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July 12, 2022

How to Overcome 7 Challenges of Collecting Water Quality Data

OTCO RESERVOIR MANAGEMENT WEBINAR

YSI®

Presenter

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YSI.com

Challenges to Collecting WQ Data

Expert tips to solve the most common problems when performing water quality monitoring.

Overview

1. Repair and Maintenance
2. Evolving Site Needs
3. Data Quality
4. Resource Efficiency
5. Data Hosting
6. Bringing Everything Together (Integrated Systems)
7. Training Employees

Q&A with Catie

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1

Repair and Maintenance

[1] Repair and Maintenance

POV: Your sonde does not hold up well in the field.

- Water ingress
- Corrosion
- Cable failure
- Broken pins

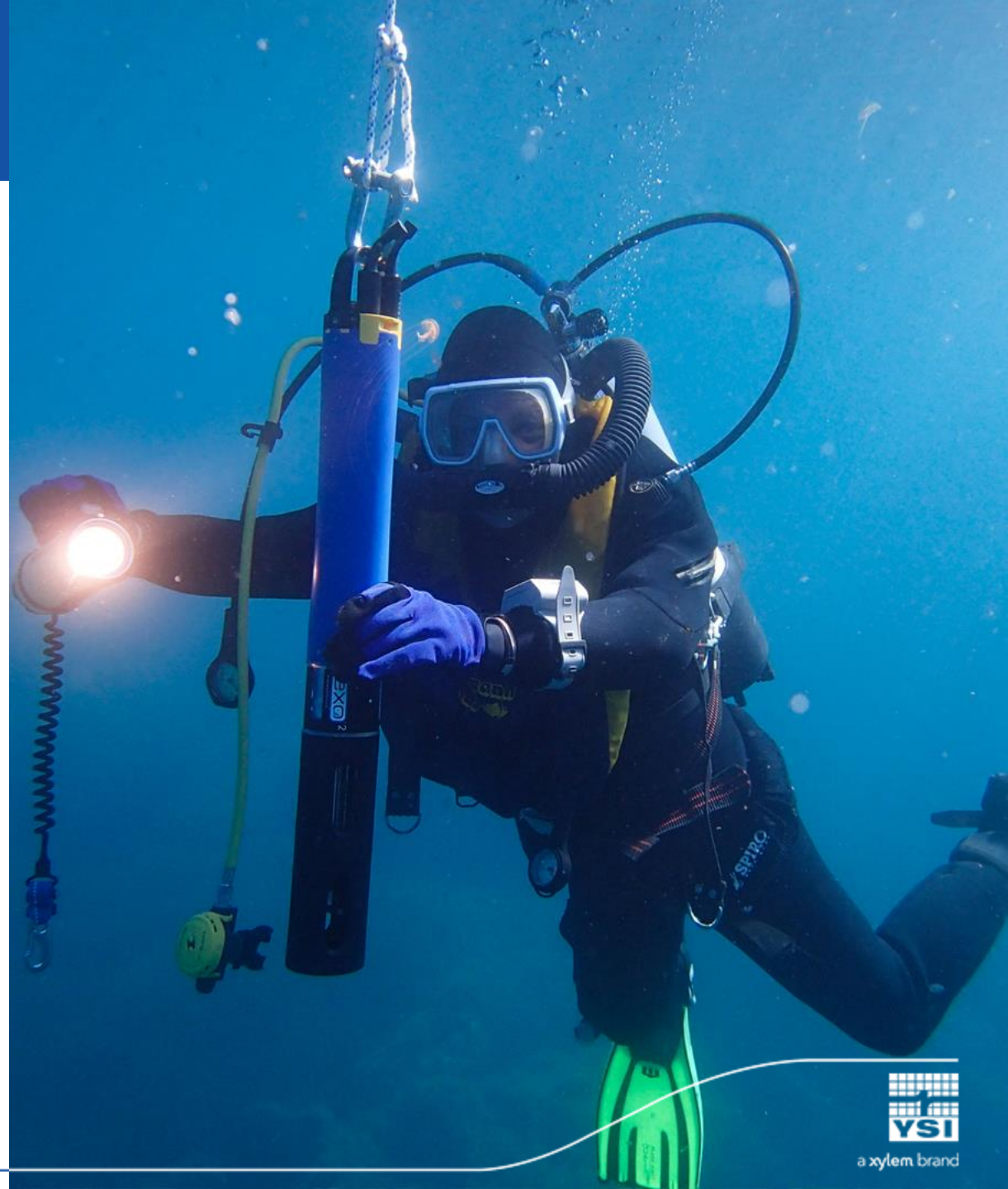
Unreliable equipment = More repairs & Higher cost!

[1] Repair and Maintenance

Rugged Materials

- Titanium sensors and bulkhead
- Rubberized wetmate connectors
- Reinforced, strength-tested cables
- High impact Xenoy housing

