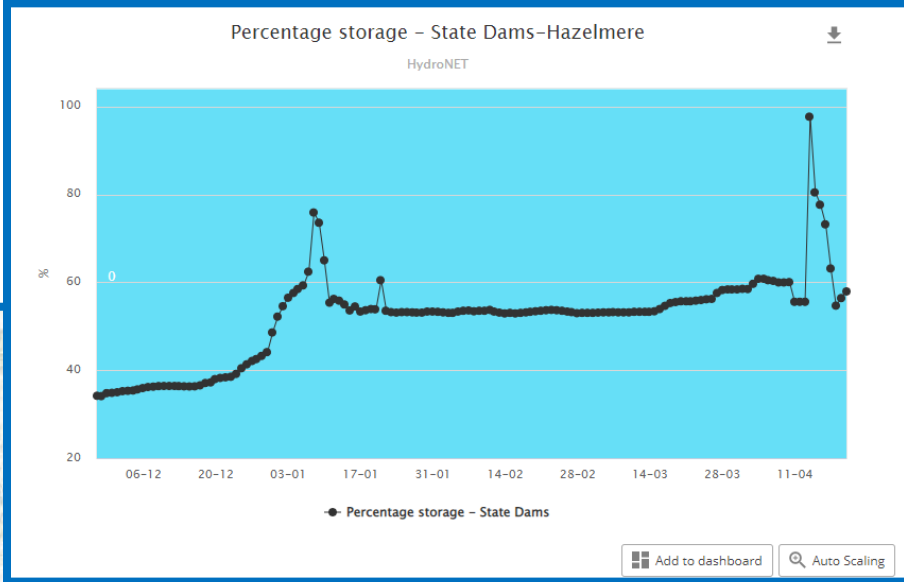- What decisions are you trying to make?

QUANTITY
PERCENTAGE STORAGE: STATE DAMS

Water released from Hazelmere dam to lower dam to 56% (KZN April 2022 floods)

