

Digest
#06
March 2024

ResilienTogether is a Defra-funded project that aims to build a Smart Catchment to enhance flood resilience. Our Learning Digests capture and share what we have learnt while we build a smarter, more resilient catchment.

Water quality measurement: Probes & Sondes

A comparison of water quality measurement sondes and probes



Figure 1: XYLEM YSI EXO-1 - Water Quality Sonde

ResilienTogether

ResilienTogether is creating a Smart Catchment, through use of innovative technologies and techniques, to reduce flood risk to people and places, enhance the water environment in the Pix Brook catchment and improve community resilience in the face of climate change.

What have we learnt?

This digest draws from the SuDS-specific water quality monitoring section of the *Pix Brook Catchment: A review of available technologies* report, prepared by the University of Exeter for ResilienTogether. This Learning Digest summarises the uses and differences between market-available sonde and probe technologies. Products in this report are used for information purposes only and CBC do not endorse any products in this report, other products are available.

Sonde vs probe

The terms "probe" and "sonde" are often used interchangeably in the context of water quality monitoring, but there can be slight differences in their connotations and usage. A probe is a single sensor or a set of sensors designed to measure a specific parameters within a body of water. Whereas, a sonde has multiple sensors for simultaneously measuring various water quality parameters. You can read more on sondes and probes in Learning Digest #04.

What to look for in a probe or sonde

Self-cleaning wipers - The accumulation of biofilms, algae, or debris on the sonde's sensors can significantly impact the accuracy and reliability of the collected data. Sondes with self-cleaning capabilities mitigate fouling issues and ensure the continuous accuracy of data over time. Additionally, the frequency and costs associated with manual maintenance and cleaning efforts are reduced, making the monitoring process more efficient and cost-effective.

SDI-12 - The communication protocol SDI-12 facilitates data exchange between an autosampler and sonde. A sonde with an SDI-12 protocol means an autosampler can instruct the sonde to capture measurements at specific intervals. This allows an autosampler and sonde to collect data at the exact same time, making comparing data more precise

Minimum depth - Sensors need to be covered by water to take a reading, and some sensors can be damaged by drying out. As the minimum depth requirement for a probe/sonde correlates to its diameter it becomes crucial to strike a balance between the number of parameters measured and the resultant increase in sonde diameter as more sensors are incorporated.



PROTEUS Multi-parameter Water Quality Sensor

- Holds 11-13 sensors
- Self Cleaning
- SDI-12 Compatibility
- Minimum depth - 100mm

A



EUREKA EasyProbe

- No self-cleaning
- SDI-12 compatibility
- Minimum depth - 75mm

B



XYLEM YSI EXO-1, EXO-2, EXO-3

- Holds up to 5 sensors
- Self Cleaning for EXO-2 and 3
- SDI-12 Compatibility
- Battery Powered - 60-90 day life
- Minimum depth - 20mm

C



EUREKA Trimeter

- Temperature sensor plus one additional sensor
- No self-cleaning
- No SDI-12
- Minimum depth - 50mm

D

Table 1: Parameters that each sonde or probe samples for

Type of Sonde or Probe	Total Suspended Solids (TSS)	Temp	pH	Turbidity	Dissolved Oxygen	NH ₃	NO ₃	PO ₄	Mg	Zn	Ni	Cu
A PROTEUS Multi-parameter Water Quality Sensor	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗
B EUREKA Trimeter	✗	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗
C XYLEM YSI EXO-1, EXO-2, EXO-3	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗
D EUREKA EasyProbe	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗
E Aquaread Aquaprobes and Aquasondes (AP-5000 or AP-6000)	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗
F EUREKA Manta+20, +25, +30, +35, +F35, +40	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗
G In-Situ AquaTROLL 400, 500, 600, 700, 800	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗

In-situ testing for different parameters - Not all water quality parameters can be tested for in-situ using probes/sondes. From the list of parameters being monitoring in ResilienTogether Zinc, Nickel, and Copper require laboratory analysis and thus cannot be monitored in real time. The table above shows the parameters that can be sampled using each probe/sonde.



Aquaread Aquaprobes (AP-5000 or AP-6000) and Aquasondes

- Aquasondes have onboard memory and logging
- Self-cleaning
- Slots for up to 7 sensors
- Minimum depth - 75mm

E



EUREKA Manta (+20, +25, +30, +35, +F35, +40)

- Up to 12 sensors
- Self-cleaning on +30 and up
- SDI-12 compatibility
- Minimum depth 50-100mm depending on probe

F



In-Situ AquaTROLL 400, 500, 600, 700, 800

- AquaTROLL 500-800 have up to 7 interchangeable sensor ports.
- Self-cleaning
- Option to add VuLink Telemetry rather than SDI-12
- Minimum depth - 50 mm

G

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University of Exeter

If you want to hear more, please contact ResilienTogether.project@Centralbedfordshire.gov.uk or visit our website <https://resilientogether.org.uk/>