Constant design improvements

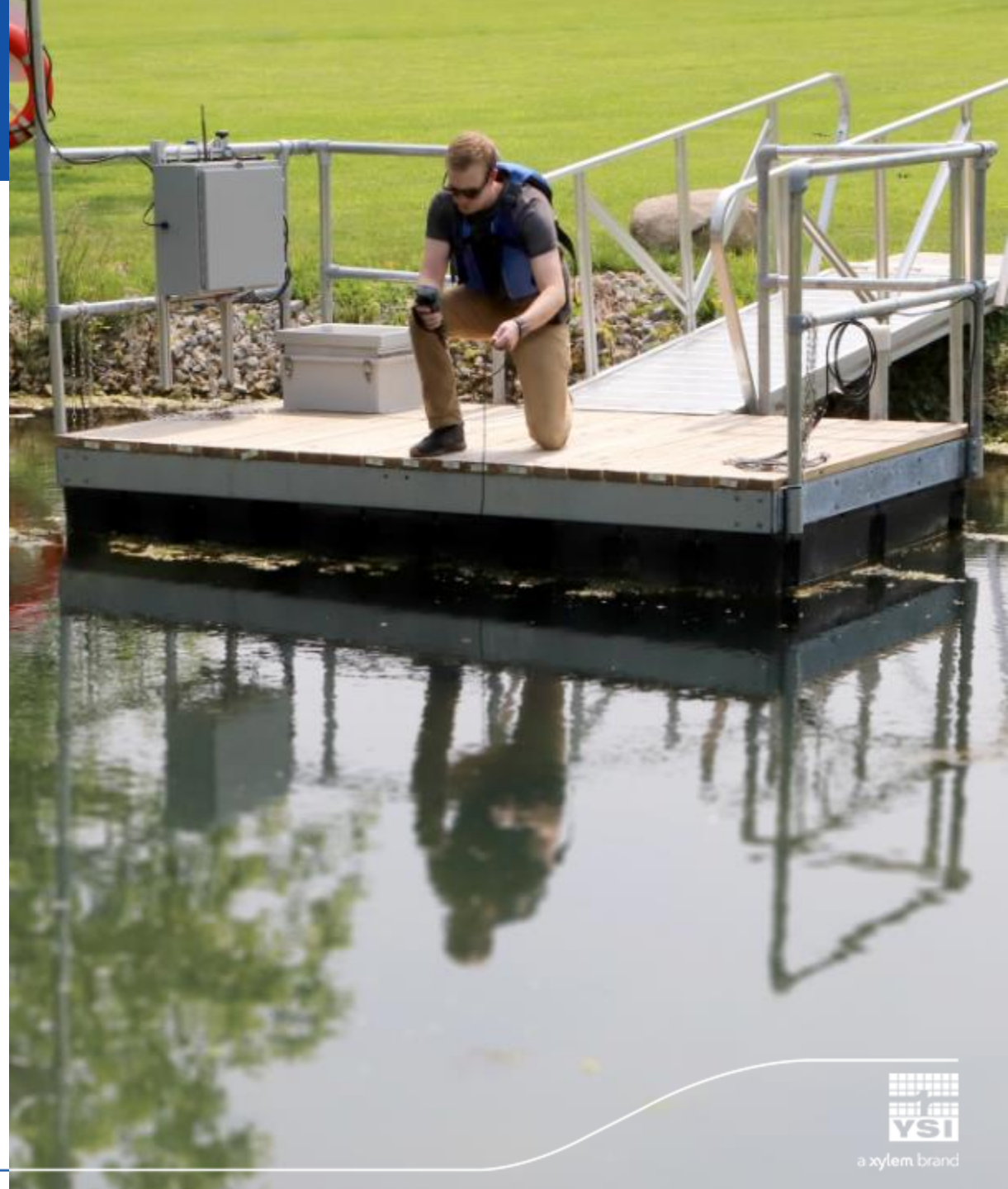


[1] Repair and Maintenance

Look for the Longer Warranty

- Typical 1 or 2-year warranty for sondes

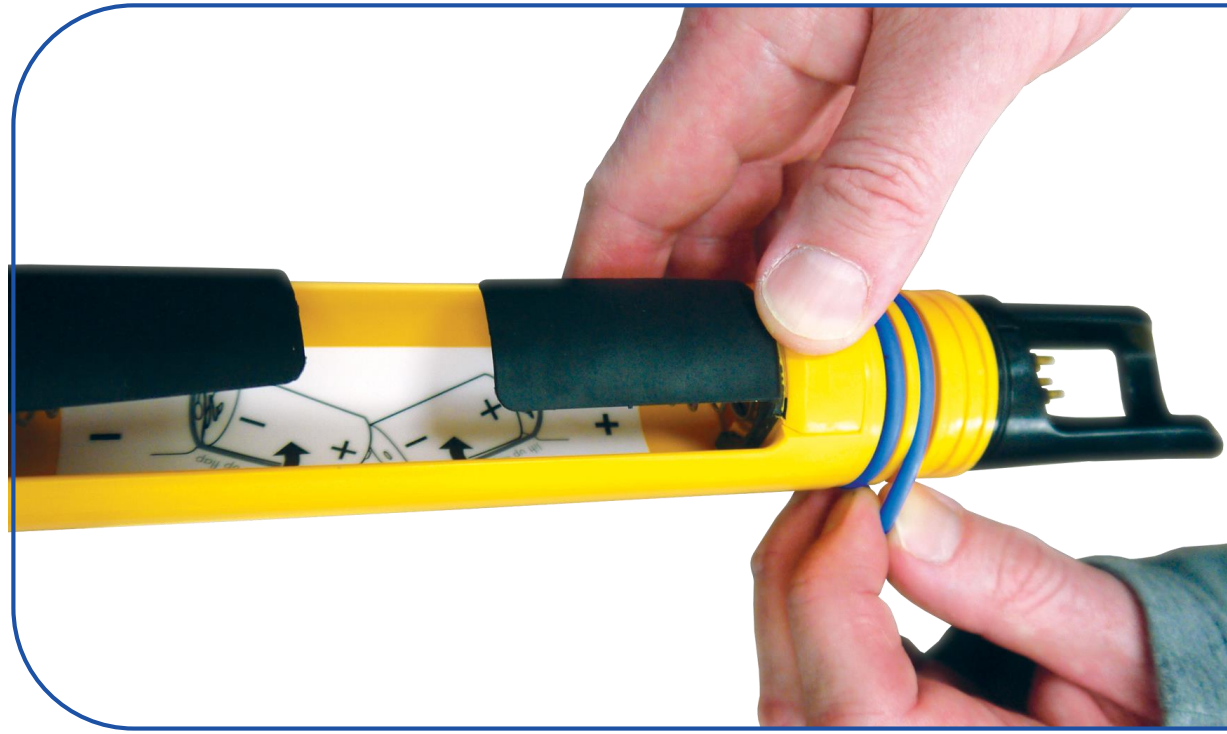
- 2-year warranty on sensors
- 3-year warranty on handheld and sonde

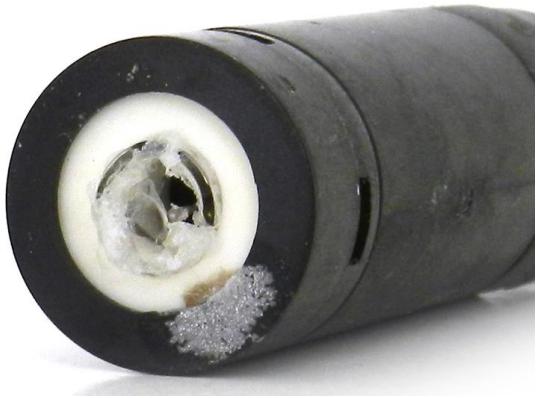


[1] Repair and Maintenance

Maintained by YOU

- Frequent and regular upkeep
- Modular parts for removal and replaceability
- Recommended user maintenance kits



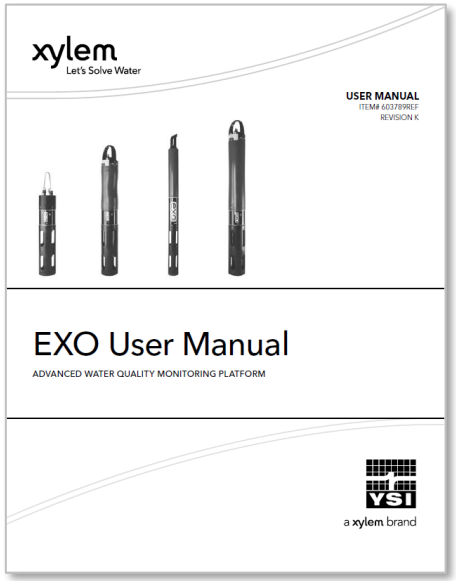


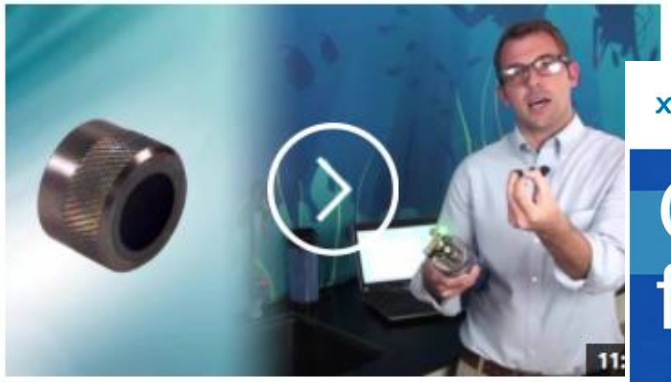
Only the module will need to be replaced

[1] Repair and Maintenance

Inspecting Your Sensors

- Check the User Manual for proper handling and storage recommendations
  - YSI.com > Support > Resource Library
- Watch tutorial videos
  - video.YSI.com





YSI Webinar | Gearing Up for Fieldwork
April 23, 2021

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[1] Repair and Maintenance

Factory Service

- Return equipment annually
- Repair Center technicians run diagnostics on all parts
- Reset to factory settings
- Increase the life of your equipment

Winter Maintenance Special during off-season


YSI Winter Maintenance Specials

LIMITED TIME ONLY: DECEMBER 1, 2021 – APRIL 15, 2022

Routine maintenance can make all the difference in the performance of your equipment.

Know the Benefits

- Longer life expectancy for your monitoring equipment
- Less downtime and missed data in the field when sampling
- Lower overall repair costs over the life of your equipment
- Ensure the highest quality data for another sampling season

WINTER MAINTENANCE SPECIAL

6-Series Sondes

EXO Sondes

ProDSS Meters

Instructions for Sending in Your Instrument

1. Download the YSI Product Return Form and fill out the required fields.
2. Specify WINTER MAINTENANCE as the reason for equipment return.
3. Include the form with your equipment and ship to our Yellow Springs facility:
   YSI Service Center
   1725 Brannum Lane
   Yellow Springs, Ohio 45387
4. Check the status of your repair at any time on our online Repair Status Checker

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2

Evolving Site Needs

[2] Evolving Site Needs

Changes to Project Requirements

- Legislative & Rule Making
- Federal Initiatives
  - The Bipartisan Infrastructure Law (2021)
- EPA Regulation
  - National permit requirements (NPDES)
- State / Local Government

Investment in Environmental Remediation

Table. Recommended magnitude for cyanotoxins.

Microcystins	Cylindrospermopsin
8 µg/L	15 µg/L

[2] Evolving Site Needs

Environmental Conditions

- New inputs / sources of pollution
- Acts of God
  - Fires
  - Floods, etc.

[2] Evolving Site Needs

Aging Equipment

- Low detection limits
- Outdated processors, memory, hardware
- Limited parameters
- Incompatible with other equipment

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[2] Evolving Site Needs

Versatility!

- Equipment that can adapt to your needs:
  - Increased range of parameters
  - Calibrate to your intended range
- Multiple communication modes
  - SDI-12
  - Modbus
  - 4-20
- Configurable with different site types