Percentage storage – State Dams–Hazelmere
HydroNET

—●— Percentage storage – State Dams

Add to dashboard   Auto Scaling

Themes

☑ **Percentage storage - State Dams**

From: 26-11-2021 10:59
To: 25-04-2022 10:59

●   0
        No data
        No value

Scale = 1 : 2M

3723737.21 | -3503302.77

20 km
20 mi

© ESRI ArcGIS - World Topographic Map

TRACKING PERFORMANCE
## GREEN DROP CUMULATIVE RISK RATING
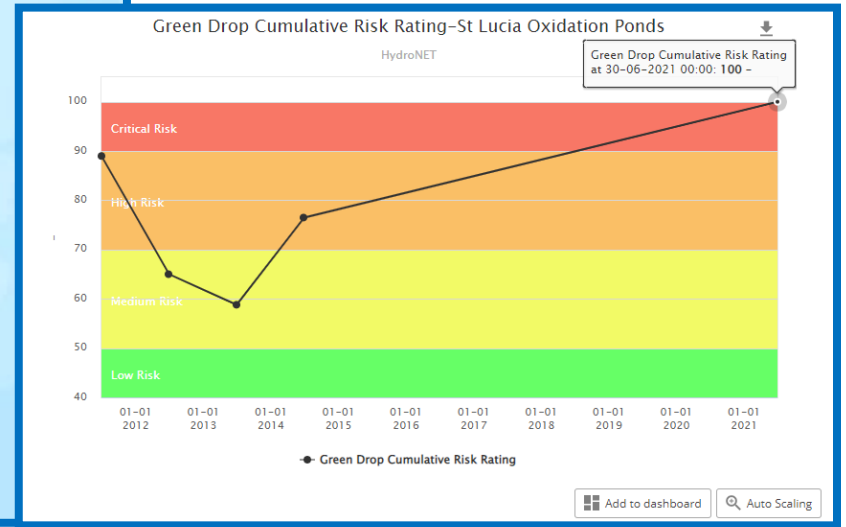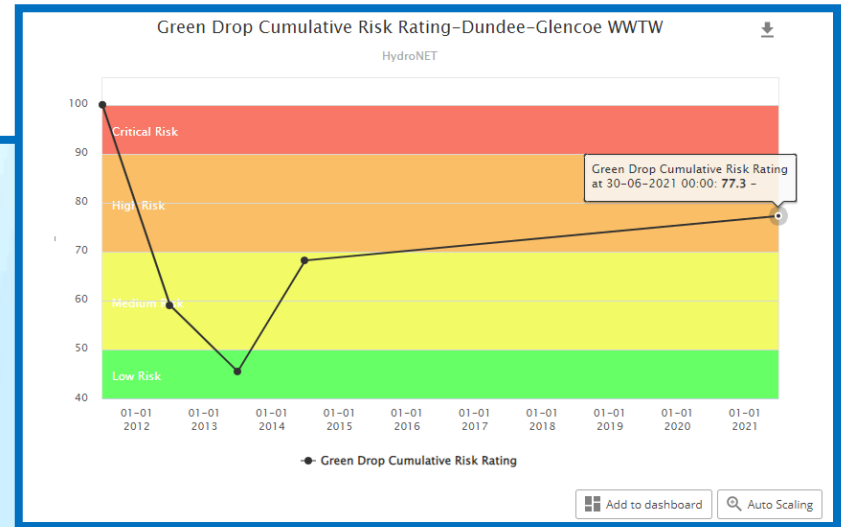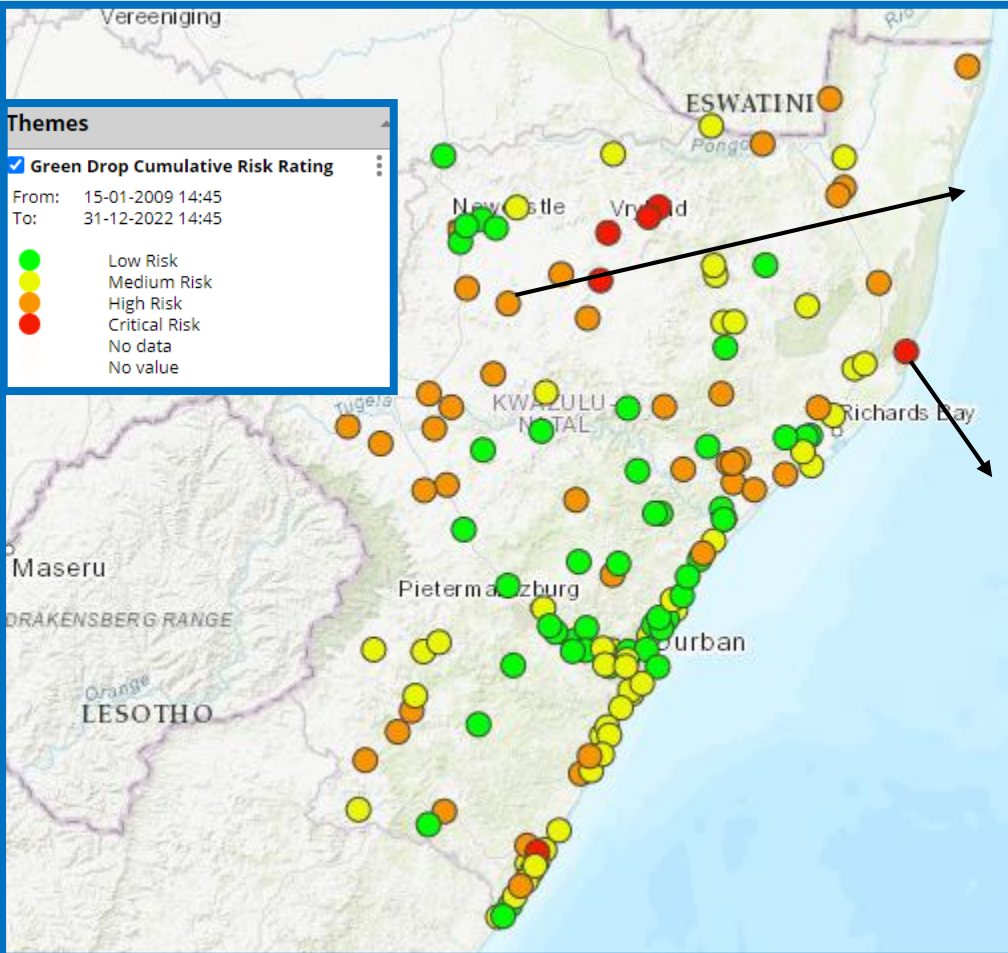
ADDITIONAL PRACTICAL USES
RAINFALL, WEATHER STATIONS & FORECAST APPLICATIONS

