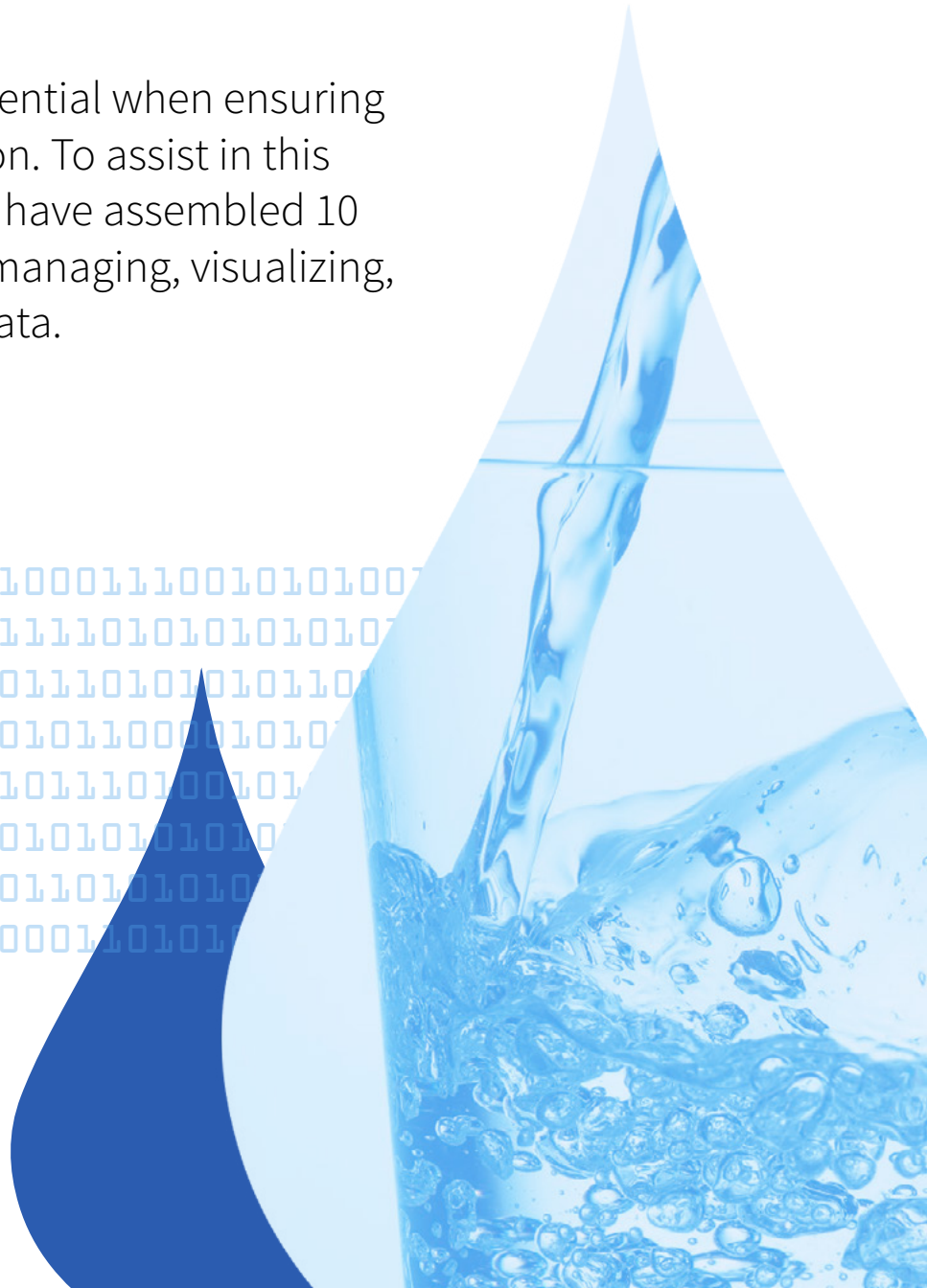


Water Quality Data Management: 10 Best Practices

Exercising best practice is essential when ensuring water quality and conservation. To assist in this effort, Locus' domain experts have assembled 10 best practices for collecting, managing, visualizing, and reporting critical water data.