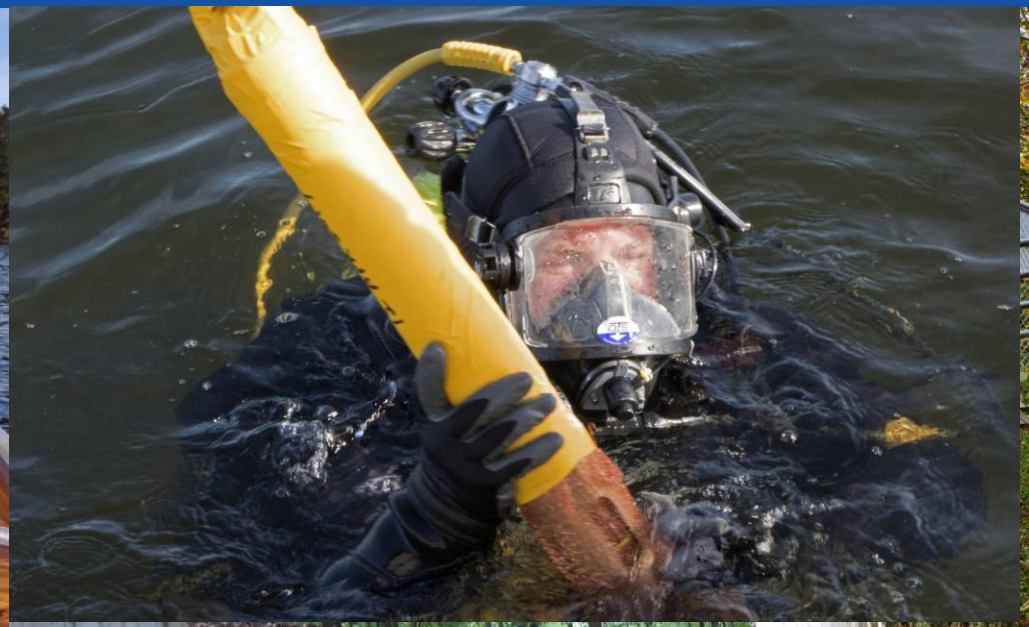



[2] Evolving Site Needs

Future-Proof Equipment

- Continued support
- New sensor technology
- User-friendly software

[2] Evolving Site Needs



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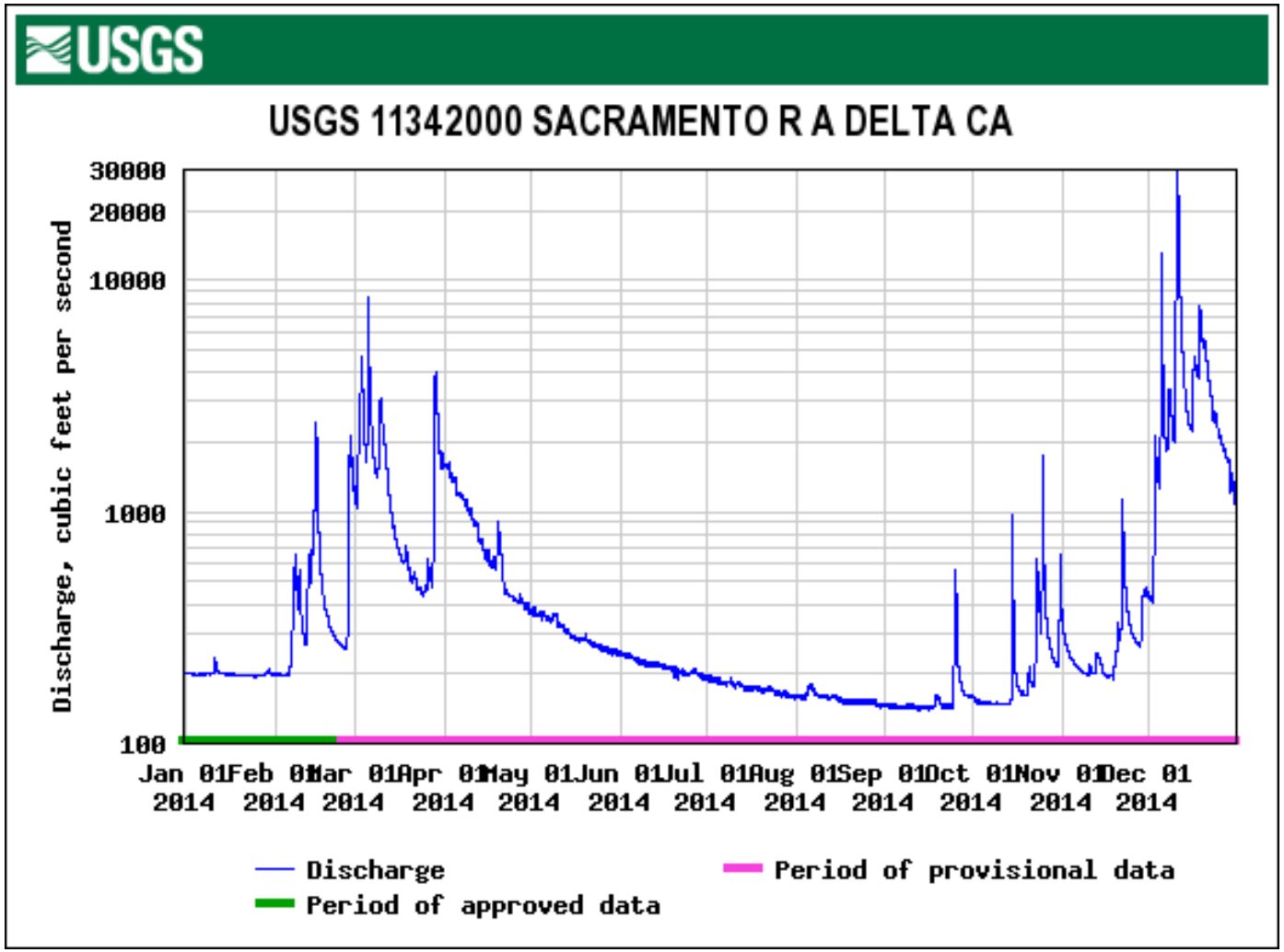
3

Data Quality

[3] Data Quality

Common Concerns

- Unreliable Results
  - False Positive / False negative
  - High error
  - Loss of data
- Insufficient SOPs
  - User variability
  - Lack of QA/QC
- Biofouling



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[3] Data Quality

Quality Assurance Project Plans (QAPPs)

- Developed by user's agency
- Frequency of calibration
- SOPs
- Equipment, methodology requirements

[3] Data Quality

Instrument Configuration

- Smart Sensors
  - Store their own calibration data
  - SmartQC
  - Automatically configured
- Kor Software
  - Save user settings in a template and copy across units

[3] Data Quality

Proper Calibration

- Check standard expiration dates
  - Conductivity:
    - Unopened – glass quarts — 1 year
    - Unopened – plastic pints — 18 months
    - Opened — 1 month
  - Turbidity
    - Unopened — 1 year
    - Opened — 6 months
  - pH
    - Unopened — 2 years
    - Opened — 6 months
  - Confidence Solutions
    - Unopened — 1 year
    - Opened — 3 months

REMEMBER:
The data you collect is only as good as the calibration you perform.

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[3] Data Quality

Calibrating Sensors

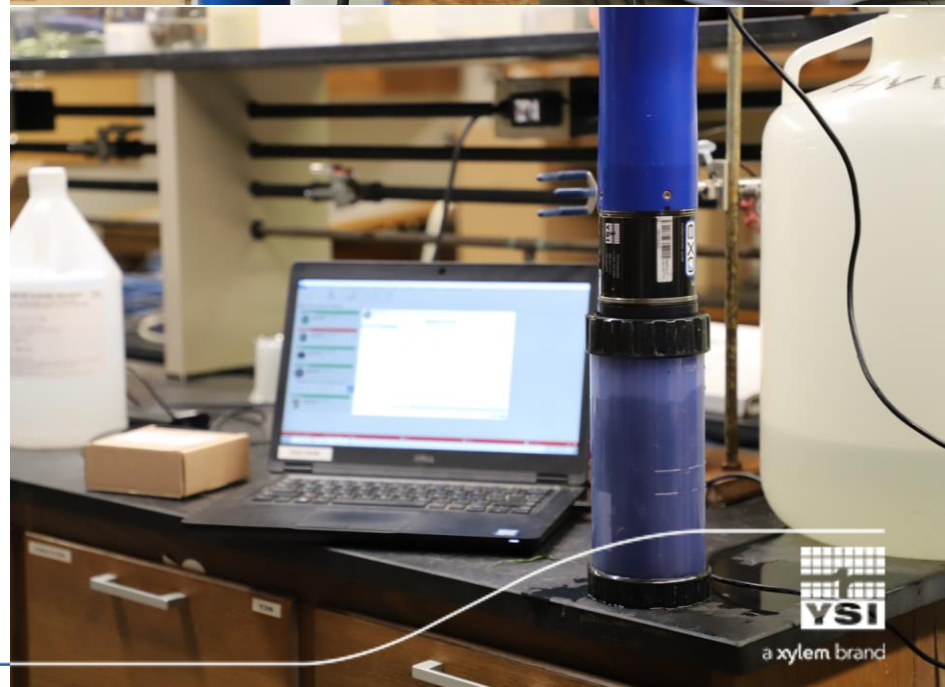
- During Calibration
  - Take note of response times
  - Allow enough time for stabilization
  - You can expect similar performance issues when trying to collect data

SmartQC

Not within limits

Proper calibration, nearing limits

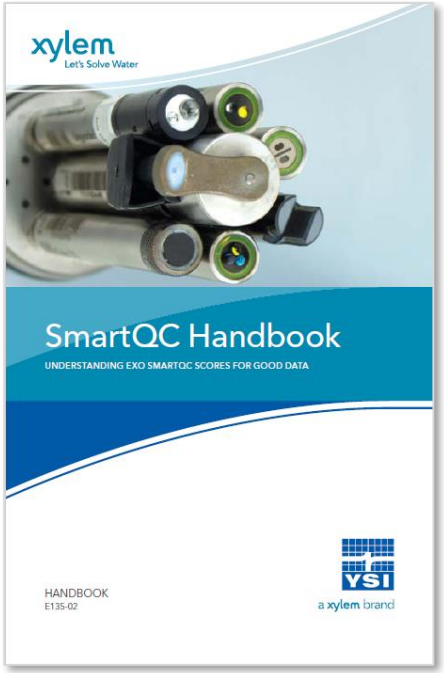
Proper calibration

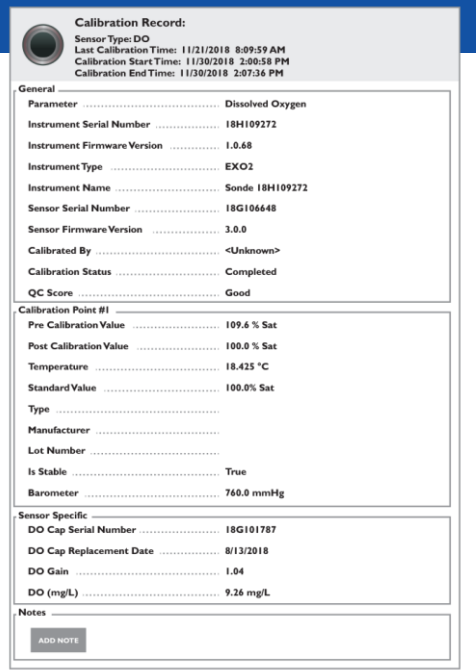


[3] Data Quality

After Calibration

- Make note of indicators like:
  - Conductivity cell constant
  - pH millivolt slope
  - DO gain
  - SmartQC Score





Don't force a bad calibration!

