

California's Surface Water Ambient Monitoring Program How to Select and Work with a Laboratory in the Context of SWAMP-Comparability

May 19, 2011



Presented by:

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**The QA Research Group at
Moss Landing Marine Laboratories**



Overview

- The SWAMP QA Requirements
- Assessing the Laboratory
- Methods for Assuring Compliance with QA Requirements
- Example Program-Practical Application Exercise



Outcome

- How to identify relevant SWAMP QA requirements
- Which QA requirements need to be communicated to the contractor
- Methods for ensuring the requirements are understood and followed
- How to work with a laboratory over the duration of a project
- How to work through problems with a laboratory



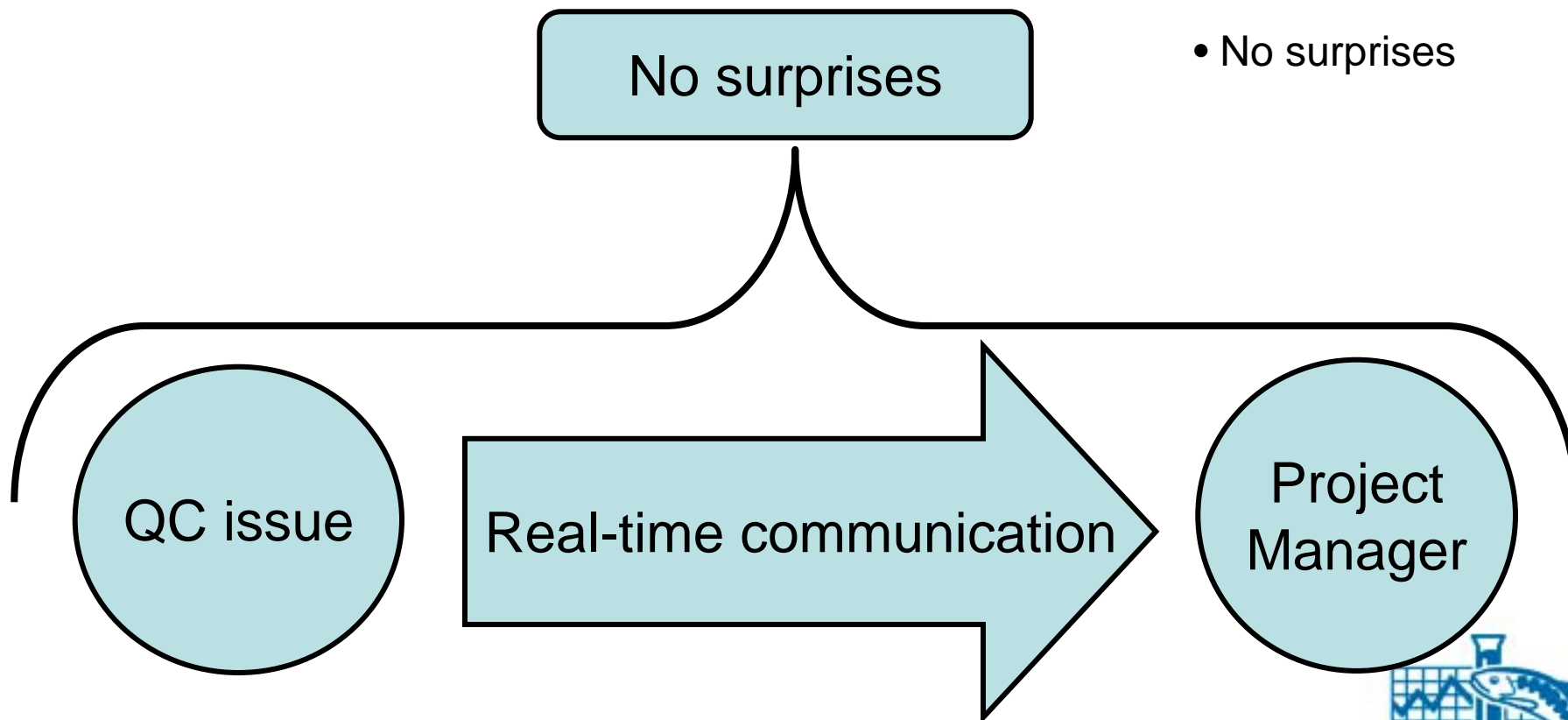
Terms

- QAPrP = QA Program Plan
- QAPP = QA Project Plan
- MQO = Measurement Quality Objectives
- SOP = Standard Operating Procedure
- Method = standardized method for sample collection or analysis
- Parameter = analyte/chemical along with a matrix (freshwater/sediment/tissue)
- MDL = Method Detection Limit
- RL = Reporting Limit
- Real-time QC = immediately when issue arises (i.e., right away)
- SWAMP Help Desk
 - SWAMP QA Help Desk
 - (swampQA@mlml.calstate.edu)
 - SWAMP Data Management Help Desk
 - (SWAMPHelpDesk@mlml.calstate.edu)



Three Keys to Success

- Real-time QC
- Communication
- No surprises



Project Manager Responsibility

- Sets a “no surprises” policy via real-time QC communication
- Knowledgeable on necessary lead and turnaround times
- Awareness of tools
- Familiarity with SWAMP QAPrP, database management plan, and QAPP(s) (if applicable)
- Familiarity with relevant project and SWAMP standard operating procedures (SOPs)
- Initiation of a project QAPP if necessary
- Knowledgeable on corrective action and payment obligations
- Routine contact with laboratory and sampling crew
- Communication with laboratories and field crews when QA requirements are not met
- Putting together kick-off and mid-project meetings
- Communication with the project QA Officer when systemic QA issues are identified
- Initiation of the corrective action process when isolated QA issues are identified



Laboratory and Field Crew Responsibilities

- Follows a “no surprises” policy using real-time QC communication
- Awareness of tools
- Familiarity with SWAMP QAPrP (particularly appendices A-D), database management plan, and QAPP(s) (if applicable)
- Preparation of elements for project QAPP if needed
- Knowledgeable on relevant project and SWAMP SOPs
- Communication of utilized methods and internal SOPs
- Knowledgeable on necessary lead and turnaround times
- Knowledgeable on necessary holding times
- Knowledgeable on corrective action and payment obligations
- Routine contact with Project Manager and Project QA Officer
- Communication with project management when QA requirements are not met (in real time!)
- Communication with Project QA Officer when systemic QA issues are identified
- Initiation of the corrective action process when isolated QA issues are identified



The SWAMP QA Requirements

- Where do I find the SWAMP QA requirements?
- What requirements do the laboratory or field crew need to meet?
- How should these requirements be communicated?
- QA requirements for non-SWAMP parameters?



Where Do I Find the SWAMP QA Requirements?

- SWAMP 2008 QA Program Plan
 - http://www.waterboards.ca.gov/water_issues/programs/swamp/tools.shtml#qa
 - Google search: SWAMP QAPrP
- Look in the appendices
 - Appendix A: Measurement Quality Objectives Tables
 - Appendix B: Sample Handling
- Bioassessment, algae, P-Hab
 - <http://swamp.mpsl.mlml.calstate.edu/resources-and-downloads/standard-operating-procedures>
 - Google search: SWAMP Bioassessment SOP
- Call/email the SWAMP QA Help Desk
- Read the SWAMP-Comparability FAQ
 - <http://swamp.mpsl.mlml.calstate.edu/faqs>



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Measurement Quality Objectives: SWAMP Examples

Laboratory Quality Control	Frequency of Analysis	Measurement Quality Objective
Calibration Standard	Per analytical method or manufacturer's specifications	Per analytical method or manufacturer's specifications
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Laboratory Blank	Per 20 samples or per analytical batch, whichever is more frequent	<RL for target analyte
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Field Quality Control	Frequency of Analysis	Measurement Quality Objective
Field Duplicate	5% of total project sample count	RPD<25% (n/a if native concentration of either sample<RL)
Field Blank, Travel Blank, Equipment Blank	Per method	<RL for target analyte

QA Program Plan Appendix A: Measurement Quality Objectives (Page 59)



Holding Times: SWAMP Examples

Analyte	Units	Recommended Container	Recommended Sample Volume	Recommended Preservation	Required Holding Time
Sulfate	mg/L	Polyethylene Bottles	300 mL	Cool to 6 °C and store in the dark	28 days
Sodium	mg/L	Polyethylene Bottles Glass or plastic filtering apparatus are recommended to avoid possible contamination.	600 mL	Acidify with (1+1) HNO ₃ to pH <2.	6 months
Turbidity	NTU	Polyethylene Bottles	300 mL	Cool to 6 °C and store in the dark	48 hours

QA Program Plan Appendix B: Sample Handling (Page 92)



Database Management Systems

- SWAMP v2.5 Database
 - Documentation v2.5
 - Templates v2.5
 - Translators and Transformers v2.5
- SWAMP v2.2 database
 - Documentation v2.2
 - Templates v2.2
- Required Data Submission Information

Quality Assurance

- [Quality Assurance Program Plan](#)
- [Quality Assurance Project Plan Guidance](#)
- [Quality Assurance Report Template](#)
- [Data Verification and Validation Systems](#)
- [Systems Assessments](#)

Standard Operating Procedures

Quality Assurance

[The Surface Water Ambient Monitoring Program Quality Assurance Program Plan](#)
The Surface Water Ambient Monitoring Program Quality Assurance Program Plan (QAPrP) serves as an umbrella document for use by each of SWAMP's contributing projects. It describes the program's quality system in terms of organizational structure; the functional responsibilities of management and staff, the lines of authority; and the interfaces for those planning, implementing, and assessing all activities conducted.