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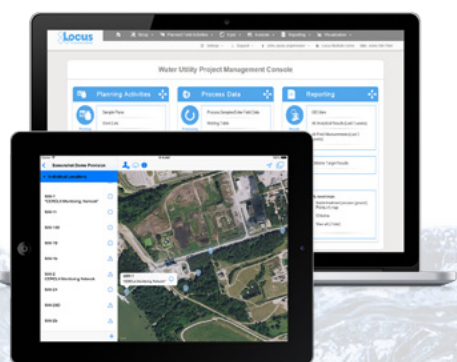
Take greater control of your data management processes.

Nothing productive can be accomplished without first being confident in your data quality. Although standard practices are well documented in the industry, never underestimate complacency and the propensity for human error. Taking greater control of your data management processes doesn't necessarily mean taking your own samples or generating your own reports—it means becoming more familiar with the data gathering and management practices of your field sample crews, consultants, laboratories, sensors, and other equipment and vendors to determine if the proper processes are being followed and tools are being used. All of these elements should be documented in your sampling and analysis plan and periodically audited by you, the data owner.

02:

Ensure vital information is accessible.

Once you control your water sample collection, analysis, and recording processes, you can then focus on where all this information resides and how it can be managed and used most effectively. By handling your water quality data and information in one central repository it can be easily accessed by all necessary parties, and the chance of data being altered or lost in individual databases or spreadsheets is eliminated. Accessibility is the essential link between effective monitoring efforts and informed data analysis for assessing water quality. For example, imagine watershed management where members of the Lake Association have direct access to historic data trends and can check up on current datasets at any time. If you think of the famous Louis Brandeis quote “sunlight is said to be the best of disinfectants” you can see how this applies to your water quality data. The more accessible and transparent the data is, the more eyes to identify water quality issues before they turn into problems.



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Be able to act quickly.

The key to being able to act quickly when water quality thresholds are exceeded is having the appropriate controls in place to immediately alert you of these instances. With effective monitoring and surveillance programs you are able to reduce the public health or economic consequences as much as possible when an unexpected situation arises. For example, a modern, intelligent, centralized database will send notifications to designated users when regulatory exceedances have occurred in the latest data upload from the lab.



Notifications can be triggers for additional data validation, repeat sampling, more analysis, public health alerts, or mandatory external notifications depending on your project. But more importantly, these notifications give you real-time information with maximum lead-time to respond in a planned manner instead of learning too late or being forced into rash reactions.

Make compatibility a priority.

It is imperative that all your different parties or systems for handling water quality data, such as laboratories, sensors, SCADA systems, IoT data streams, and field data collection crews, are able to easily interact with one another. If this isn't the case, you're faced with many separate instances of data or activities that may end up overlapping and negatively affecting data quality, or completely halting certain steps in your management or reporting processes. Ensuring compatibility means reducing risks and operational inefficiencies. Here are some basic steps to ensure compatibility among the different parties handling your water quality data:

- ◇ Create a standard list of locations
- ◇ Identify a standard approach to geo-reference locations and document the datum
- ◇ Designate a standard list of field and analytical parameters, both full names and abbreviation codes
- ◇ Define imports and exports, or better yet APIs for interconnectivity

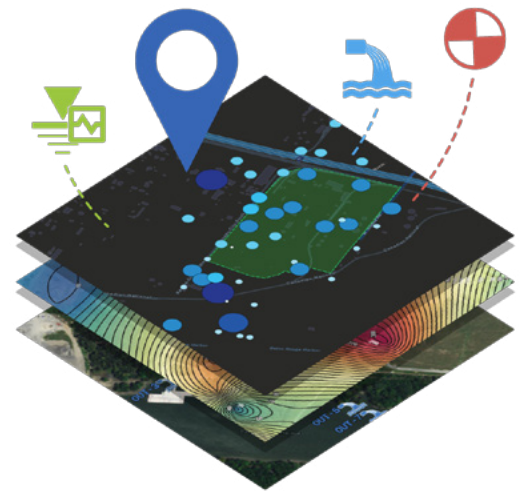
Determine your reporting requirements.

To be efficient at reporting, you may need to answer a few questions first. Does your organization need custom reports? Who is your audience? Are report templates needed to provide consistency among multiple parties or between routine reports? Would graphs, charts, maps, or heat maps be helpful in enhancing your reports? Are there certain things you would like to improve about your reporting—such as amount of time or resources consumed? The sooner you have questions like this answered, the sooner next steps can be taken toward making improvements possible; improvements such as automated, pixel-perfect reports that are produced with a single click.