SmartQC and Calibration Reports inform you of problems and ensure better calibration

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[3] Data Quality

Redundant Data Logging

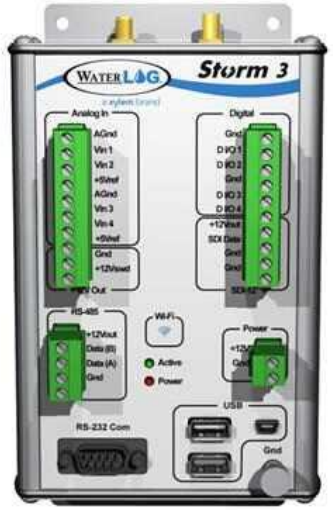
Internal Memory:

Sonde (EXO)

1,000,000 logged readings, 512 MB

External Memory:

Datalogger (Storm3)



Cloud Storage:

Web server (HydroSphere)

[3] Data Quality

Manage Biofouling

- EXO Central Wiper is the best tool available
- Periodic maintenance on o-rings, seals, etc.
- Also consider sonde sleeves, copper tape, and sensor guards

[3] Data Quality

Fouling Field Kit

- Common items found in a field trip kit
  - Lint-free cloths
  - Sponges
  - Hard bristle brushes and/or toothbrushes
  - Toilet bowl brush
  - Scraping tool for hard growth
  - Cotton swabs
  - Brush kits that come with sensors
  - Mild soap and clean water
  - Spare o-rings and Krytox grease
  - Sonde and sensor sleeves / duct tape / copper tape
  - Sensor wrenches

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Resource Efficiency

[4] Resource Efficiency

Common Concerns

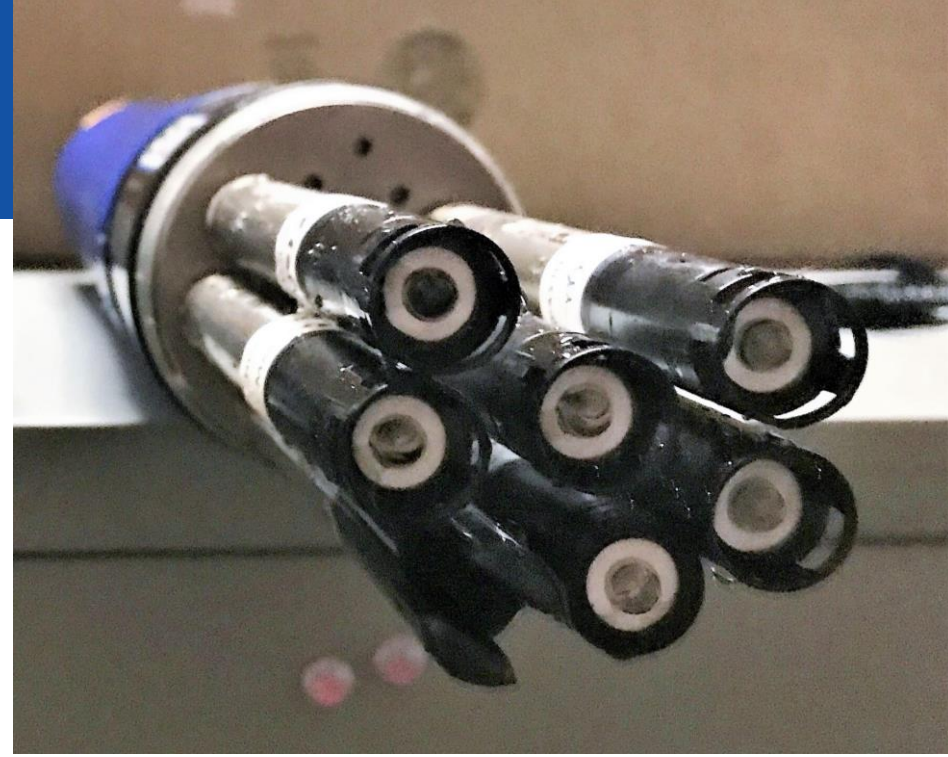
- Budget Constraints
- Reduced Staff
- Less capacity for impactful projects

[4] Resource Efficiency

Smart Sensors

- Modular consumables
- Concurrent calibrations

Only the module will need to be replaced



[4] Resource Efficiency

Reuse Standards for Rinses

- Stretch the use of your standards
  - “For rinse only”
  - Date opened
  - “R” on the cap reminder

REMEMBER:
You can reuse standards for rinsing only.

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[4] Resource Efficiency

Autonomous Vehicles

- Multiple sensors and equipment types in a single platform
- Site accessibility
- Vehicles can be manned by one person
- Reduce field time

[4] Resource Efficiency

Long-term Monitoring

- Sonde deployments
- Reduce number of site visits
- Take advantage of site maintenance services

Support/Maintenance

On-site contracted and preventive maintenance solutions to fit your needs and budget.

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Data Hosting

[5] Data Hosting

Common Concerns

- New user complications
- Non-user-friendly interface
- Steep learning curve

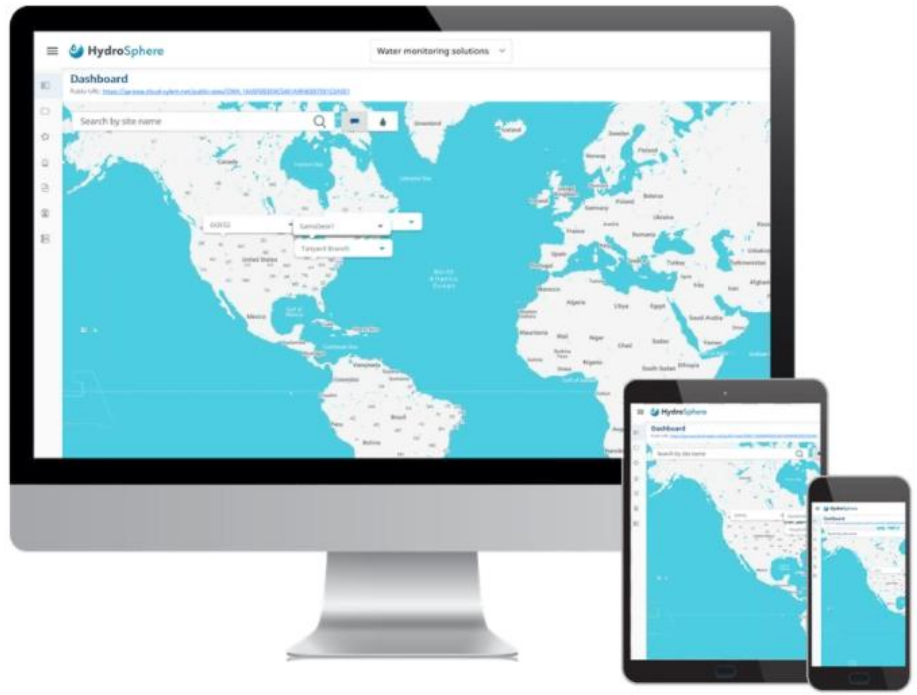
- Difficulty adding equipment to existing network
- Incompatibility between equipment

[5] Data Hosting

HydroSphere - a scalable, collaborative data visualization platform for outdoor water monitoring.