- Application and implementation in daily work stream.

  - Use of rainfall and weather station applications for the generation of Flood Reports (e.g. Ladysmith Floods in January 2022 & KZN Floods in April 2022).
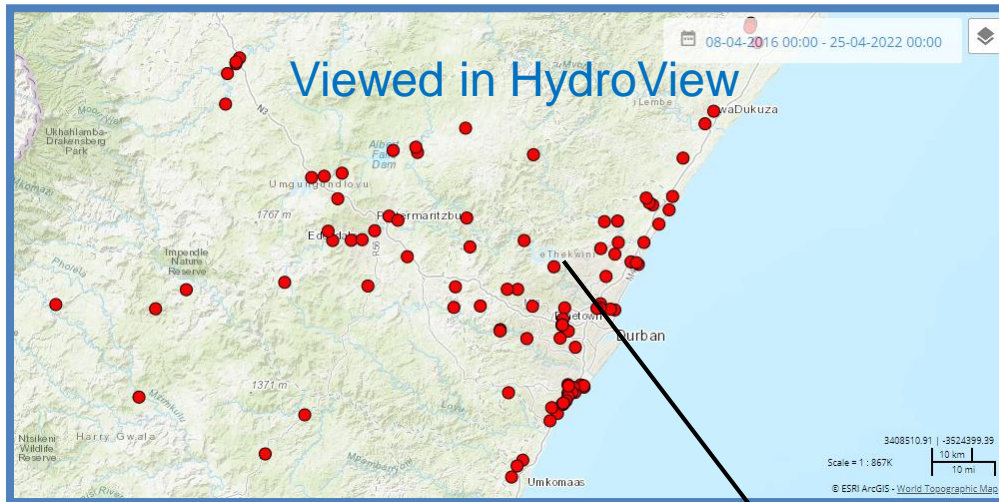 - Weather forecast application can be used as an early warning system.

M4 flooding, Durban (April 2022)

Ravine opens beneath residential house, uMdloti (April 2022)

