Quality Assurance (QA): What, When, How

Green Country Stormwater Alliance
Tulsa Mohawk Education Auditorium
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INCOG

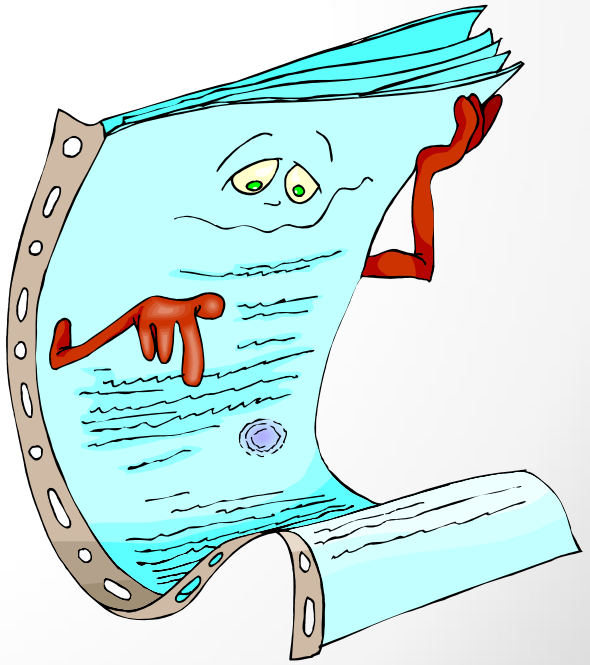
What Is Quality Assurance (QA)?

- QA is the overall *management system* that ensures that your data will meet defined standards and project requirements.
- Quality Assurance isn't just for testing and laboratory data, QA principles should be applied to all aspects of the storm water program.

What is Quality Control (QC)?

•Quality control refers to the *technical activities* intended to reduce errors. We accomplish this by relying on standard operating procedures (SOPs).

•An SOP is a defined, step-by-step procedure for carrying out a task. This will help provide consistency in daily operations and aid new staff in the proper execution of activities.



Credibility

- The credibility of your work and data gathering efforts depends upon a good QA/QC program.

- You can't make good decisions with bad data.

Standard Operating Procedures

•Repetitive managerial tasks, field work, analytical procedures and data processing activities should be clearly outlined in written Standard Operating Procedures (SOPs).

•These written procedures should provide enough detail for someone familiar with the process to complete the task in a precise manner.

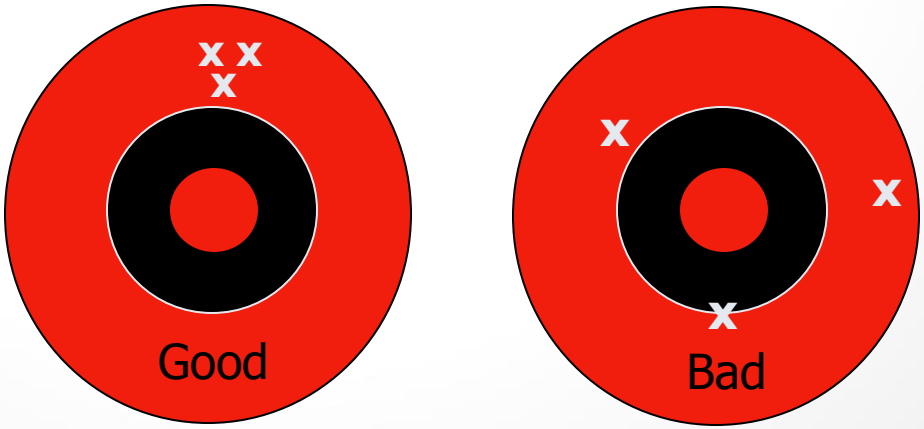
Five Major Data Quality Indicators

1. Precision
2. Accuracy
3. Representativeness
4. Completeness
5. Comparability

Precision

- This is a measure of agreement among repeated measurements of the same property or characteristic under identical or substantially similar conditions.

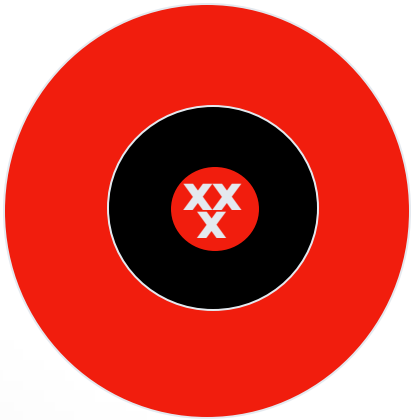
- Good precision does not mean your results are true, correct or right. It just means they are reproducible.