- Customizable graphs, tables, and dashboards
- Data-driven alarms with customizable escalation paths
- User-definable roles and access with personalized credentials
- Scalable for small or large monitoring networks
- Public website available for displaying curated data

HydroSphere



Visit ysi.com/hydrosphere

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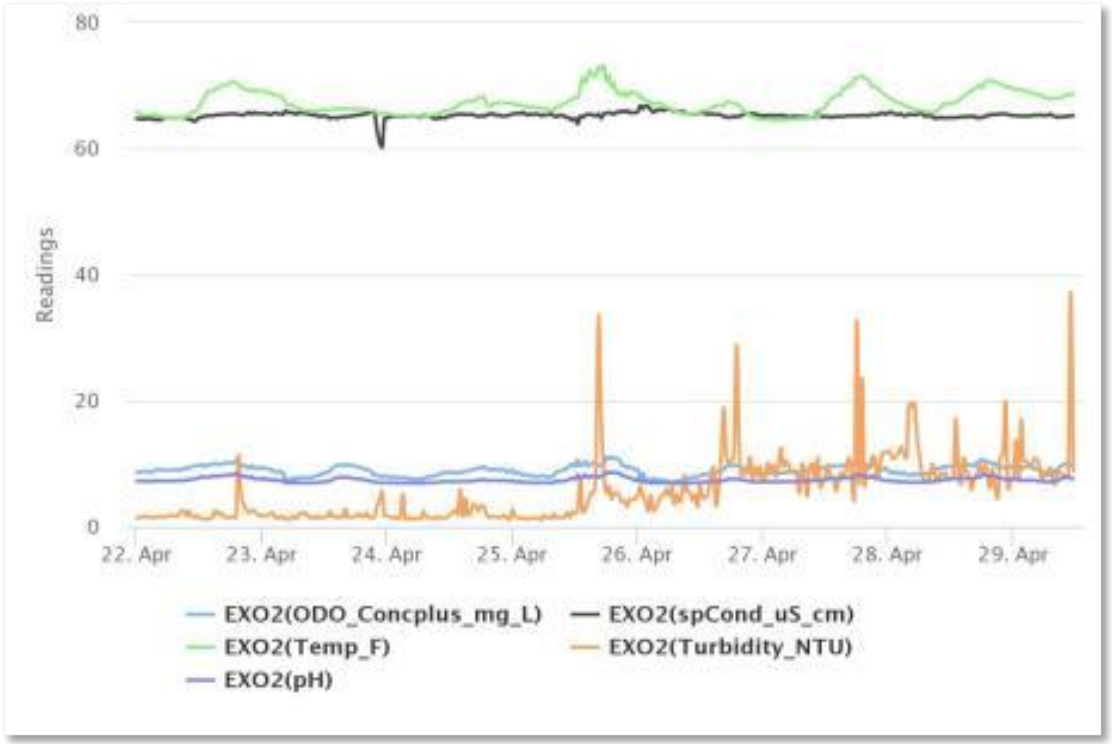
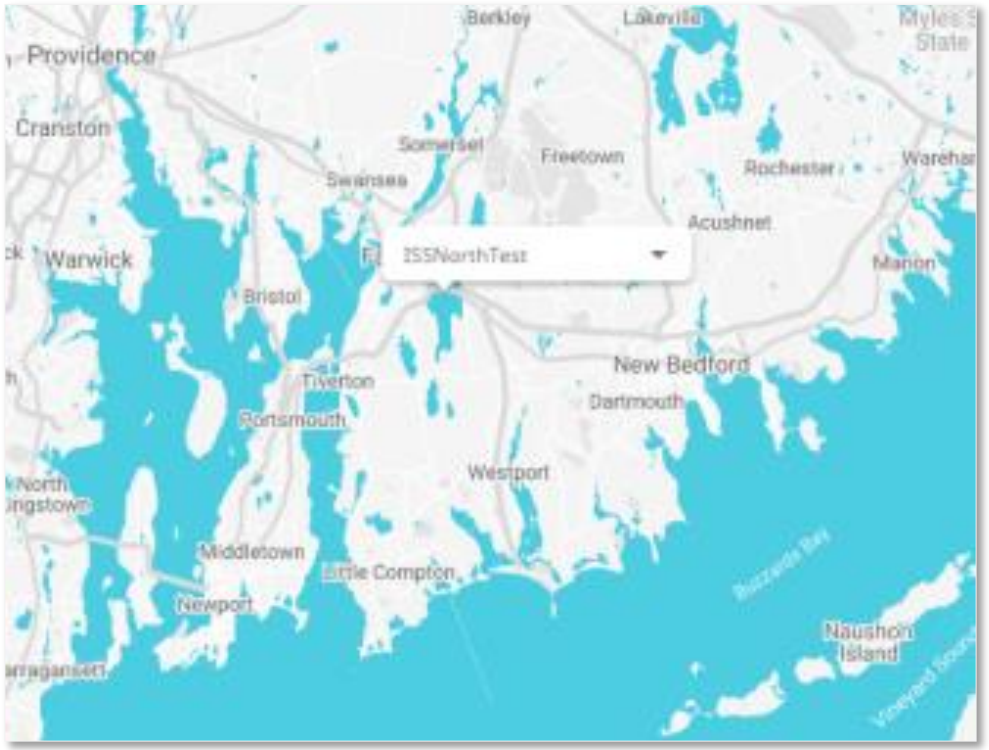
[5] Data Hosting

Remote Monitoring

- Data available anywhere and anytime, 24/7/365
- Easy connection to telemetry systems





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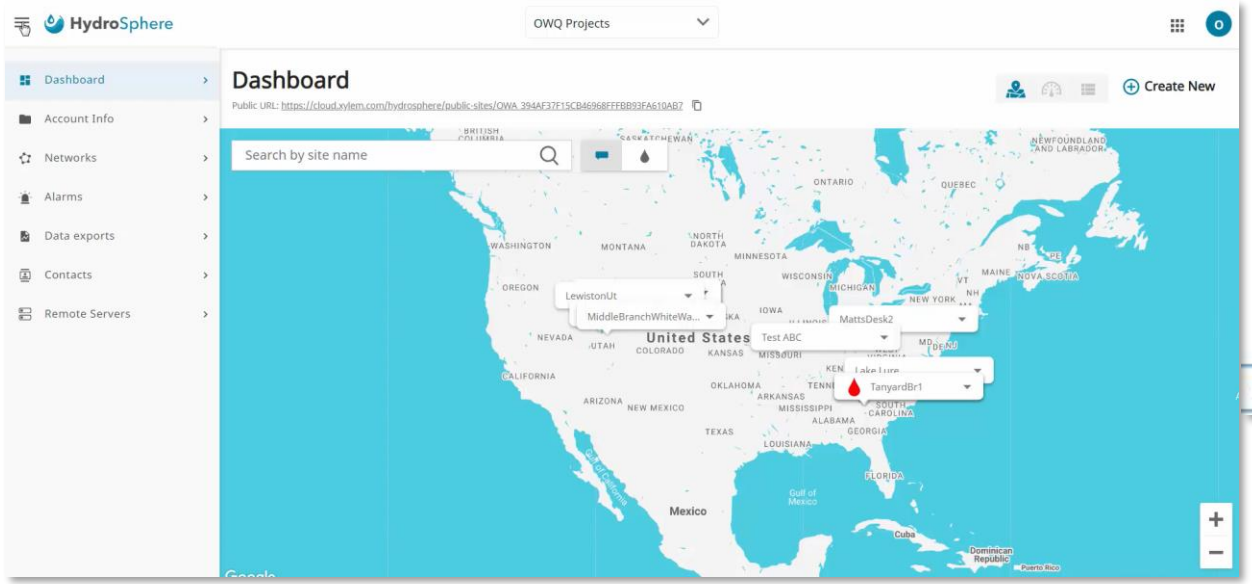
[5] Data Hosting

Live Dashboards

- Private or Public view
- Shareable real-time graphs
- Fully customizable
  - Manage parameters, sites, settings



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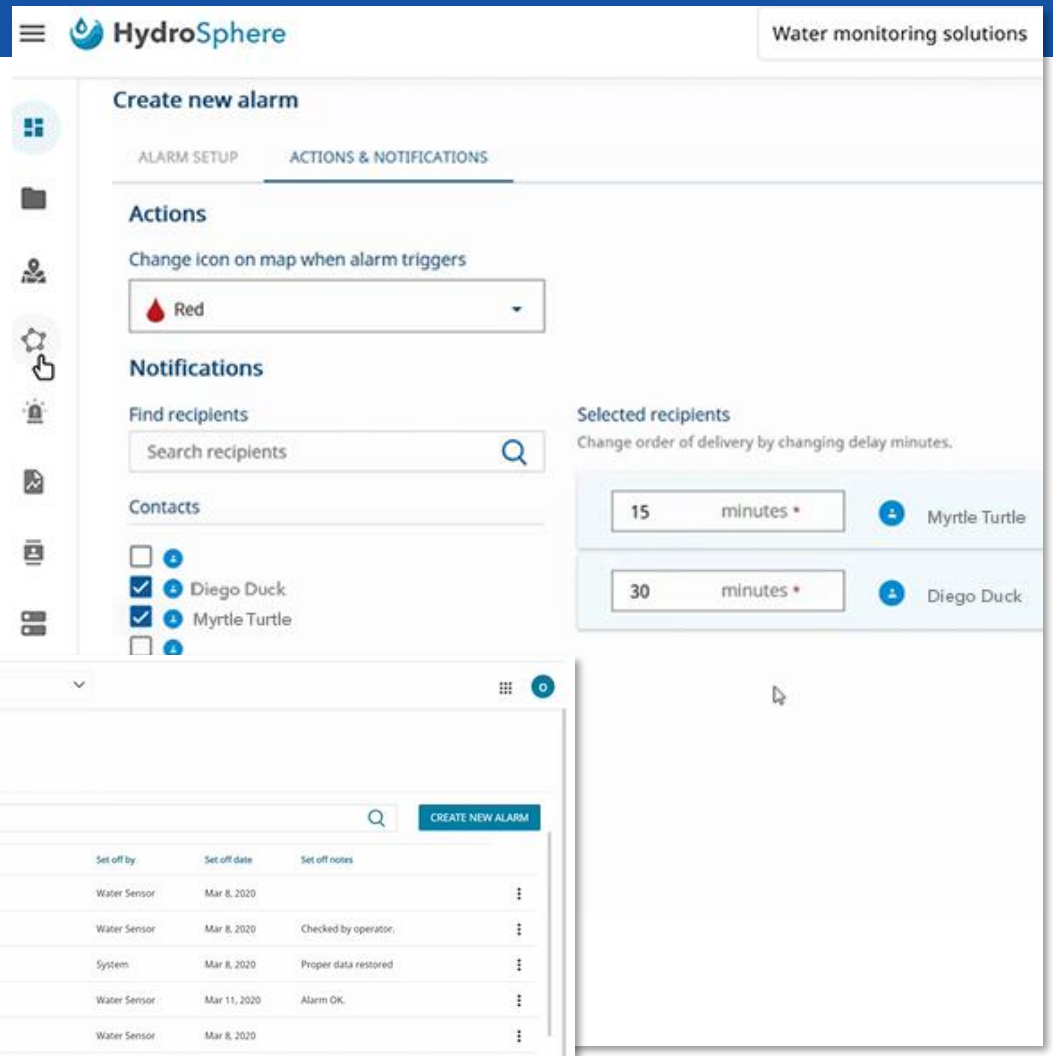
[5] Data Hosting