KZN FLOODS: ETHEKWINI REGION
WEATHER STATION AND RAINFALL APPLICATION INFORMATION
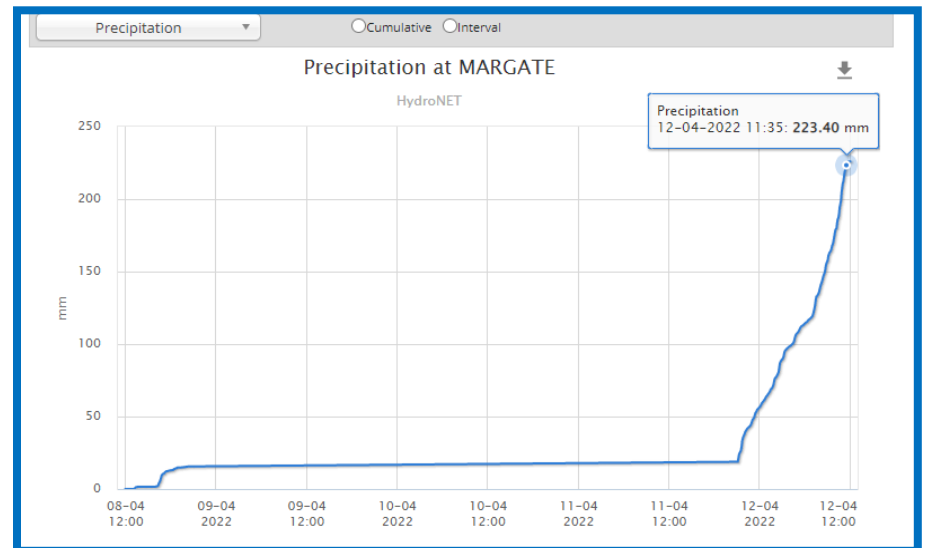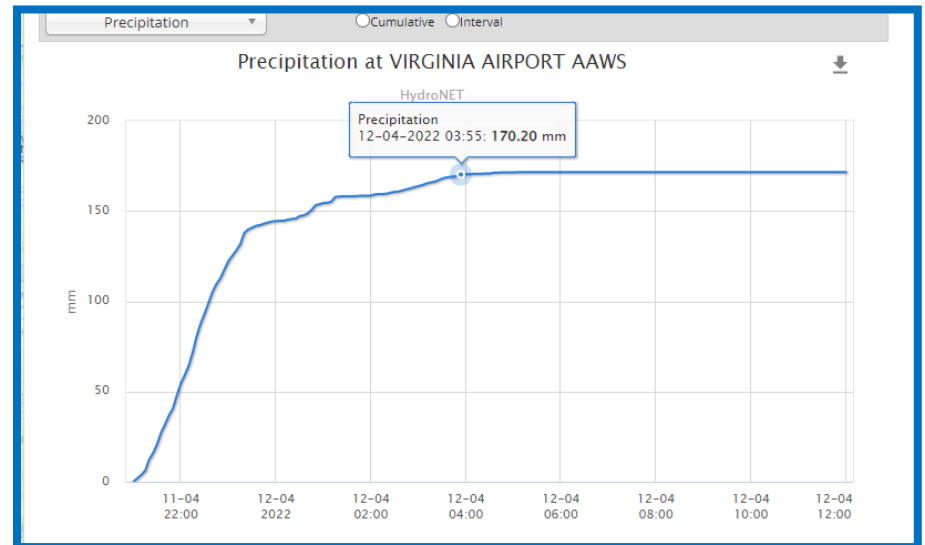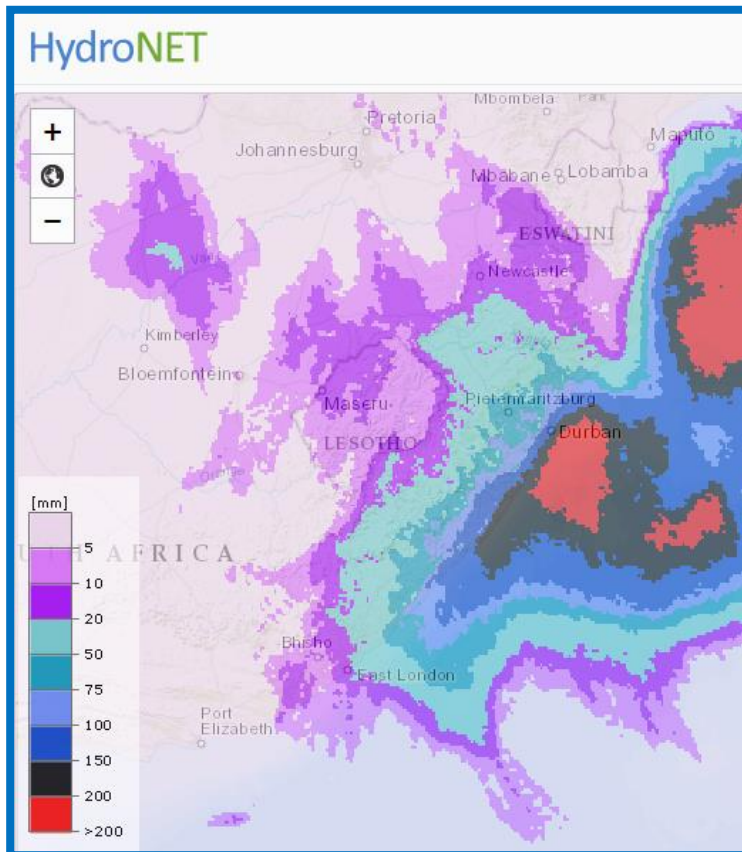
HYDRONET LINK TO WMS NOW AVAILABLE