[Quality Assurance Project Plan Guidance](#)

A quality assurance project plan (QAPP) is required for certain large, ongoing, or special projects conducted by the Regional Water Quality Control Boards (Regional Boards) or contractors under SWAMP. To streamline the creation of these documents, SWAMP encourages the use of its own standardized review checklist, QAPP template, and *SWAMP Advisor* Expert System.

[Quality Assurance Report Template](#)

The SWAMP Data Management Team (DMT) and Quality Assurance Team (QAT) have created templates for the *Quality Assurance* section of the SWAMP Regional Report. To ensure consistent presentation and reporting of quality assurance (QA) data, these templates include a narrative and table.

[Data Verification and Validation Systems](#)

SWAMP plans to employ three stages of data review: first-party review in the laboratory or field, second-party review by the SWAMP DMT, and third-party validation on a percentage of data by the SWAMP QAT.

[Systems Assessments](#)

The SWAMP QAT performs periodic onsite and remote quality system assessments of the program's master contract laboratories.

Official SWAMP Website

For comprehensive SWAMP content, visit the SWRCB's [official website](#)

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California Environmental Data Exchange Network
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What Requirements do the Laboratory or Field Crew Need to Meet?

- Sample Handling
 - Preservation
 - Holding time

- Method Requirements

- All QC samples as required by SWAMP and method (whichever is more strict)

- Field crew and lab staff must be knowledgeable in SWAMP QC requirements
 - SOPs if doing bioassessment, etc.
 - MQOs



How Should These Requirements Be Communicated?

- Project Management Responsibility
 - Spoon-feed the information
 - Set a “no surprises” policy
 - Develop timely and open communication: real-time QC

- Kick-off Meetings
 - For SWAMP comparability work, check-in with the SWAMP QA Help Desk prior to kick-off meetings

- Documents (and READ them!)
 - QAPrP
 - QAPP
 - Contract



QA Requirements for Non-SWAMP Parameters

- Methods
- Establish own for project
- SWAMP Help Desks are not set-up to provide assistance for non-SWAMP parameters
- Marine
 - SWRCB Ocean Plan
 - Southern California Bight 2008 Regional Marine Monitoring Survey Quality Assurance Plan
 - National Coastal Assessment Quality Assurance Project Plan 2008-2012. EPA/841-R-09-004




Assessing the Laboratory

- How do I know if the lab is good or bad? Certification?
- Assessing the organizational structure of the laboratory
- Assessing the “QA acumen” of the laboratory
- Assessing if the laboratory will deliver adequate customer service
- Assessing if the laboratory will meet reporting requirements



Assessing the Organizational Structure of the Lab

- Is there a QA Officer and does that position have a direct line to management? No 
- Does the QA Officer have other job duties?
- Is there a lab liaison or Project Manager dedicated to your project?
- Where in the organizational structure is data review performed?




Assessing the “QA acumen” of the Laboratory

- What is the experience of the analysts? Can they supply CVs?
- Are there a QA documents (SOPs, QA Plan)?
- Does the lab provide QC reports along with samples?
- Is the lab already familiar with SWAMP (do they run other SWAMP samples)?
- Does the lab check QC samples in real-time?
- Does the lab participate in PT or intercomparison studies?
- What is the data review process?
- Has the lab been audited?



Assessing if the Laboratory will Deliver Adequate Customer Service

- Is your project assigned one liaison who will manage the work within the lab?
- What are the expected turn around times?
-  Will the lab or field crew contact you immediately when something goes wrong?
 - Real-time QC
 - Communication
 - No surprises
- Do they have the capacity/redundant instrumentation/LIMS?
- Will they be subcontracting any of your work?



Assessing if the Laboratory will Meet Reporting Requirements

- Do they have a LIMS?
- Where are you reporting your data to?
- Will the lab take time to get trained in reporting formats?
- Who will do the reporting? Designated staff? PM, QAO, etc.
- Does your project need data reported within a given time frame?



Methods for Assuring Compliance with QA Requirements

- Contracts
- SWAMP QA Program resources



Contracts

- Specifying Quality Control requirements directly in the contract language is beneficial in two ways
 - Improves communication between project management and contractors
 - Prompts the project management and contractors to clarify important project details

- Contractual Requirements
 - MQOs
 - Holding Times
 - Methods (when appropriate – no SWAMP parameter)
 - Communication
 - Reporting Limits
 - Reporting Formats & Timelines
 - Subcontracting work



SWAMP QA Program Resources

- SWAMP 2008 QA Program Plan
- SWAMP QA Help Desk
- SWAMP QAPP Template
- SWAMP Advisor (software that helps you write a QAPP)
- SWAMP Web Site (Google search: SWAMP QA Help)
 - <http://swamp.mpsl.mlml.calstate.edu/>
 - http://www.swrcb.ca.gov/water_issues/programs/swamp/tools.shtml



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How to work through problems with lab

- Assess the problem
 - Did they alert you regarding the issue as soon as possible, or did you find out long after when you received your results?
 - Is the source of the problem an honest accident (e.g., broken bottle), or a blatant oversight (e.g., neglecting to run the requested QC)?
- Discuss issue with your lab representative
 - Good labs will own up to problems with data
 - Corrective action will depend on nature of problem and the impact on data
 - Opportunity to discuss how to avoid such problems in future
 - Should you be talking with the staff that performs actual work?
- Remember, you are the client
 - Business/client relationship
 - Does your contract allow withholding payment?



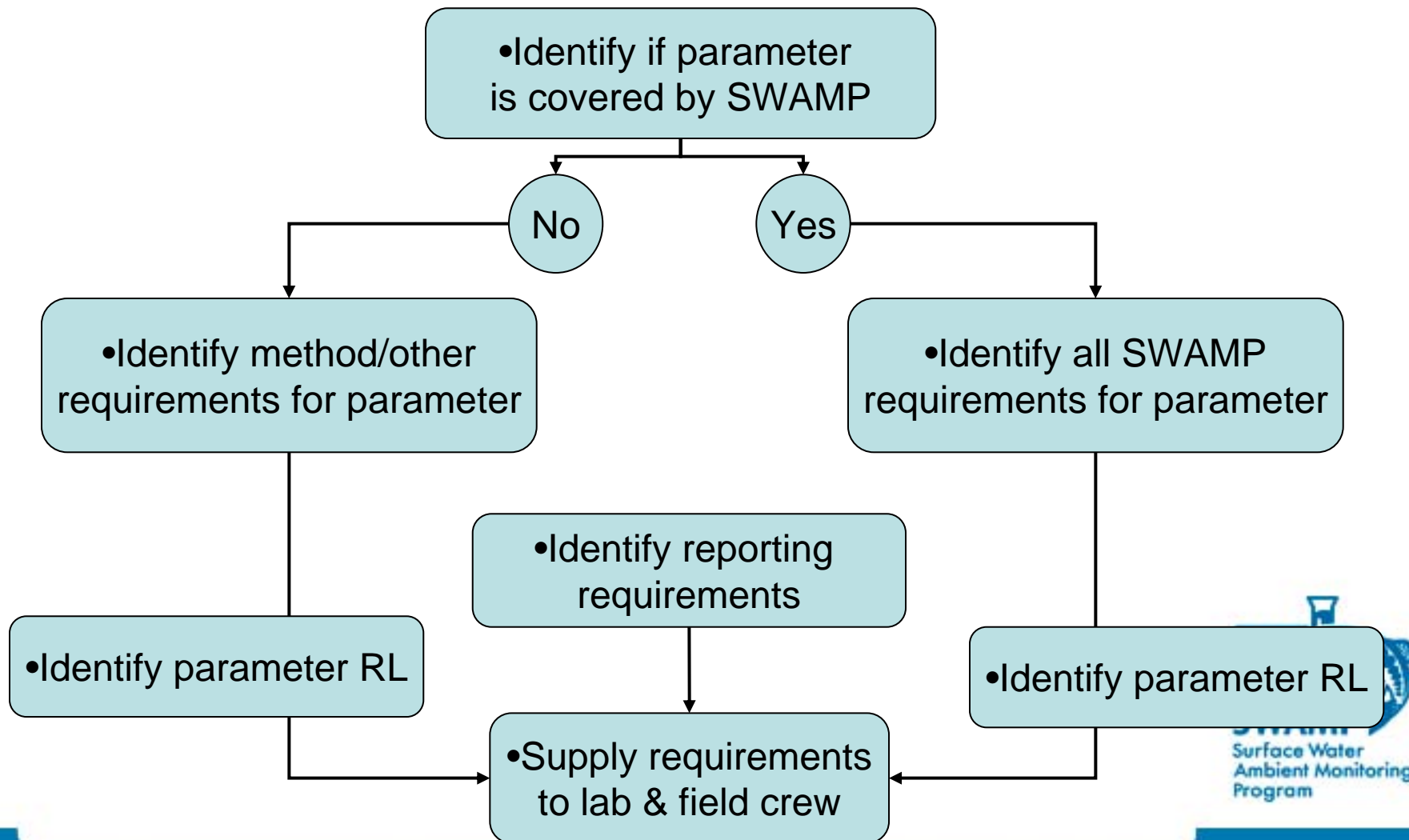
Example Program-Practical Application Exercise