However, endless discussions on report formats, output styles, proper fonts, charts, maps etc. can waste valuable time and money. Sloppy inconsistencies can waste credibility. Determine what is needed for the job at hand, and create standardized templates for routine reporting. Automate reports as much as possible to both save costs and have consistent presentations to reviewers, regulators, and stakeholders. Spend money where it is needed to support complex decision making—not on routine matters.

Reuse your data and visualize it.

Data can be organized and used to improve operational efficiencies in industrial or other applications, conduct pollutant source assessments to target remediation/restoration activities, and develop management plans for protecting existing water quality. Being able to visualize your data, detect the impact of management changes in water quality parameters, and identify long-term trends or source areas will do wonders toward meeting water quality goals and tracking your programs progress. In order to improve visualization, replace data tables with maps, heat maps, 3D maps, and GIS wherever possible. Save the expensive and time consuming mapping for final reports and take advantage of quick maps for a more cost effective analysis.



Take advantage of mobile.

Thanks to the latest advances in technology, paper forms and spreadsheets are becoming obsolete. The use of a mobile app for recording and uploading data consolidates the process of gathering field sample data, then logging and performing QA/QC, into one simple step. Eliminating the step between field and office can help ensure the quality of your data without performing another QA/QC action, and thus make your life a little bit easier. You also reduce the cycle time as information you collected on your mobile device becomes instantly actionable and verifiable. Many mobile programs allow partial data uploads so your coworkers in the office can be reviewing the information before your sampling day is done. They can also spot issues before you demobilize so if resampling is needed, it can be addressed immediately while the crew is still in the field.



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Design for sensors and IoT.

In addition to the popular phrase “mobile-first” design, regarding water quality it may be time for “sensor-first” and “IoT-first” design. In today’s world of Internet of Things (IoT), make sure all sensors are equipped with an IP address and can seamlessly transmit information to your database in real-time. Automated sensors that can measure water quality are becoming more and more incorporated into water quality management. They already handle all physical and field data such as temperature, pressure, alkalinity, and other field-readable characteristics within treatment system processes and throughout watersheds, and we should expect them to be even more prevalent in the future. From wearable devices to button-sized low powered beacons that transmit signals—the use of sensors is increasing. Think about how you can start capturing these signals to help create that perfect, real-time management of your water quality.

Embrace change and simplification.

As technology continues to improve, there will always be a faster, simpler, and more efficient way of doing things, and this holds true when it comes to water quality data management. Often our instinct in many situations is to fall into a routine of performing daily tasks the way they've always been done. For example, using Excel spreadsheets for complex data management because “we always do it this way”. However, it is often those who choose to seek out a better way and embrace change that end up achieving greater success. Focus on unifying all water apps on a single platform with a single system of record in the multi-tenant cloud. Focus on inputting data only once and reusing it many times to avoid transcription errors and reduce QA/QC time and cost. In summary, you should unify, streamline, and report all your water data in the simplest way possible.

Prepare for the data storm of the future.

With water contaminants already being measured at minute levels, one can only assume that as detection technology improves, safe exposure levels decrease and demands for clean water increase, more testing will be required to detect smaller concentrations at finer spatial and temporal resolution. And with the use of automated sensors, what was once a weekly data collection event becomes continuous data collection. These changes create more and more data and metadata that need to be captured, stored, managed, visualized, and reported on.

Determine in advance the data that must be kept and how you will keep it and access it. Establish a reason for all the data you collect—just because you can collect the data does not mean you need to collect the data.

- ◇ Focus first on collecting data that you need for compliance and ESG reporting.
- ◇ Know why you are collecting it (what decisions or regulatory requirements are driving the data need).
- ◇ Know how long you need to keep it and conversely, when you can get rid of it.
- ◇ Know your records management policy.
- ◇ Being prepared to face this big data storm can play a huge part in your future success.

Ready to get started?

Taking these simple steps of revisiting how you address water quality data management, the tools you use, the reasons you collect the data, and the latest advances in technology can provide fresh perspectives to ultimately help you streamline and improve your management of this essential resource. Contact us if you'd like to see a demo of Locus' water quality management solutions.



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