Viewed in HydroView

Information in Hydroview can be taken to HydroWatch where thresholds can be configured to add value to all data sources in Hydronet.
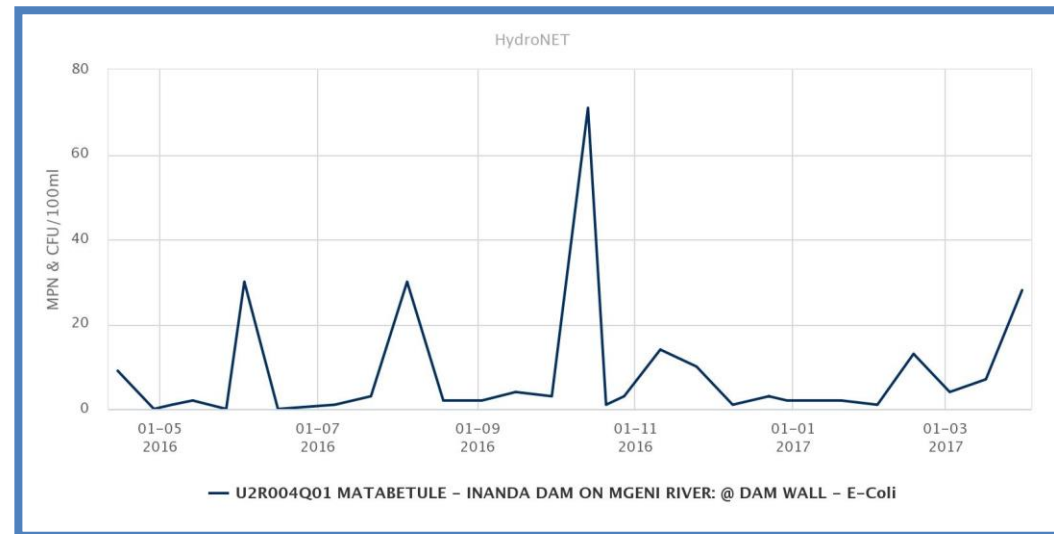
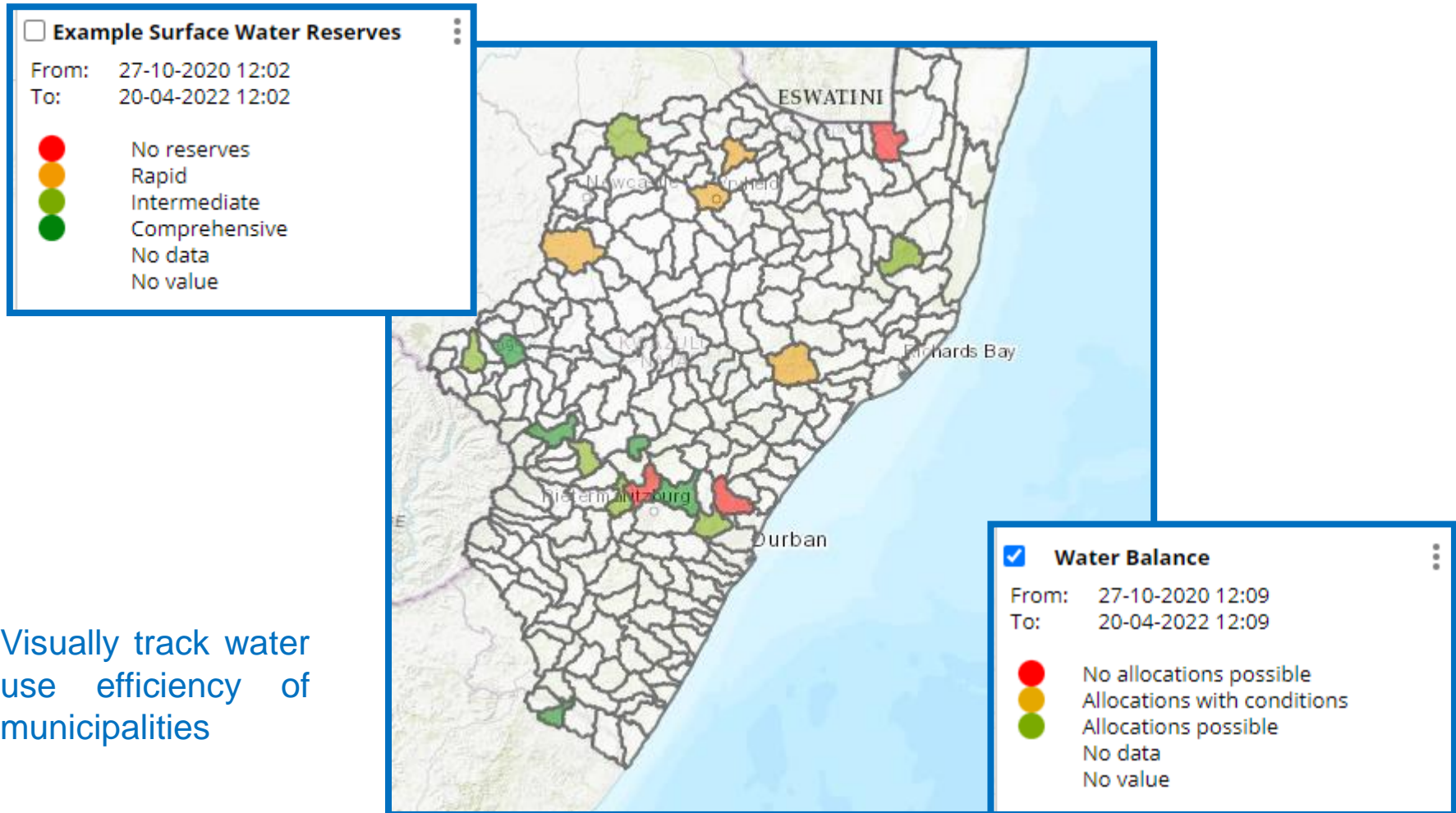WATER IS LIFE - SANITATION IS DIGNITY

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POSSIBLE FUTURE USES TO BE EXPLORED BY THE PONGOLA TO UMZIMKULU PROTO CMA