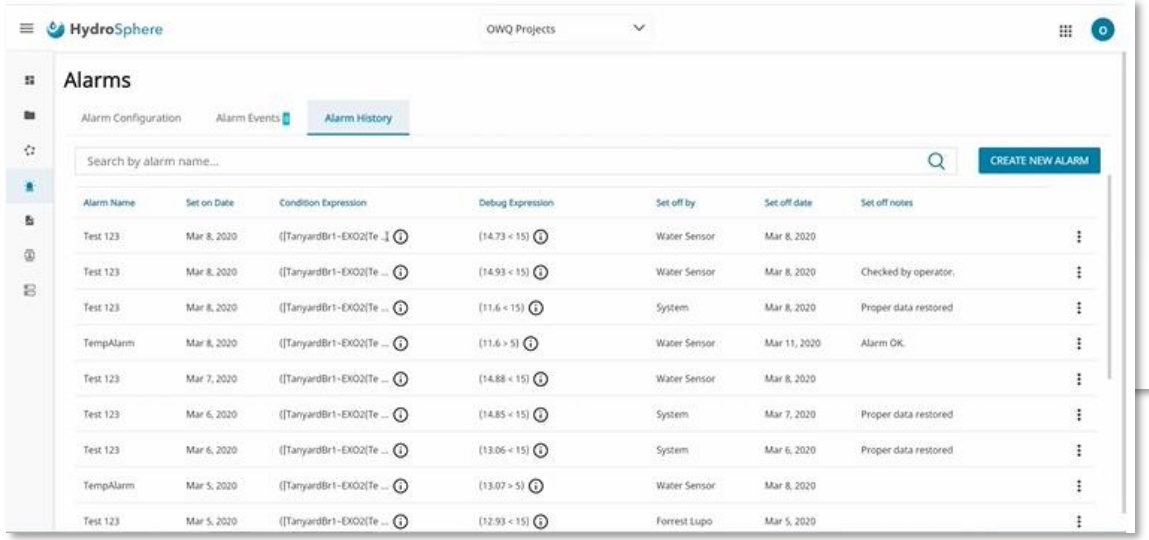
Alarms

- Notify when sensors meet user-defined thresholds
- Get updates to your phone or PC
- Select recipients
- View alarm history

Alerts

- Notify when a site is down





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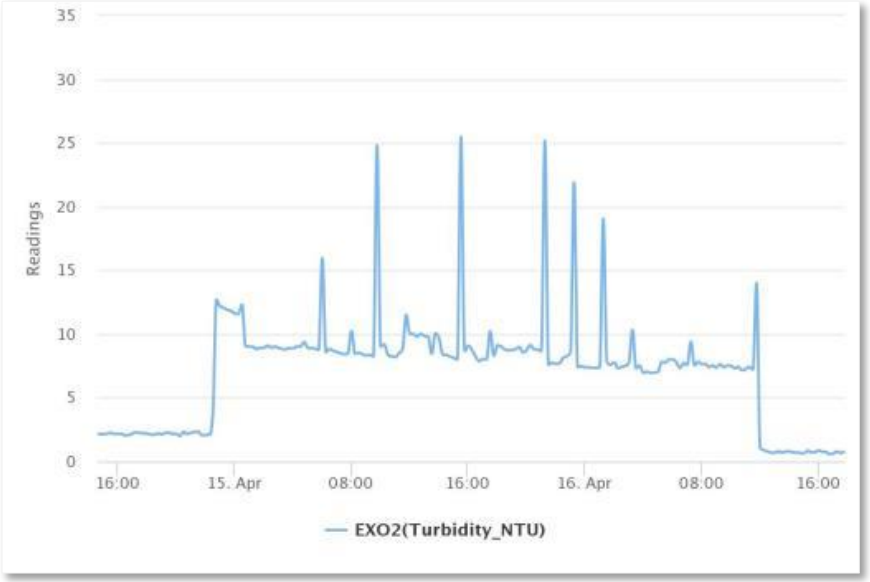
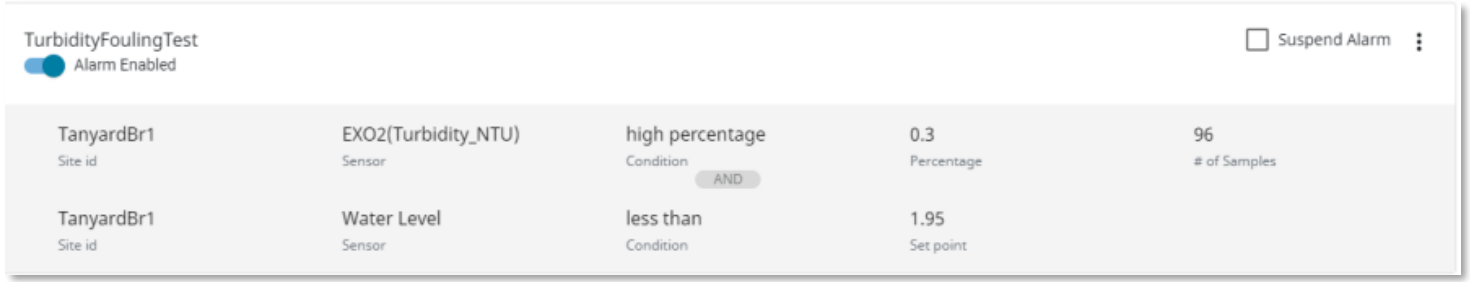
[5] Data Hosting

Remote Monitoring Example: **Alarm for Fouling**

- Turbidity fouling at this site is typically anything greater than 3 FNU
- Set an alarm for
  - Turbidity greater than 30% of average of last 96 samples
  - AND water level less than 1.95 feet





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Bringing Everything Together: Integrated Systems

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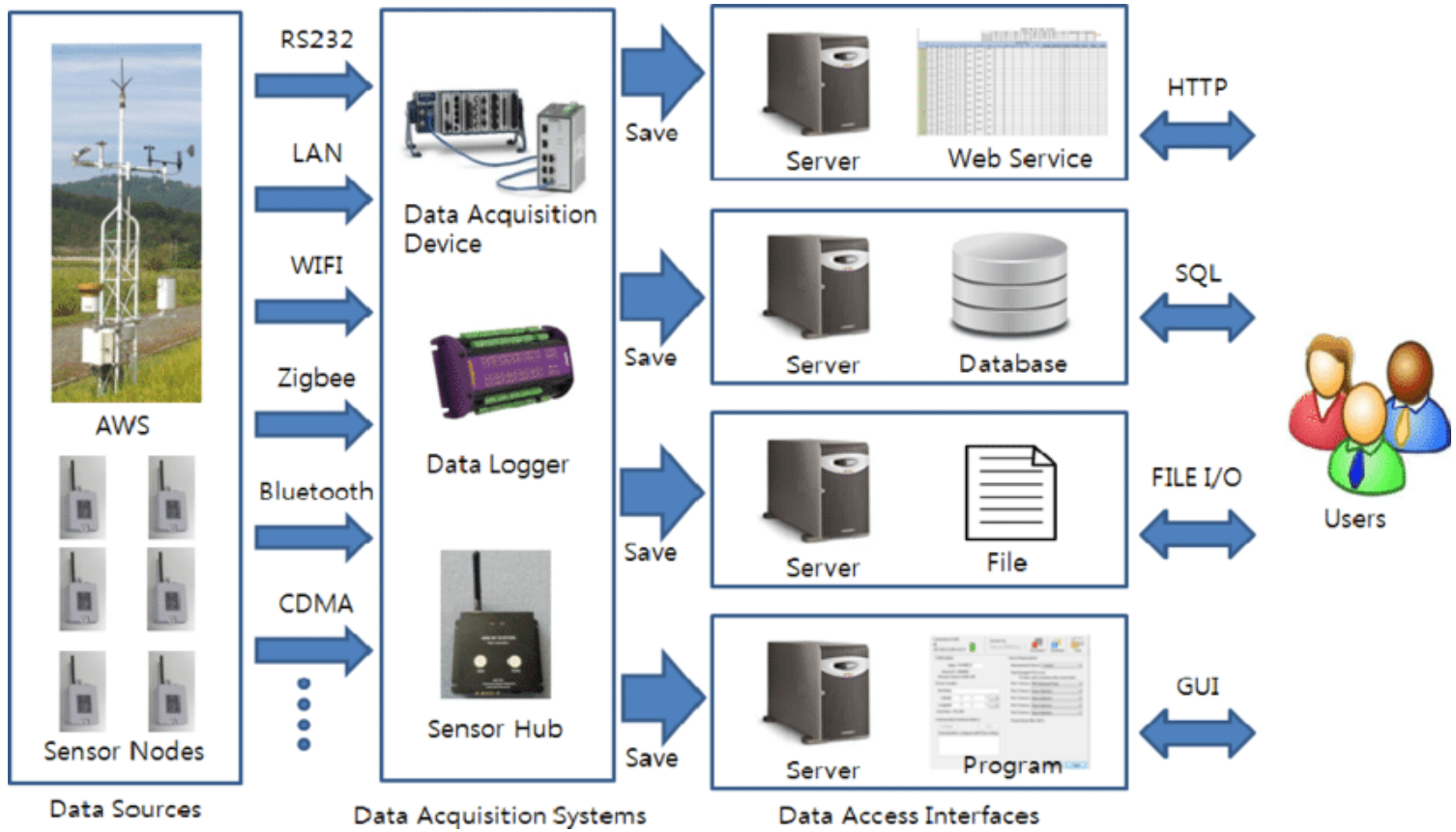
[6] Integrated Systems