- Project determined with parameter list, study design, reporting limits, and data submission formats
- Know you want to be SWAMP-comparable
- You do not have a QAPP yet (and you may not need one)
- Parameters:
 - Caffeine in freshwater
 - Orthophosphate (Total, as P) in freshwater
 - Zinc (Total and Dissolved) in freshwater



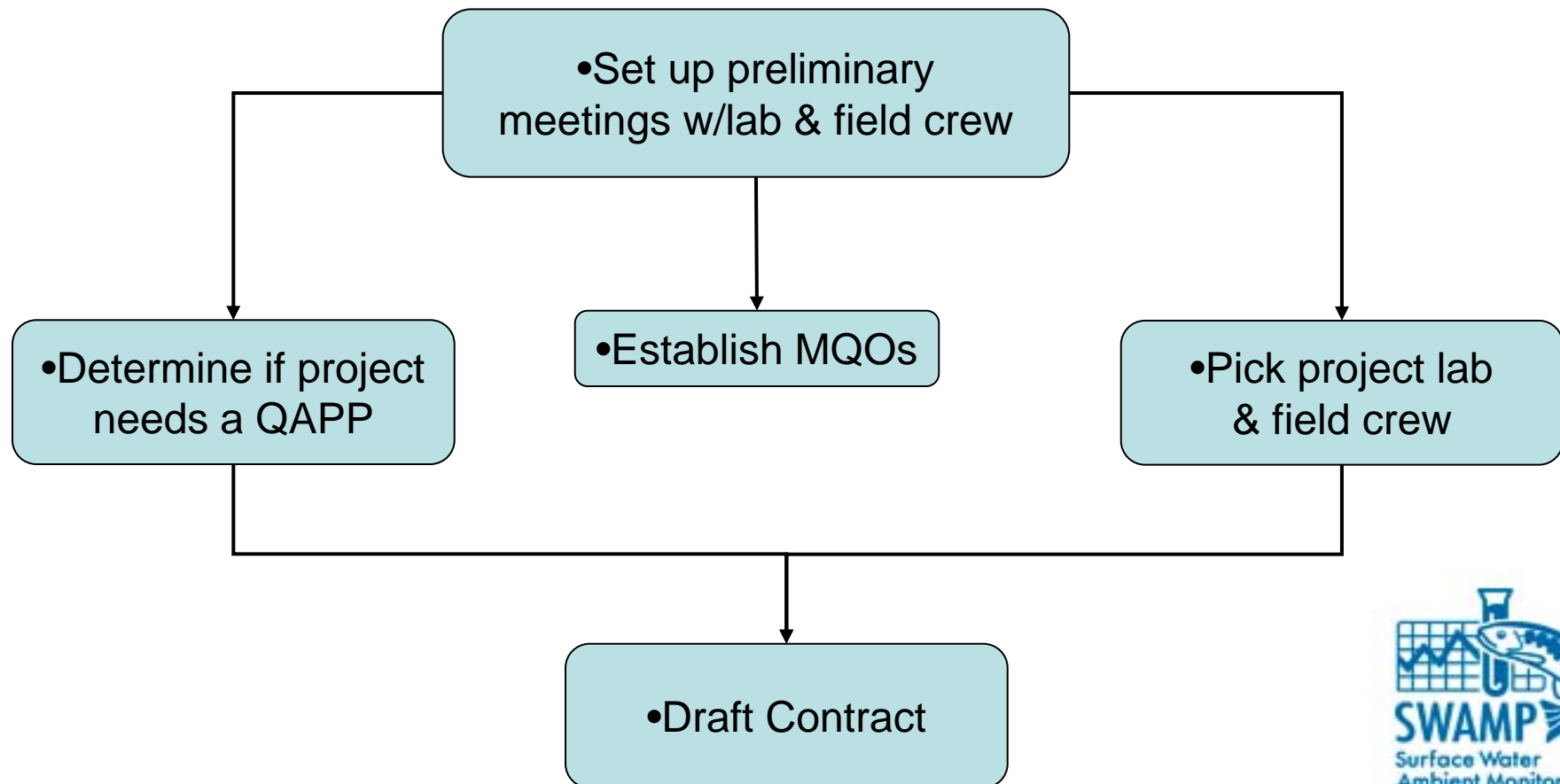
Step-by-step Process

Part 1 Identify Requirements



Step-by-step Process

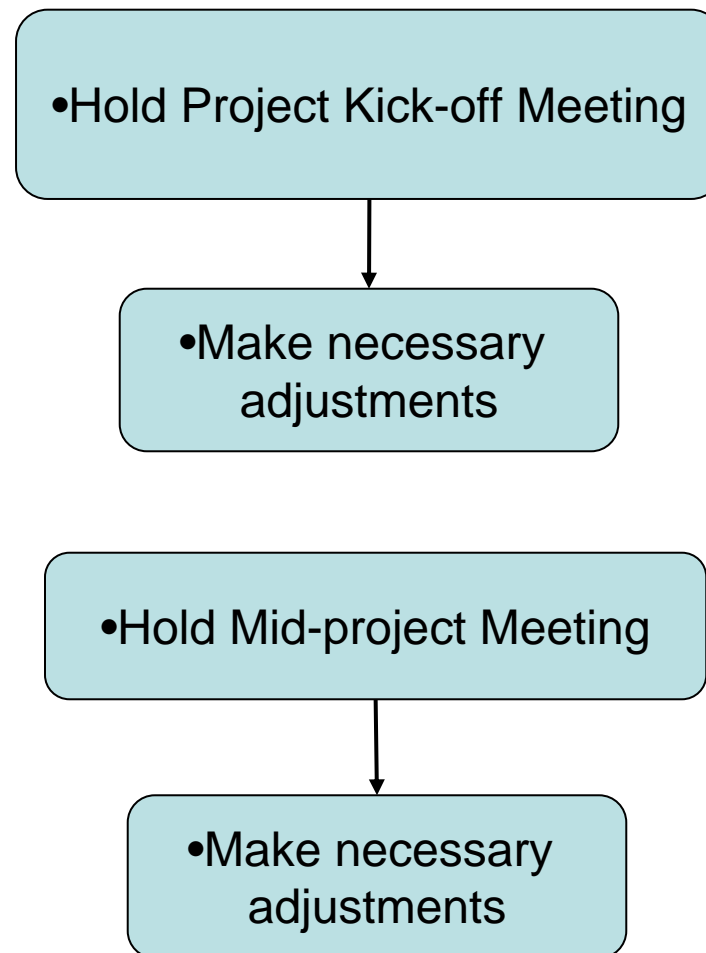
Part 2 Discuss Requirements & Establish MQOs