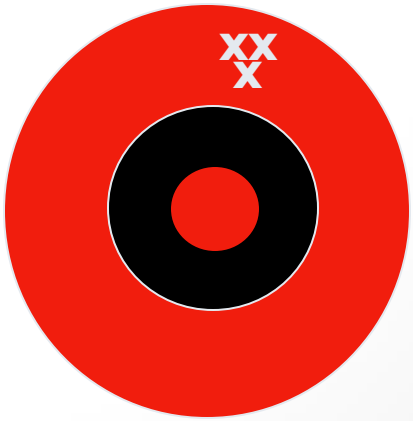
Accuracy

•This is a measure of how close your results are to a true or known value.

•Accuracy is a combination of random error (precision) and systematic error (bias) that may be due to sampling or analytical operations.



Good Precision and Accuracy



Good Precision, but Poor Accuracy

Representativeness

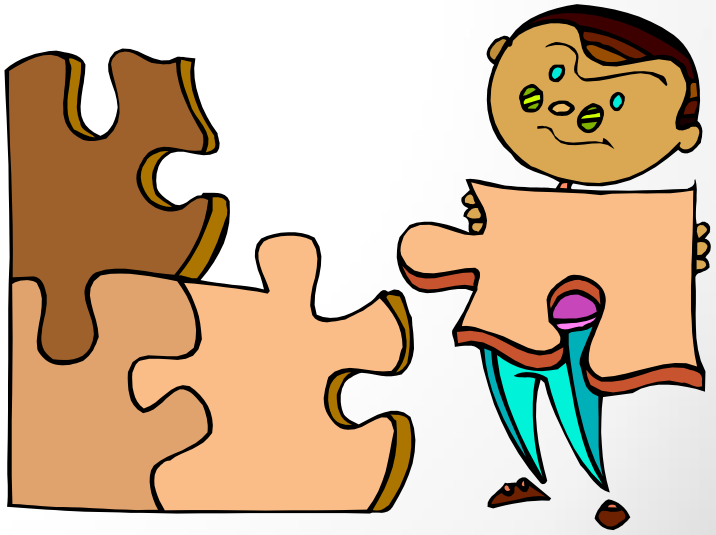
- This is the extent to which measurements actually represent the true environmental condition or population at the time a sample was collected.

- Your sample should exhibit the same chemical and physical characteristics as the source or location you are attempting to represent.

Completeness

•This is a measure of the amount of valid data obtained from a measurement system.

•As a general rule, try and collect more data (or samples) than the minimum number required. In the evaluation phase, you may find that some of your data is not usable for various reasons.



Comparability

- This is the extent to which data can be compared between sample locations, periods of time, sampling procedures or between different projects.

- Conditions change over the course of years, seasons, months, days and hours.

Chain-of-Custody Forms

The C-O-C form can act as a legal document and contract between your system and a contract lab. It should contain the following items:

- Company, organization or facility name
- Name of individual(s) collecting samples
- Date and time of collection and field analysis
- Analysis performed in field or requested
- Sample identification
- Sampling location
- Container types, size and preservation
- Necessary contact information
- Special requests like method requirements or rush status
- Signatures

Calibration

- Calibration is the comparison of an instrument reading to a known value or standard and making adjustments until the instrument can accurately reproduce known values.
- Calibrate or verify calibration before reading the first sample.
- Verify calibration throughout the event and then again after the last sample.
- Make sure calibration standards are in the correct range and current.

Blanks and Duplicates

- Trip blank is a sample container filled in the lab with reagent water and transported to the field.
- A field blank is a clean sample container filled with reagent water in the field.
- A field duplicate is a second sample collected from the same location, the same way and as close to the same time as possible.
- Field splits are obtained by dividing one sample into two portions in the field.

Holding Time

- Sample holding time is the maximum time the sample can be held before the start of the analysis.
- Sample composition can change over months, days, hours or even minutes. Preserving samples may extend holding times.
- Some parameters may have to be analyzed onsite due to short holding times, like temperature, pH, chlorine and dissolved oxygen.