Common Concerns

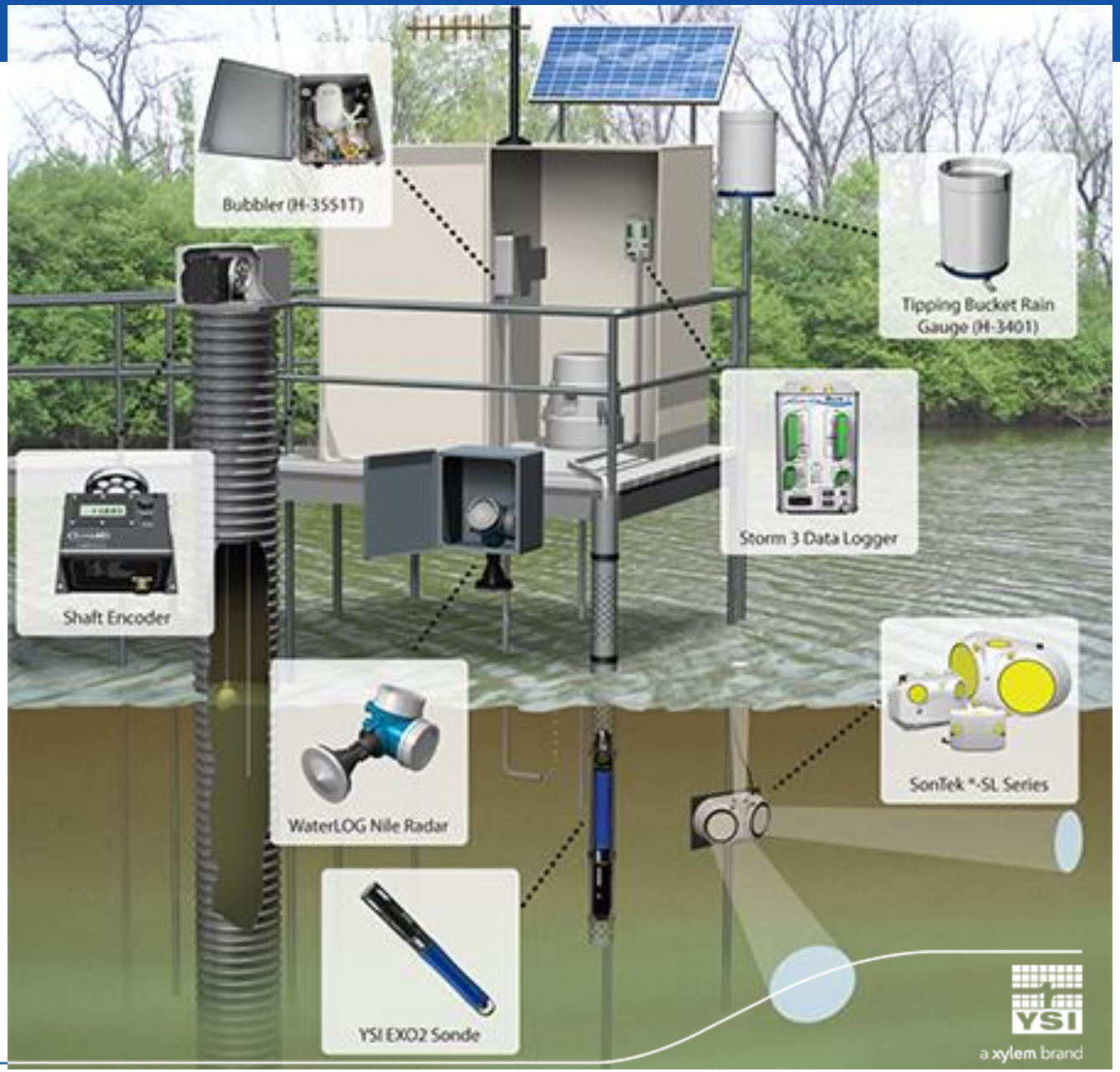
- Compatibility of multiple manufacturers
- Consistency of data quality
- Multiple data outputs
- Complicated deployments



[6] Integrated Systems

Stick with One Manufacturer

- Convenience of the same brand for everything
- Streamlined support



[6] Integrated Systems

Turn-Key Solutions

- Include everything a customer would require to start a remote data networking program
  - Land base stations
  - Data logging, telemetry, power, sensor payloads
  - Ability to integrate 3rd party (non-Xylem) sensor offerings

[6] Integrated Systems

Data Collection Platform Buoys

- Various sizes depending on payload, power requirements, and location
- Made from industry-leading unsinkable foam
- Compatible with Xylem water quality, meteorological, and hydrographic sensors
- Various telemetry options for data transmission
- Real-time data presentation
- Ability to integrate 3rd party (non-Xylem) sensor offerings

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[6] Integrated Systems

All-in-One Survey

- HYCAT for volumetric survey on a drinking water reservoir
- Results
- Determine reservoir capacity
- Mitigation techniques: is dredging necessary?

- HYCAT ASV
- SonTek M9
- YellowFin Side Scan Sonar
- EXO2-S Water Quality Sonde

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7

Training Employees

[7] Training Employees

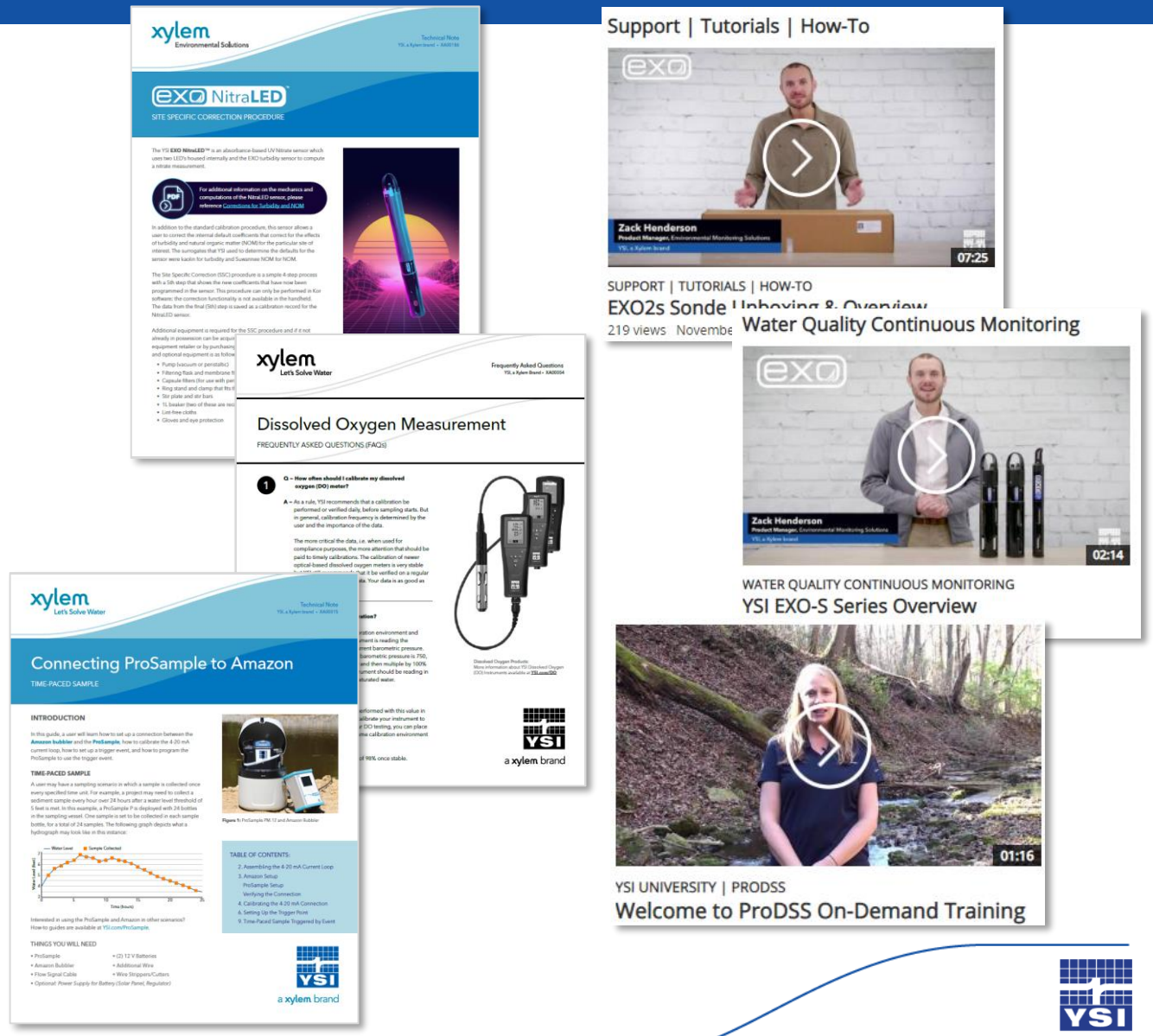
Common Concerns

- Limited in-house expertise
- Lack of cross-training
- Limited training materials
- Complicated instruments

[7] Training Employees

Resources!