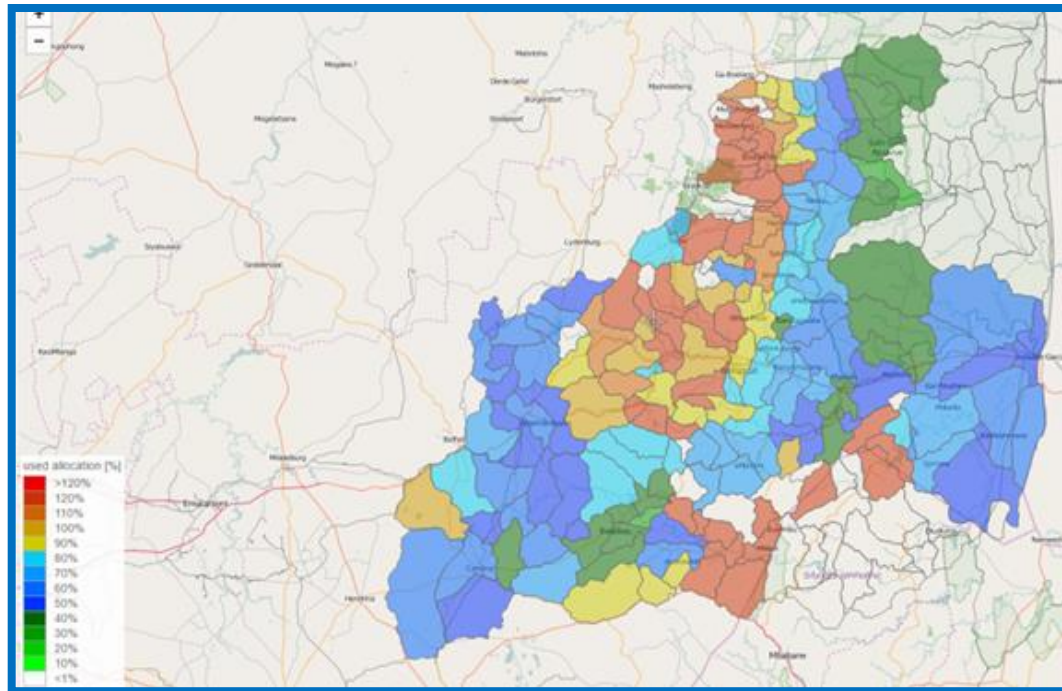Visually track water use efficiency of municipalities

ASPIRATIONS FOR FINANCIAL YEARS 2022/23 & 2023/24

- **Water Auditing:** The Water Auditing, uses satellite information to estimate water use by irrigation for each field.

- Through the Hydronet rollout, the Pongola to Umzimkulu proto CMA aims to gather information (incorporate V&V findings) to develop the shapefiles required for the Water Auditing Application.

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KEY CONSIDERATIONS IN MOVING FORWARD
SOME INITIAL THOUGHTS

- Important to find a dedicated "Home" for HydroNET (Sub-directorate / Directorate).

- Recommend the development of a HydroNET Business/Operational Plan.

- Support is Key:

  - **Management support**: Senior management support for the rollout and use of Hydronet. Hydronet must be included in the Directorate/Sub-directorate **Business Plans**. HydroNET must be included in the **Performance Agreements** of identified Champions/Users for the purpose of accountability.

  - **Supply Chain Management/Finance support**: Procurement Process / Contractual Arrangements (Proto CMAs) post the DWS/Hydrologic/SAWS contract.

  - **IT Support:** Stable internet connections, resolve firewall issues, etc. Also require GIS support for development of relevant shapefiles.

KEY CONSIDERATIONS IN MOVING FORWARD
SOME INITIAL THOUGHTS

- Embrace the National Hydronet rollout. Identify Champions to be trained as part of the rollout. The Hydronet contract includes *inter alia* the following:

  - Comprehensive Training (Water Auditing, STEEP Dashboard, HydroWatch, HydroView and Weather Applications)
  - Integration/links with existing Departmental systems (e.g. HYSTRA, NIWIS, WMS, Rivers database, National Groundwater database).
  - HydroNET Super-user Group (representatives per Region as a platform to share ideas, lessons learnt, solutions, etc.).

Be Courageous – Take the First Step

- Proto CMAs/Regions should identify key data for display on HydroNET.

- Advisable to use readily available data that can assist with your daily operation and management of the water resources.

You dont have to see the whole staircase, just take the FIRST STEP

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THANK YOU

Hydronet: Turning data into information and information into knowledge to support water resource management decision making

PRESENTERS DETAILS:

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