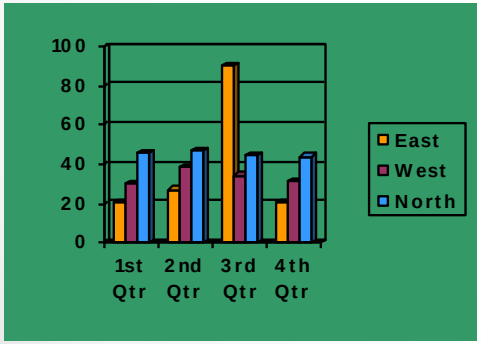
Managing Data

- To show that you have developed, implemented and are enforcing a storm water program you will be collecting data.

- Answers to the who, what, where, when, why and how questions produce data.

Forms of Data

- Records of conversations
- Lab & field data
- Compliance records
- Photos & maps
- Budget items
- Observations
- Training records
- Annual reports
- Inspection reports
- Spill reports



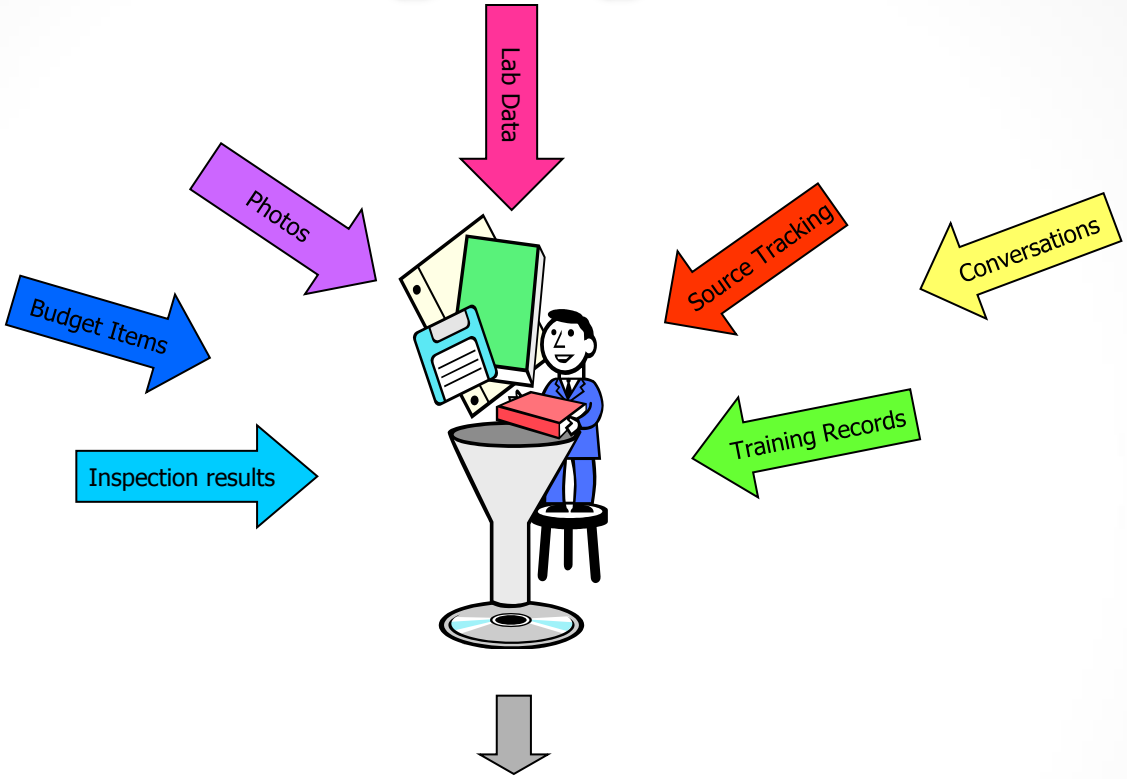
Field Inspections			
Outfall #	Date	Flow	Inspector
1	02/15/03	I.2 "	C.F
3	02/24/03	0	C.F
6	03/02/03	0.6"	B.H
2	03/12/03	1.3"	C.F
4	03/18/03	0.3"	T. S
22	04/02/03	2.2"	C.F

Managing Data

- Your data management system collects, sorts, organizes, evaluates, stores and then converts your data to a form the end user will find useful.

- The data management goal is to organize the data in an easy to use and easy to retrieve manner, prevent the loss of data and minimize erroneous data and errors.