Step-by-step Process

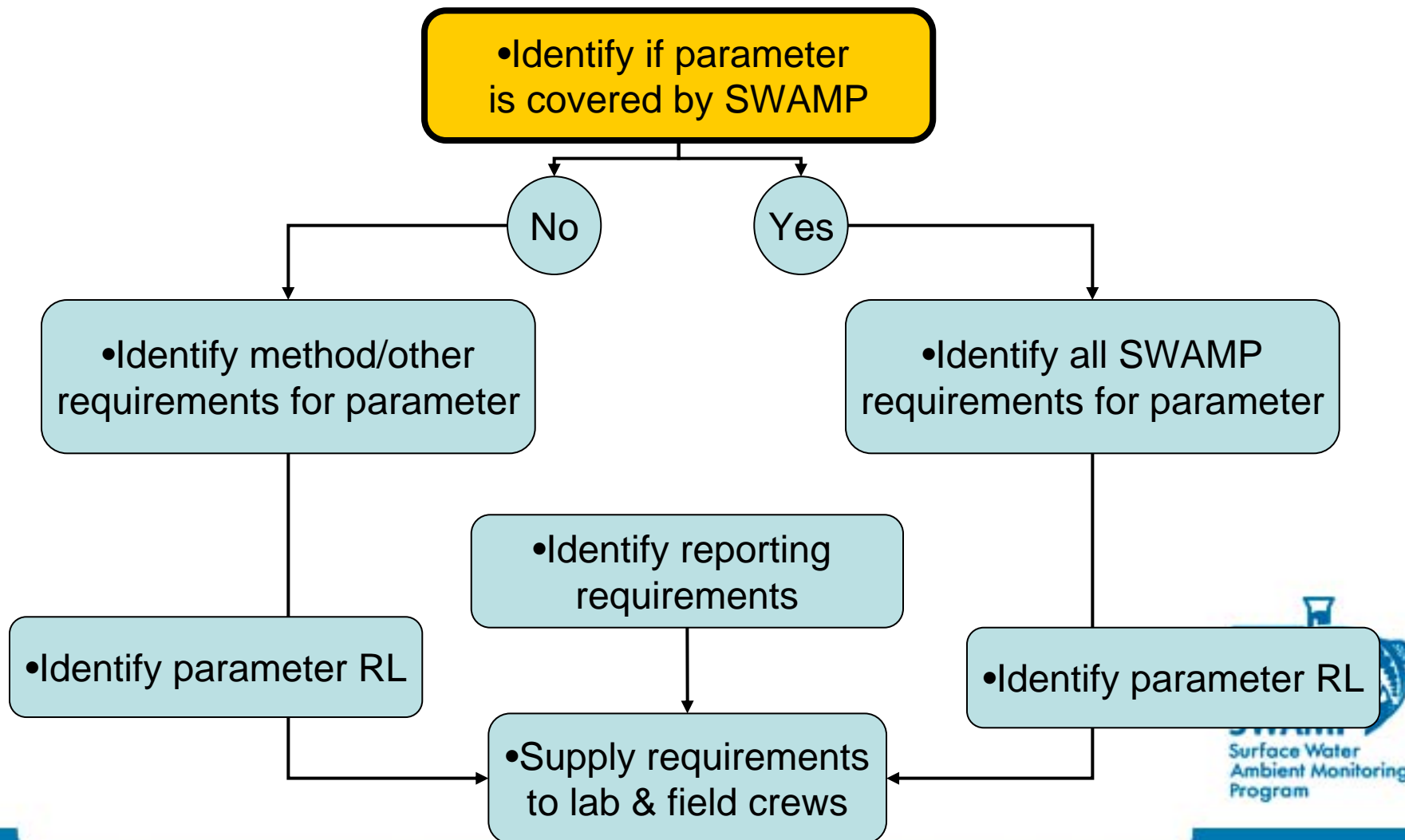
Part 3 Use Three Keys to Success

- Real-time QC
- Communication
- No surprises



Step-by-step Process

Part 1 Identify Requirements



How do I know if the parameter is covered by SWAMP?

- Look in SWAMP parameter (analyte/matrix) lists in appendices of SWAMP 2008 QAPrP
- Contact SWAMP QA Help Desk



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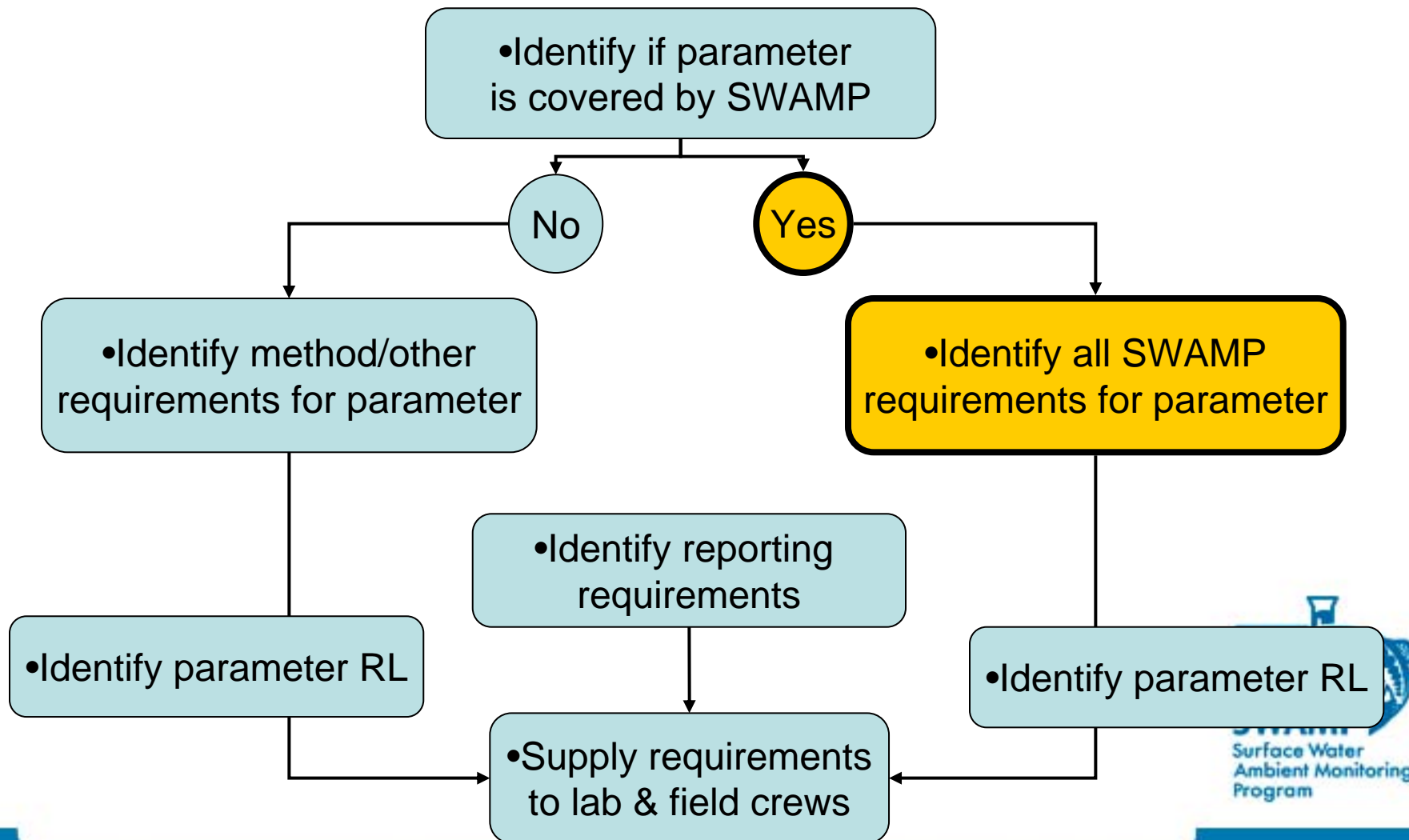
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Step-by-step Process

Part 1 Identify Requirements



Measurement Quality Objectives: SWAMP Examples

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QA Program Plan Appendix A: Measurement Quality Objectives (Page 59)



Holding Times: SWAMP Examples

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Sodium	mg/L	Polyethylene Bottles Glass or plastic filtering apparatus are recommended to avoid possible contamination.	600 mL	Acidify with (1+1) HNO ₃ to pH <2.	6 months
Turbidity	NTU	Polyethylene Bottles	300 mL	Cool to 6 °C and store in the dark	48 hours

QA Program Plan Appendix B: Sample Handling (Page 92)



Identify the SWAMP Requirements

- Sample Handling
 - Preservation
 - Holding times
- MQOs
 - Go to table for Conventionals
 - Go to table Inorganics
- Contact SWAMP QA Help Desk
- Read the additional info. in introduction of Appendix A and in Section B5 of the QAPrP
- Don't forget to also identify any method requirements that are more strict than SWAMP

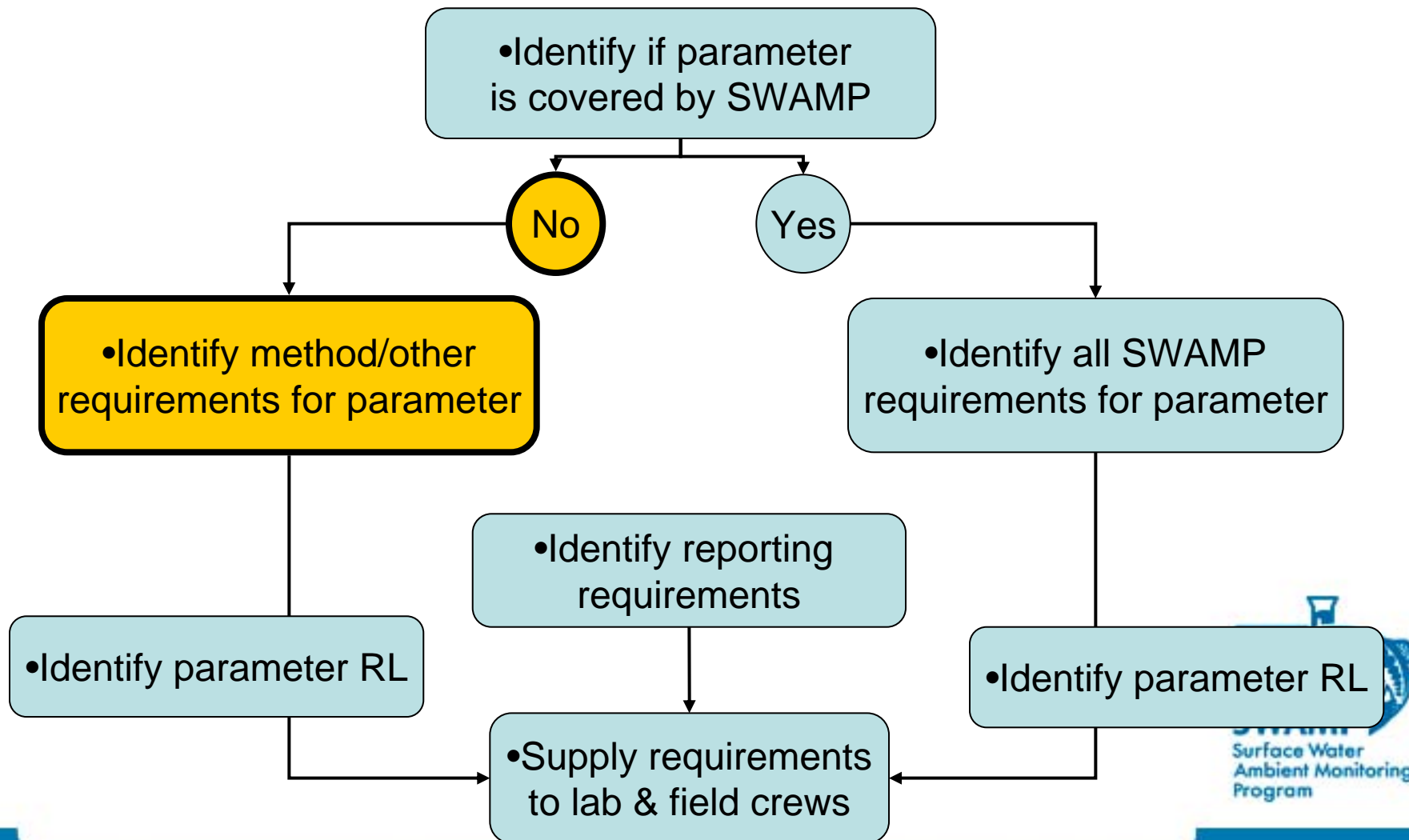
Orthophosphate (total as P) in water
Appendices A-1 & B-1