- Video Hub
  - Tutorial / How-To
- YSI University
  - EXO
  - ProDSS
  - ProSample
- Technical Notes
- Handbooks
- Guides



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[7] Training Employees

On-Demand Webinars

- Technology Reveal: EXO NitraLED UV Nitrate Sensor
- Why Collect Water Quality Data When All You Need is Flow?

video.YSI.com

YSI Webinar | EXO NitraLED Technology Reveal

Webinar | Why Collect Water Quality Data When All You Need is Flow (or Vise Versa!)

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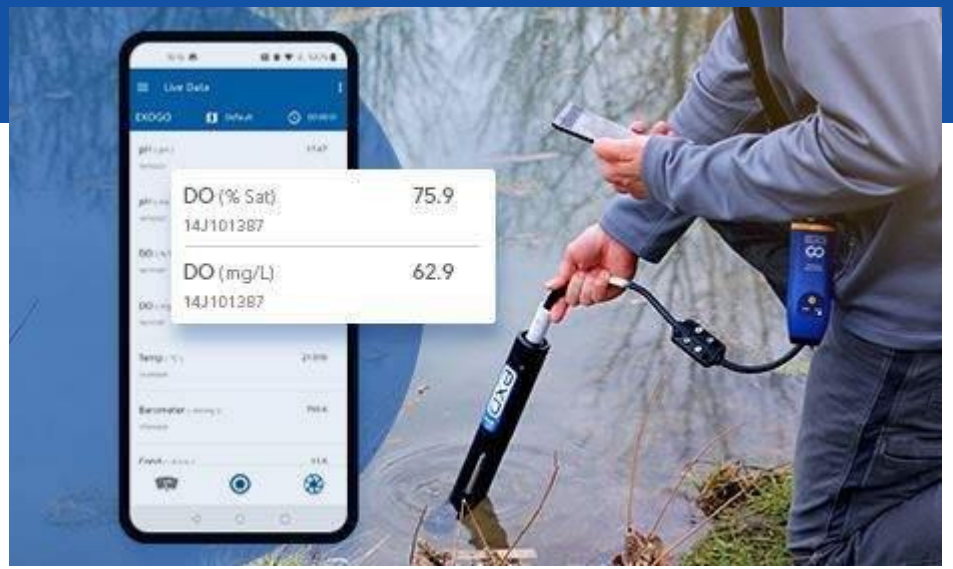
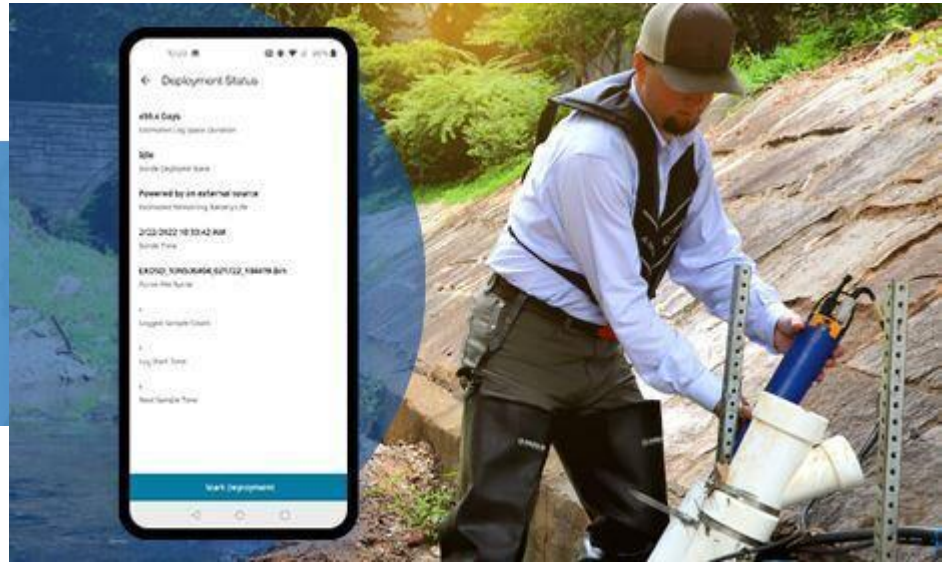
[7] Training Employees

Easy-to-Use Instrumentation

- Plug-and-play in multiple applications
- Simple, intuitive hardware design
- Software with built-in quality checks





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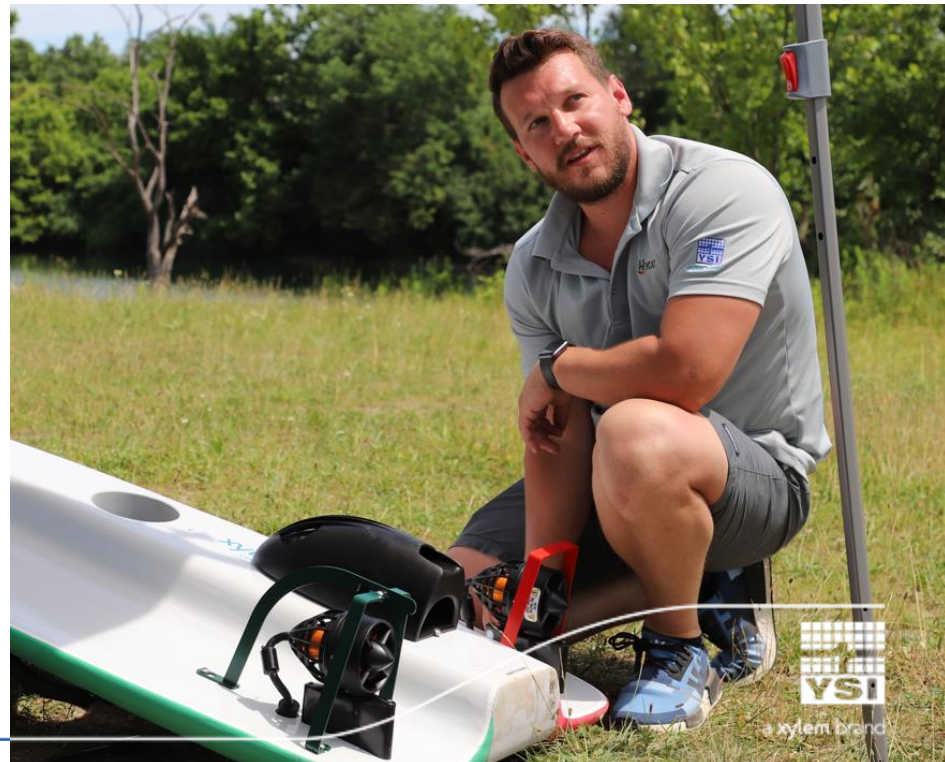
[7] Training Employees

Field Training by Experts

- At your site, train as many staff at once as you like
- Tailored to your needs and concerns

Virtual Training

- Webinar-based, but still hands-on
- Demo equipment
- Calibration and setup walkthroughs



[7] Training Employees

Field Design & Installation

- YSI's Services Team can consult on projects to ensure the meet the clients objectives. We can design a system to meet any budget while not compromising on data quality.
  - We can assist on picking proper site locations
  - Site layout & platform optimization
  - Data collection method assessment & recommendation
  - Selection of instrumentation, data collection, and data presentation
  - Equipment installation and verification

[7] Training Employees

On-Site Field Maintenance

- YSI's Services Team can provide routine site maintenance for small or large monitoring networks.
  - On-site contract services for routine calibrations, updates, and general site upkeep
  - Preventative Maintenance for scheduled inspections, system verification, user training
  - Sensor diagnostics and Repairs services

[7] Training Employees

Data as a Service

- Utilizing YSI's autonomous vehicle fleet, we are able to provide data collection services for our customers to complement any existing monitoring program.
  - Trained operators can recommend optimal surveys to collect the best data
  - Scalable offerings to meet any budget
  - Surveys include: Water Quality, Volumetric, Bathymetric, Imaging, Scour, and Hydrographic
  - Range of deliverables: raw data, manipulated data, complete, actionable reports

Recap

1. Repair and Maintenance
2. Evolving Site Needs
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Q&A with Catie

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Questions?

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Thank You!

Contact us:

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