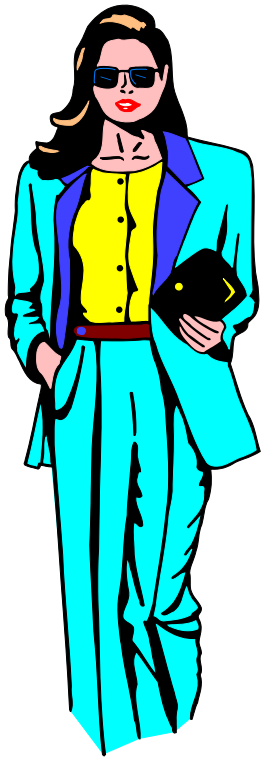
Managing Data



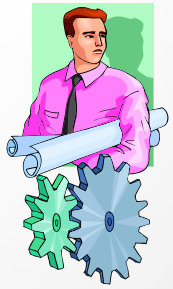
- Staff updates, Citizen reports, Compliance reports, Permits, Program evaluations, Annual reports, Media reports, Council reports, Legal documents, etc.

Who Are Your End Users?

- Regulatory Agencies
- Citizens
- Auditors
- Media
- County Officials



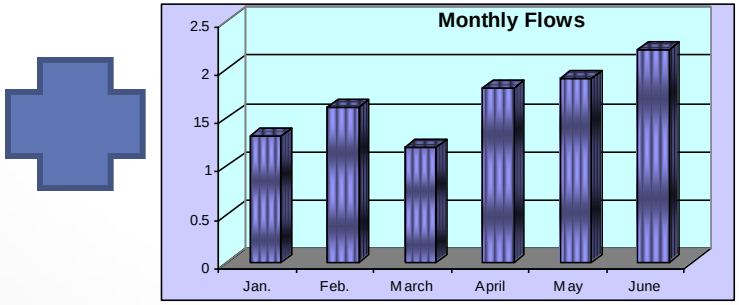
- Staff Members
- Industries
- City Officials
- Attorneys
- Enforcement Staff



End User Needs

- Identify the end users and how they will use this information.
- Provide them with the level of detail they need.
- Convert data from tables and spreadsheets to text summaries and graphic forms to allow others to quickly evaluate the information.
- “If you can’t explain something simply, you don’t really understand it.” Bill Gates

Month	Cfs
Jan.	1.3
Feb.	1.6
March	1.2
April	1.8
May	1.9
June	2.2



The monthly flows remained in the normal range for the first quarter with a slightly higher flow in Feb. and then exhibited the usual increase in flow rate for the next quarter.

Levels of Quality Assurance

- EPA recognizes that not all activities or projects require the same level of QA.

- A graded approach allows organizations and programs to vary their QA requirements to meet their specific objectives and needs.

- Judgment is required to determine what level is necessary for your storm water program.

Levels of Quality Assurance

•What level of QA do you need?

- General field screening – Low
- Enforcement actions – High
- Regulatory agencies – High
- Legal proceedings – High

•A high level QA program will result in legally defensible and statistically valid data. You can have enough, but never too much.

Levels of Quality Assurance

•Remember, the minimum requirements for one program may not meet another program's criteria. This will limit the use of your data.

•Consider the source and the likelihood you will have to defend your findings.

Data Storage and Record Keeping

•A systematic and secure method of storing and retrieving paper and electronic information will keep your data safe and easy to find.

- ✓ Keep related files in one location
- ✓ Limit access to data storage
- ✓ Purchase or develop software and programs that are user friendly and won't soon become obsolete

Data Storage and Record Keeping

- OKR04 General Permit Requirements

- Part V. B. Recordkeeping:

Retain records of all monitoring information: Include all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, copies of Discharge Monitoring Reports (DMRs), …

Data Storage and Record Keeping

•… a copy of the OPDES permit, and records of all data used to complete the NOI for this permit for a period of at least three (3) years from the date of the sample, measurement, report or application, or for the term of this permit, whichever is longer. This period may be extended by request of the Director at any time.

Data Storage and Record Keeping

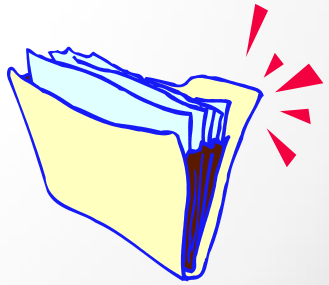
- Part VI. F. Duty to Provide Information

- You must furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. You must also furnish to the Director upon request, copies of records required to be kept by this permit.

Evaluate Your Program

Evaluate your program from different perspectives and then ask yourself the following questions:

1. Will your regulatory agency consider your program structured and meeting its regulatory obligations?
2. Is your program effective?
3. Are the data you generate convincing and useful for routine enforcement?