Zinc (total and dissolved) in water
Appendices A-5 & B-6



Step-by-step Process

Part 1 Identify Requirements



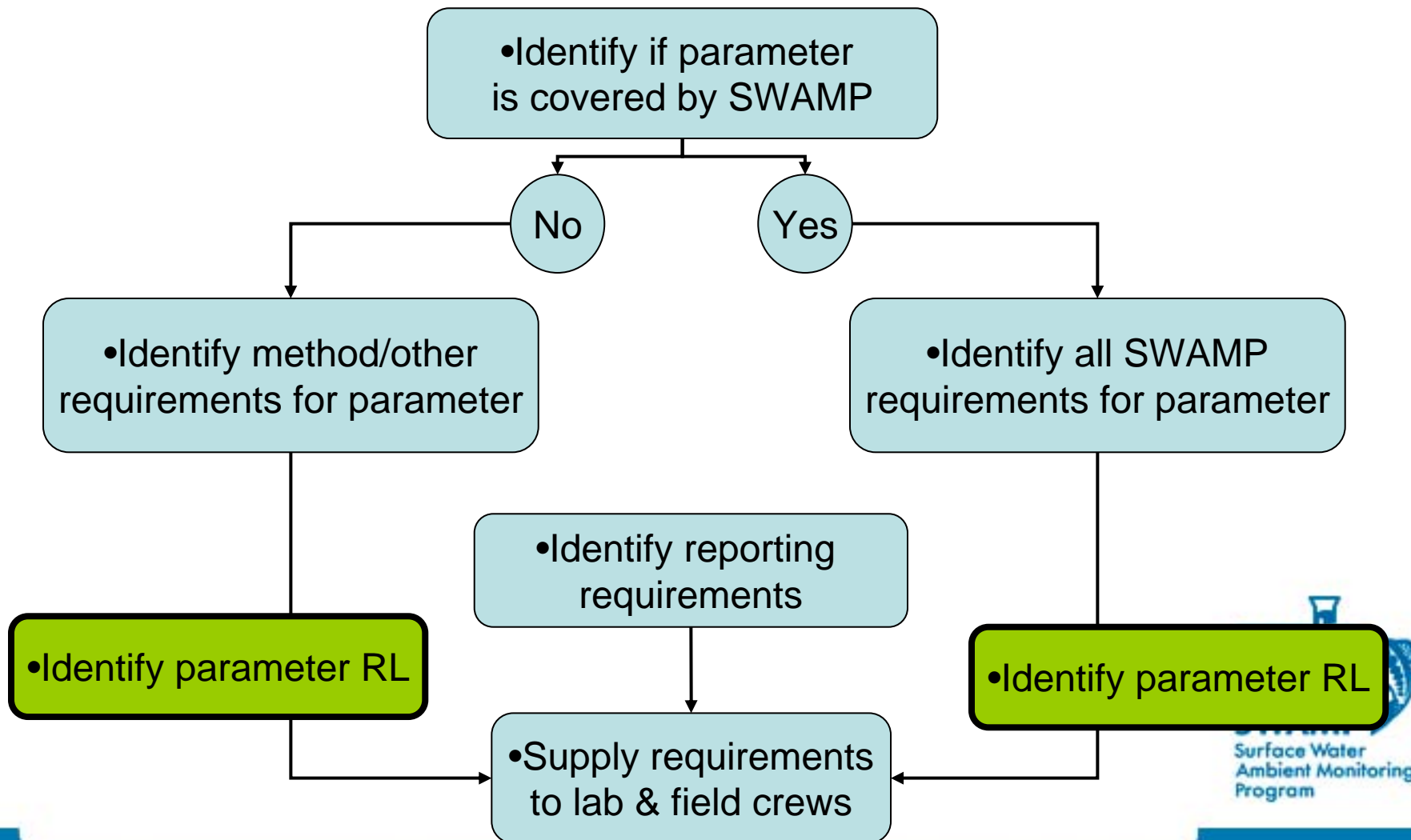
Identify Method Requirements for Non-SWAMP parameters

- Methods
- Establish own for project
- Caffeine in water is not covered by SWAMP
- Consult with lab
- What have other organizations done



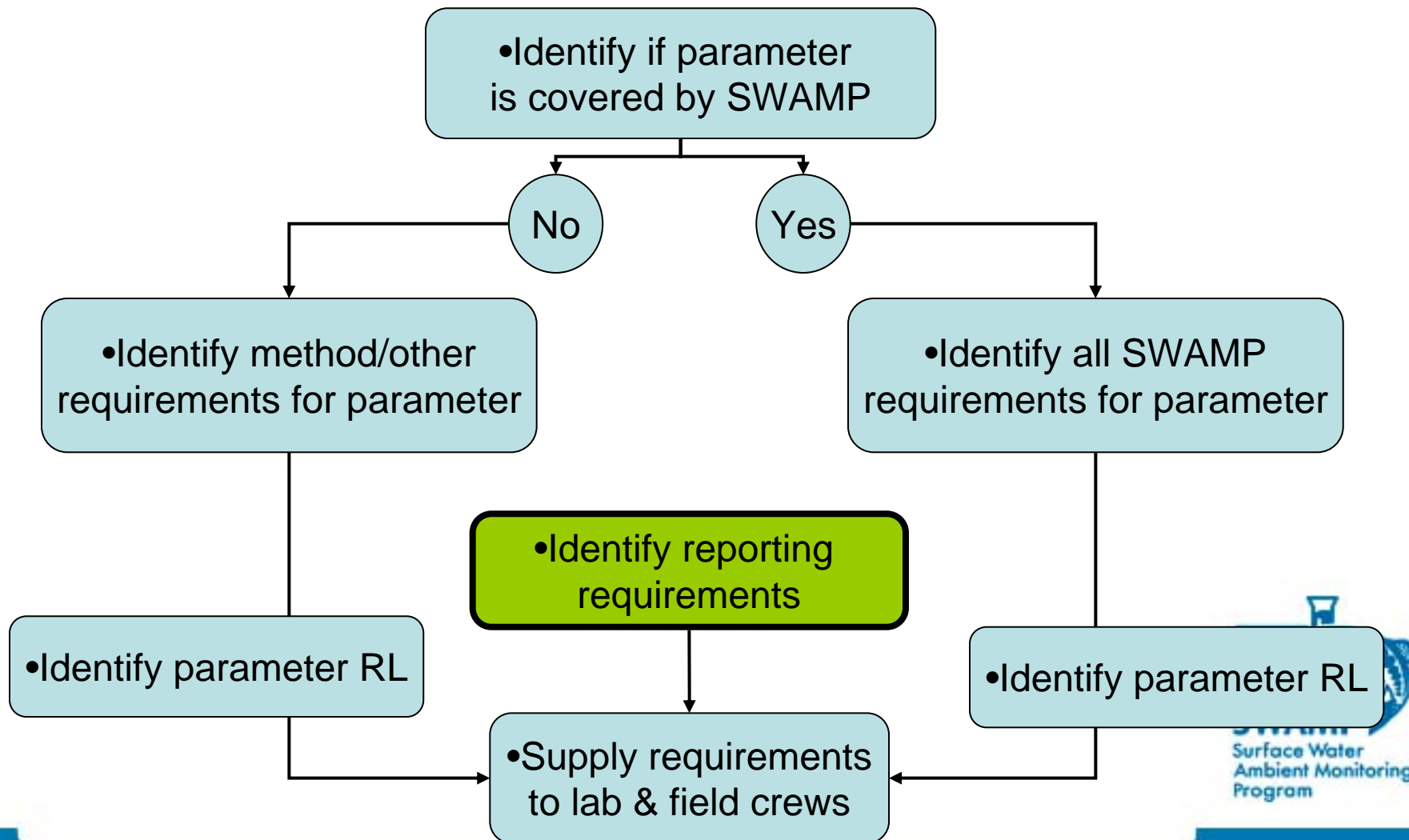
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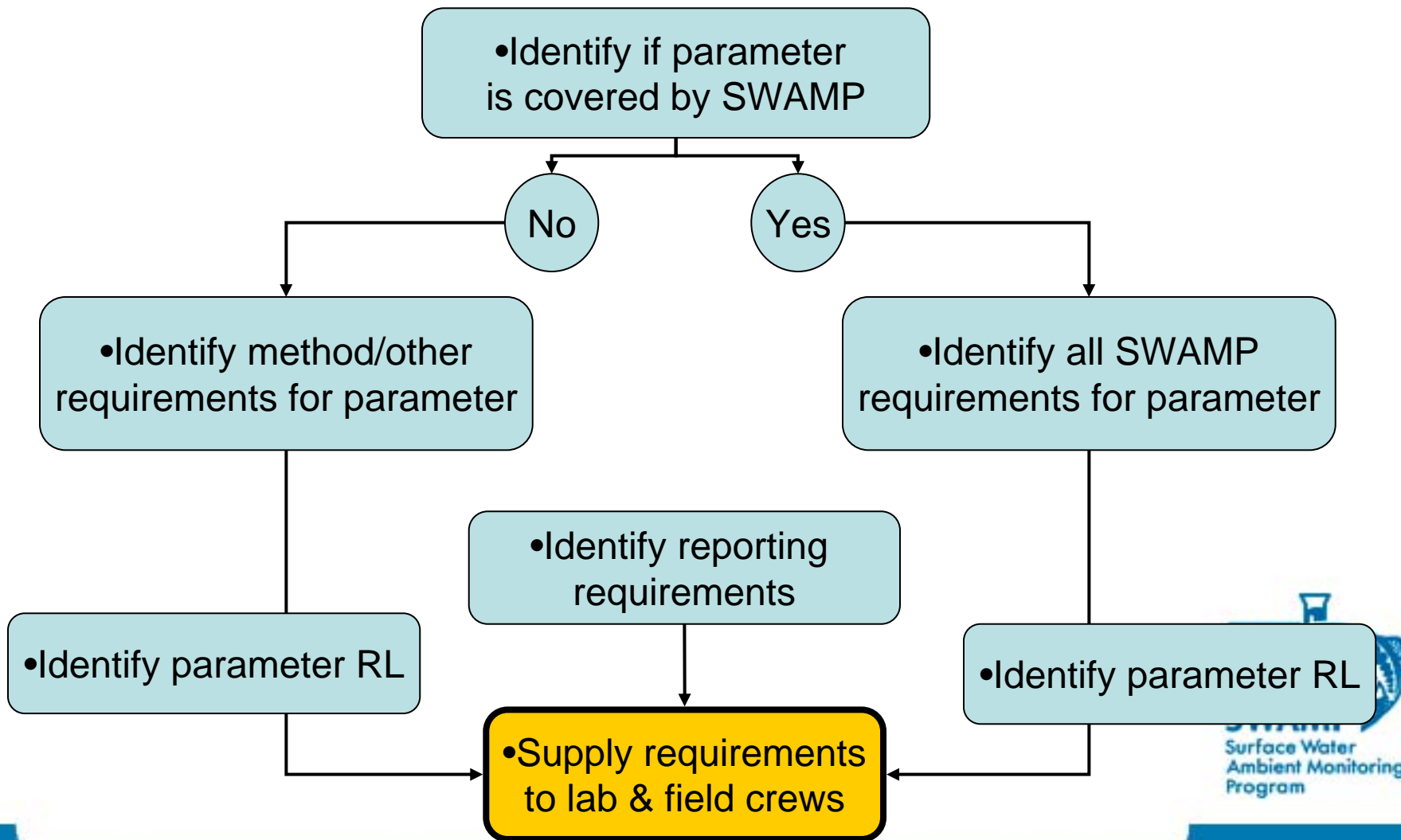
Step-by-step Process

Part 1 Identify Requirements



Step-by-step Process

Part 1 Identify Requirements



Supply Parameter List to Lab

- List of analyte/matrix combinations to lab along with QC requirements

-  Lab should be able to supply you with list of methods or SOPs and any modifications (in writing)

-  Lab should supply you with their MDLs and RLs

- Lab should then identify if they will comply with all the project or SWAMP QC requirements
 - Does your project allow batch QC? Probably necessary if you have a small project.