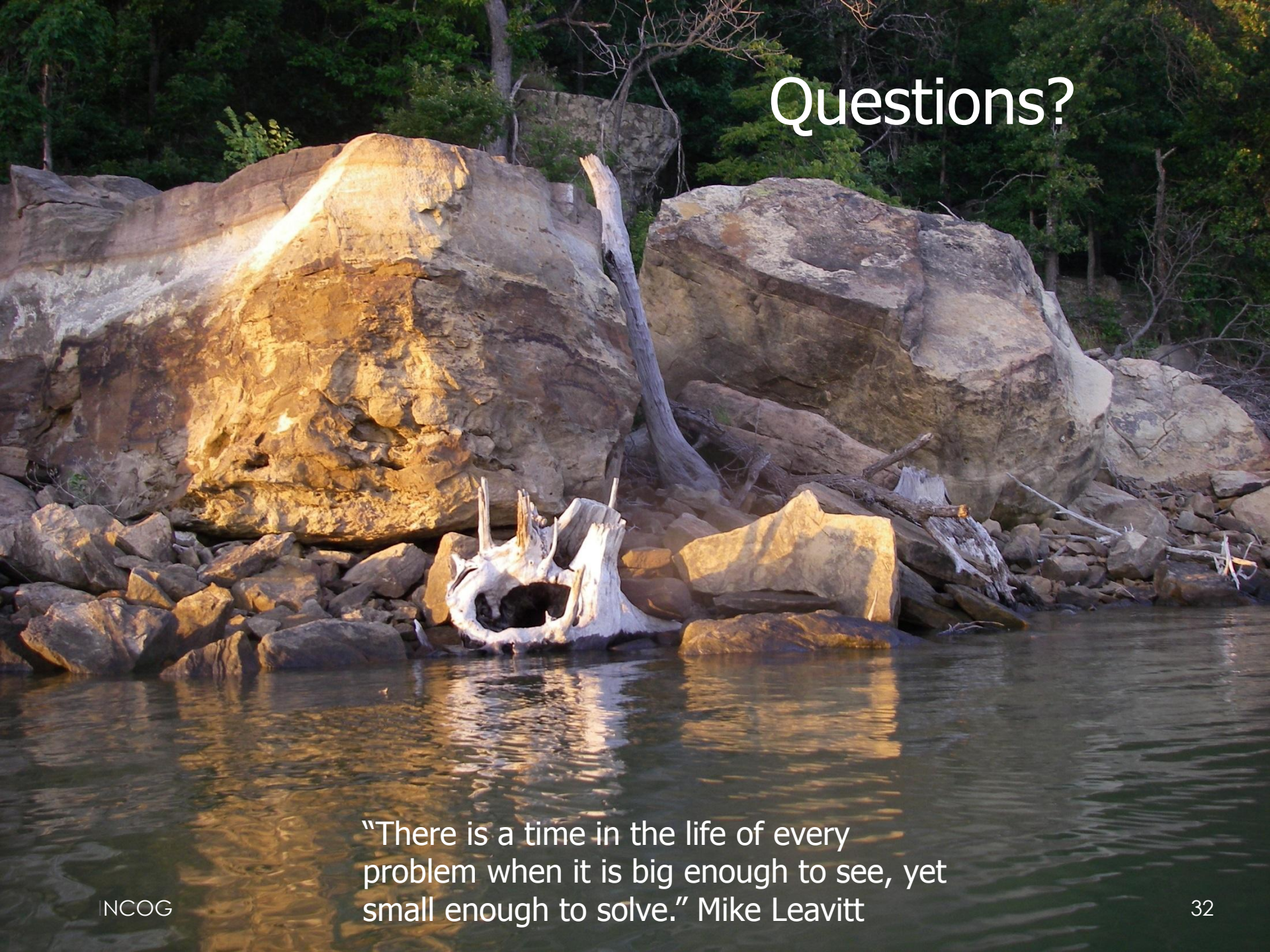
Evaluate Your Program

4. Will your data withstand scrutiny from the opposing side?
5. Could an attorney have your data dismissed due to lack of sufficient and convincing evidence?
6. Is your program well received and respected by all parties?

Evaluate Your Program

•Developing a sound QA program takes time and requires diligence. Stay flexible and allow the program to evolve as necessary.

•Your QA program should include all activities involved in the collection, manipulation, reporting and then final storage of your data. If you contract work out, make sure others have a QA program in place for their part.


Questions?
"There is a time in the life of every problem when it is big enough to see, yet small enough to solve." Mike Leavitt