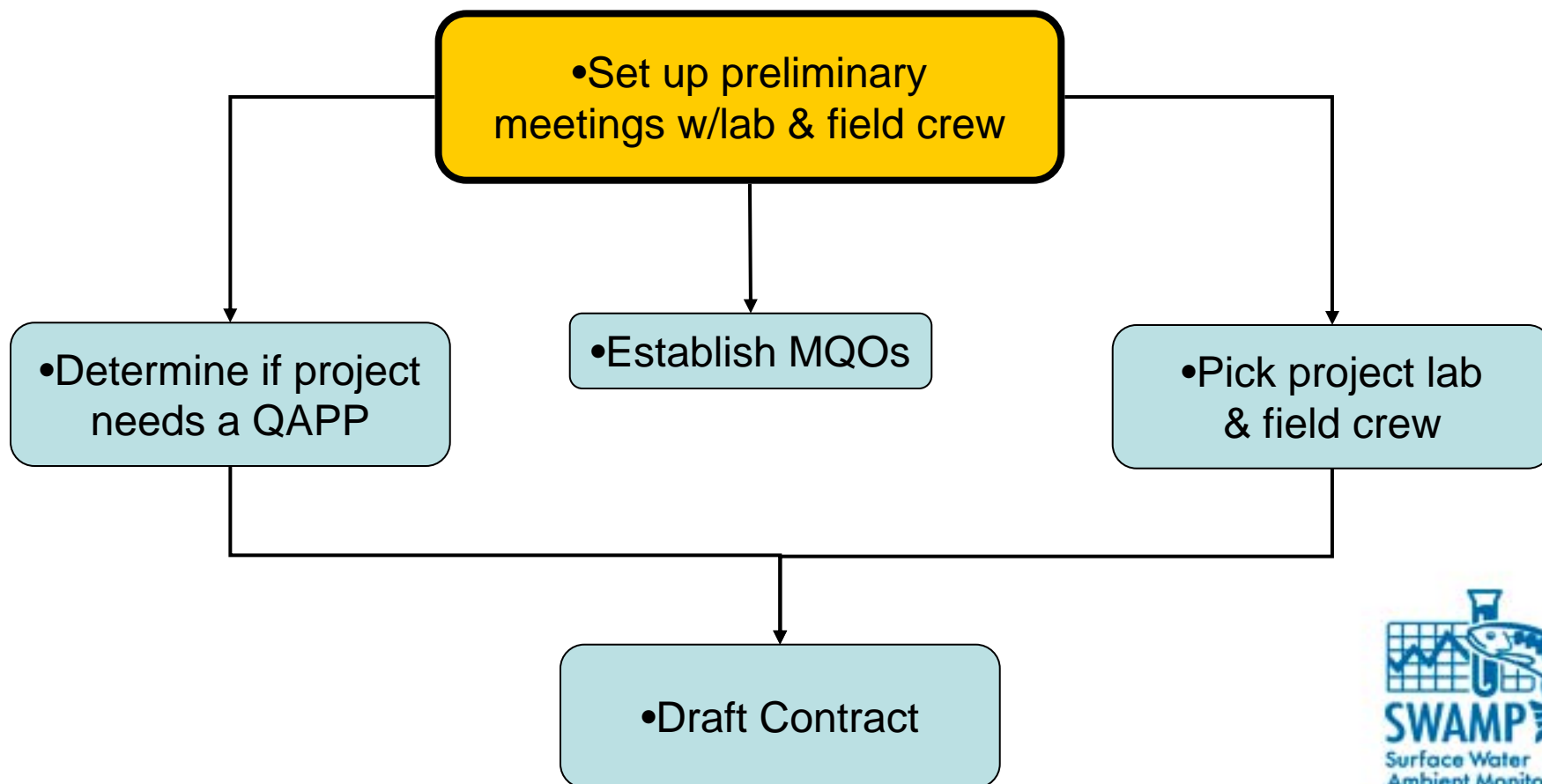


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Step-by-step Process

Part 2 Discuss Requirements & Establish MQOs

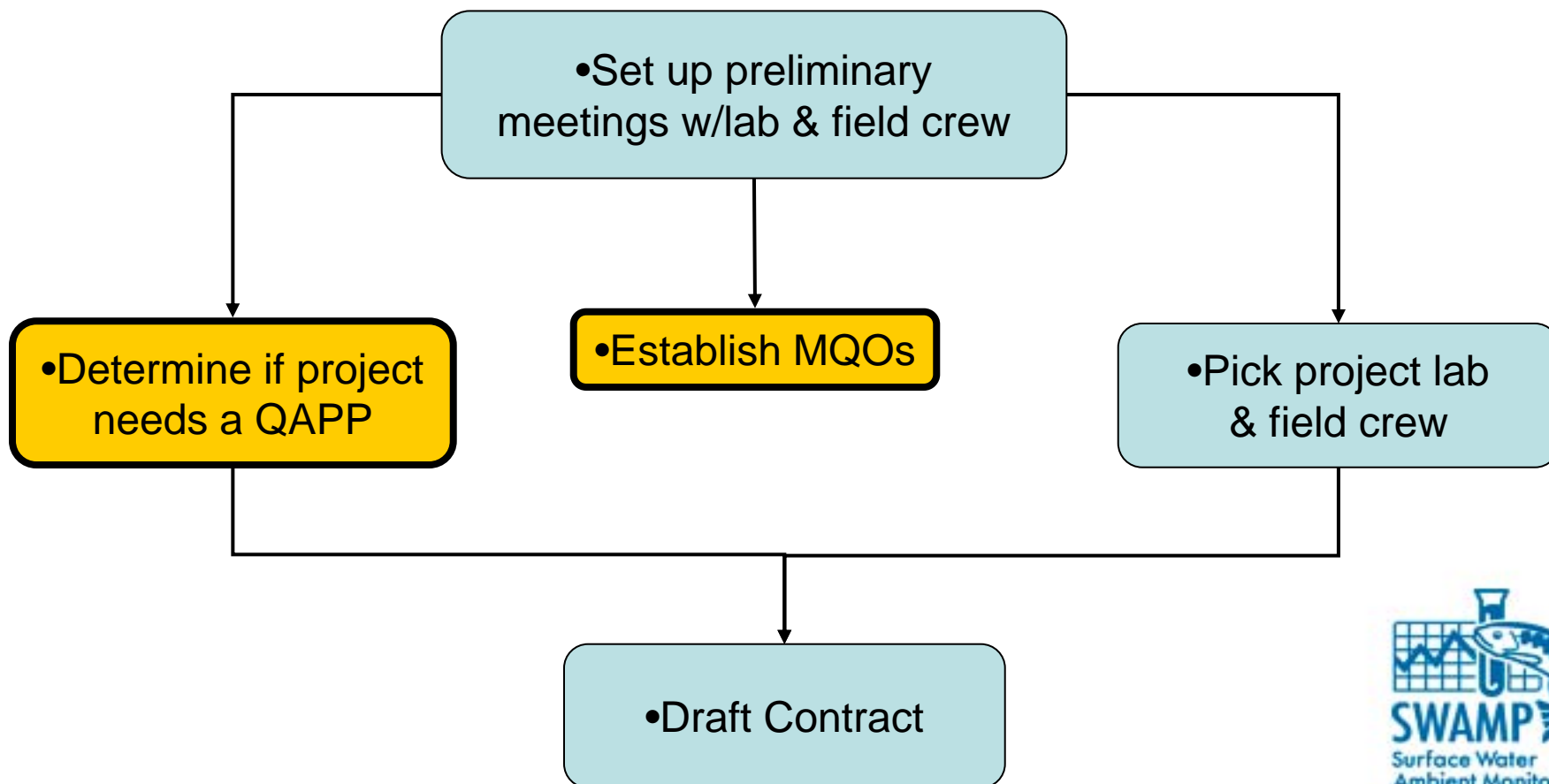


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Step-by-step Process

Part 2 Discuss Requirements & Establish MQOs



Determine if your project needs a QAPP

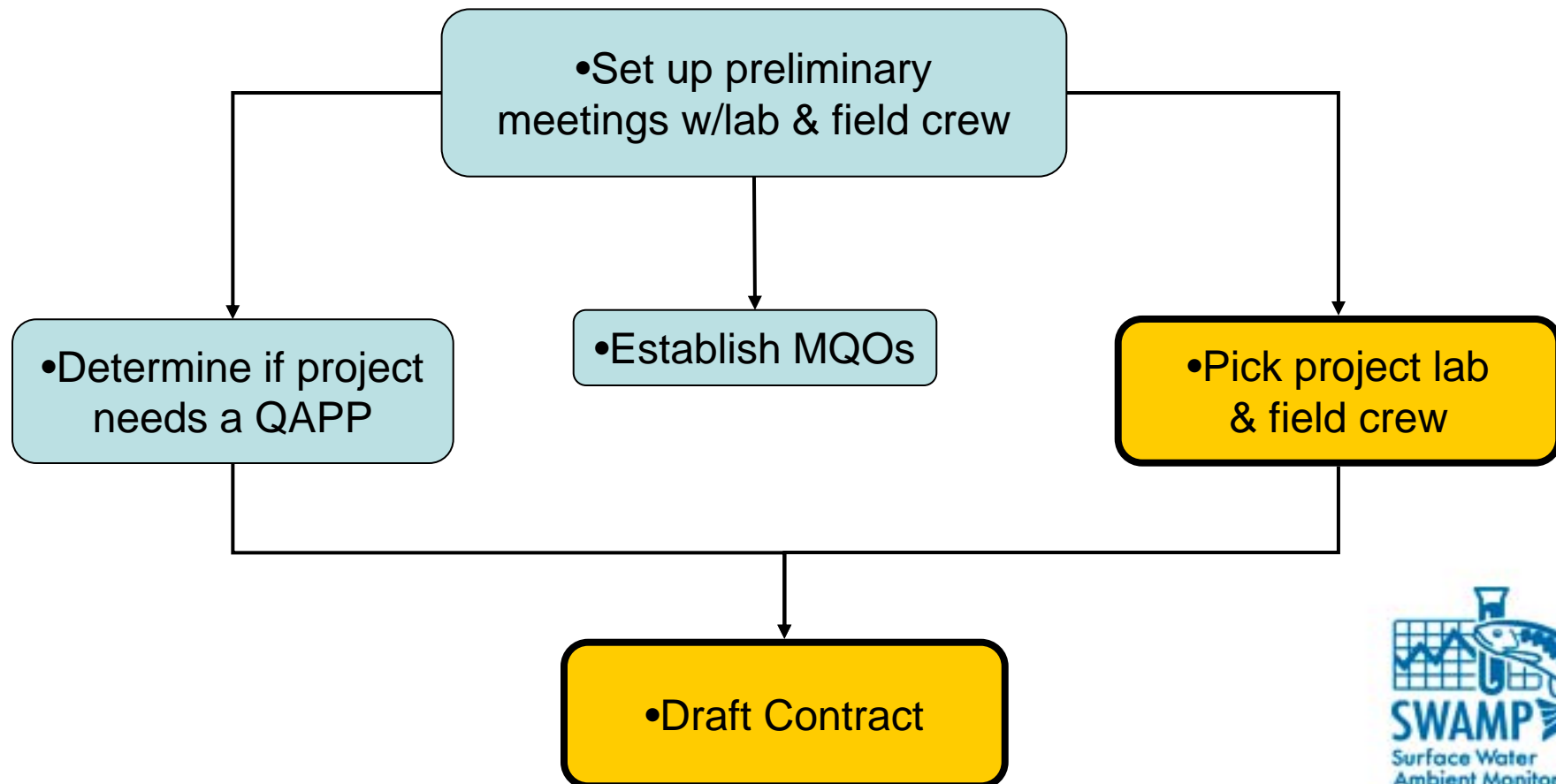
- Excellent tool for communication
- Scale of project
- Contractual requirement
- Parameters outside SWAMP
- Studies that do not rely on established methods
- Litigation potential

In our example we are not writing a QA Project Plan; all of our work is routine (established methods, mainly SWAMP parameters). We will have a short document that details the study design with references to the SWAMP QAPrP and relevant methods (e.g., caffeine 525.1).



Step-by-step Process

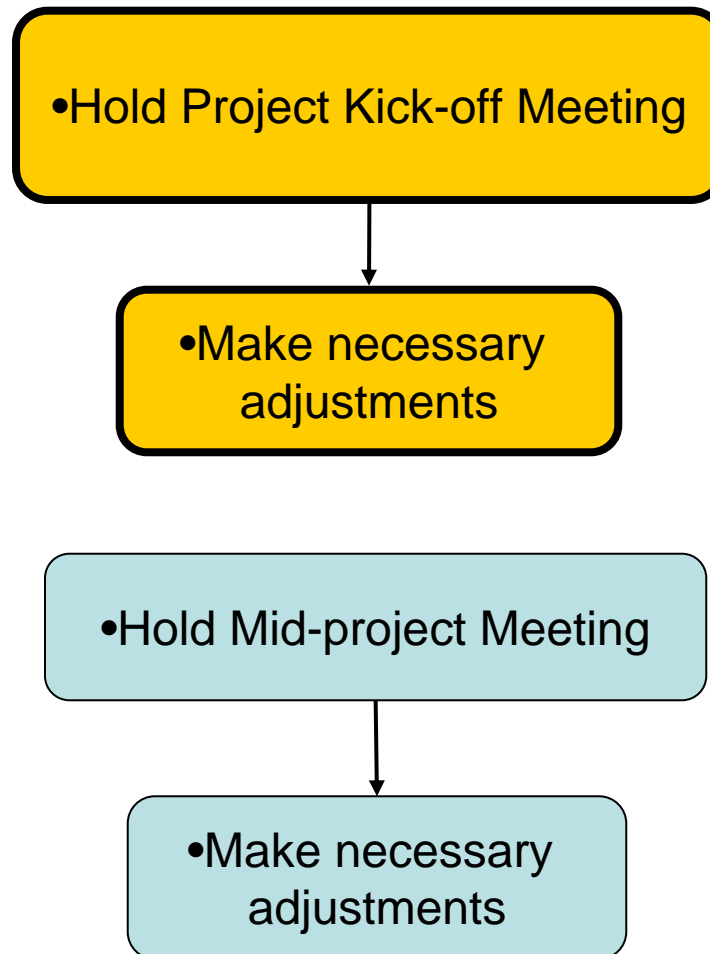
Part 2 Discuss Requirements & Establish MQOs



Step-by-step Process

Part 3 Use Three Keys to Success

- Real-time QC
- Communication
- No surprises



Hold Project Kick-off Meeting

- Responsibility of PM to call meeting
- Responsibility of all parties to attend
- All participants
 - Project Manager
 - Field Crew
 - Lab Crew
 - QA Officer
 - Other (e.g., database personnel)
- Agenda
 - Communication, Real-time QC, No Surprises Policy
 - Roles and Responsibilities – all listed above and review communication/real-time QC
 - Potential Project Issues
 - SWAMP QAPrP or Project-Specific QAPP
 - Standard Operating Procedures
 - Meeting Follow-up...



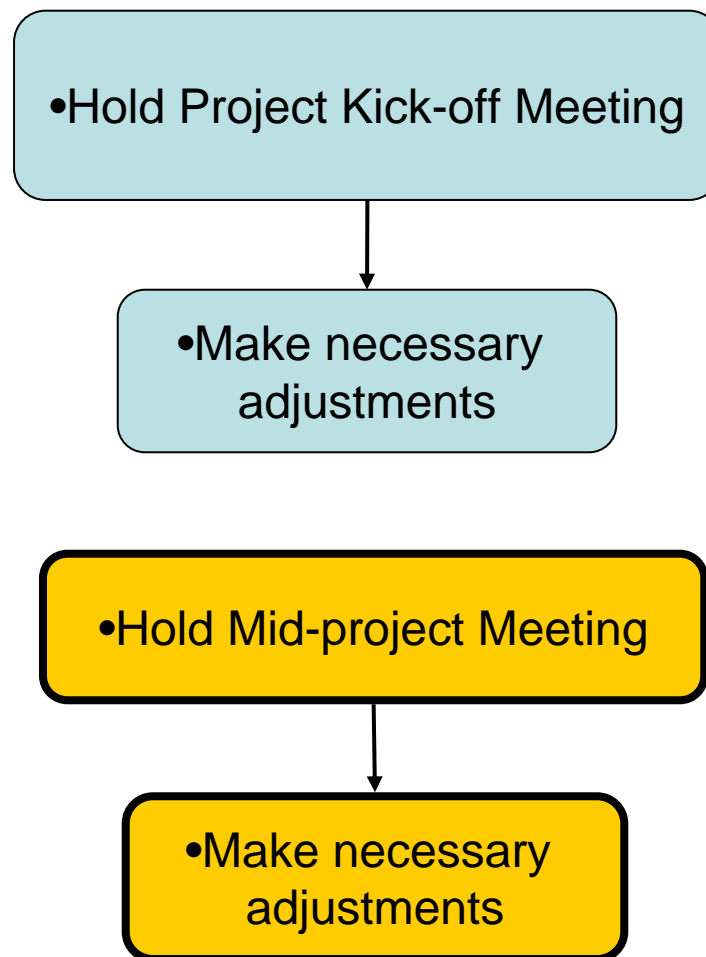
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Step-by-step Process

Part 3 Use Three Keys to Success

- Real-time QC
- Communication
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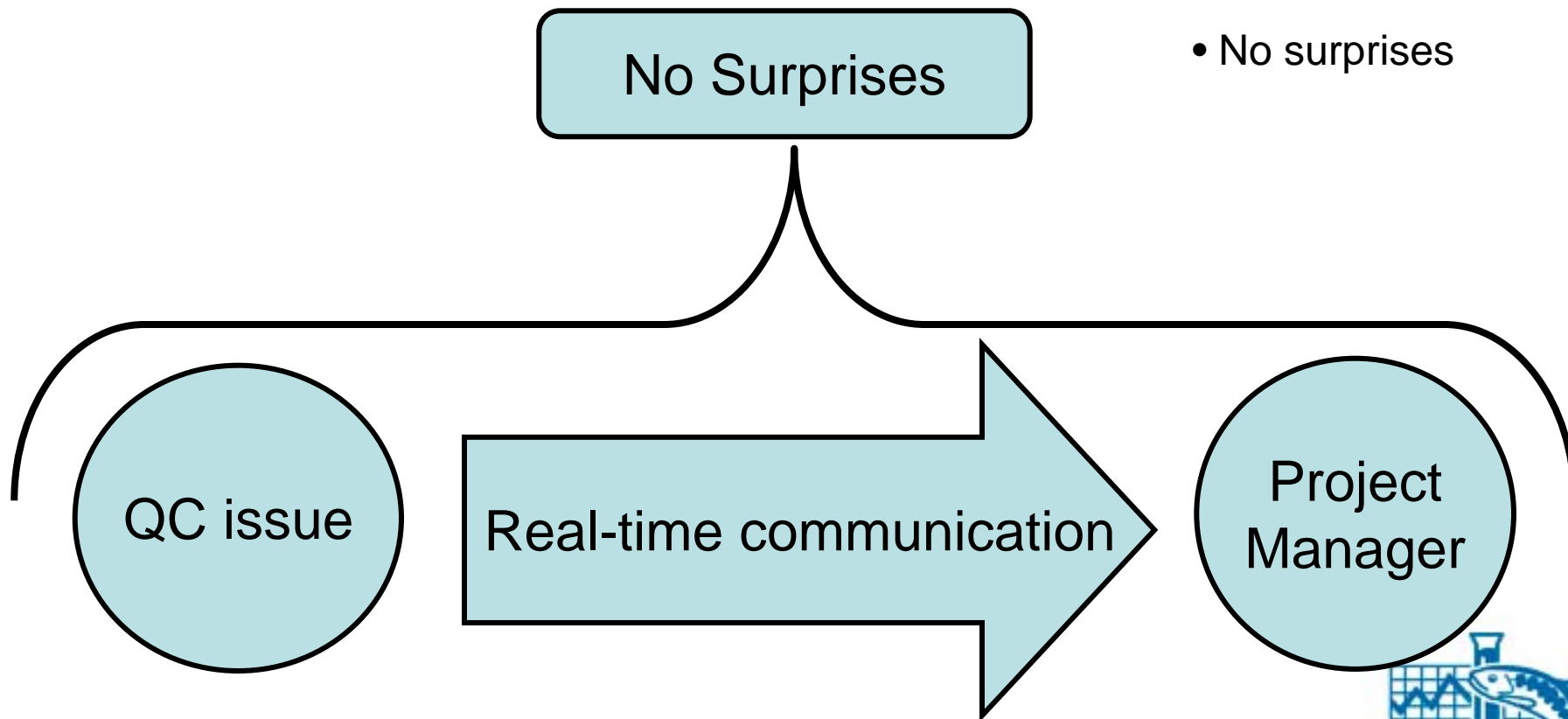
Mid-Project Meeting

- Responsibility of Project Manager to call meeting
- Responsibility of all participants to attend
- All participants
 - Project Manager
 - Field Crew
 - Lab Crew
 - QA Officer
 - Other (e.g., database personnel)
- Agenda
 - Review what is working and what is not working
 - What have been the QC issues and how were they resolved
 - Where do we go from here?



Three Keys to Success

- Real-time QC
- Communication
- No surprises



Outcome

- How to identify relevant SWAMP QA requirements
 - Look in SWAMP 2008 QAPrP
 - Call SWAMP QA Help Desk
- Which QA requirements need to be communicated to the contractor
 - Everything!
- Methods for ensuring the requirements are understood and followed
 - Contracts
 - Meetings
 - QA Documents
- How to work with a laboratory over the duration of a project
 - Do your homework in choosing lab, expect excellent customer service
 - Set up a “no surprises” work policy
- How to work through problems with a laboratory
 - Communication
 - If projected planned properly, issues should be seen as opportunities to enhance project



The QA Research Group at Moss Landing Marine Laboratories

Specializing in the Quality Assurance associated with all areas of environmental science such as in-stream flow, bioassessment, P-Hab, chemistry (including ultra-trace and speciation), toxicity testing, statistical analysis, field measurements, and database structures. If you would like to contract with the QA Research Group, please contact Beverly H. van Buuren.



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