

Environmental Monitoring Program Design

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PLANNING

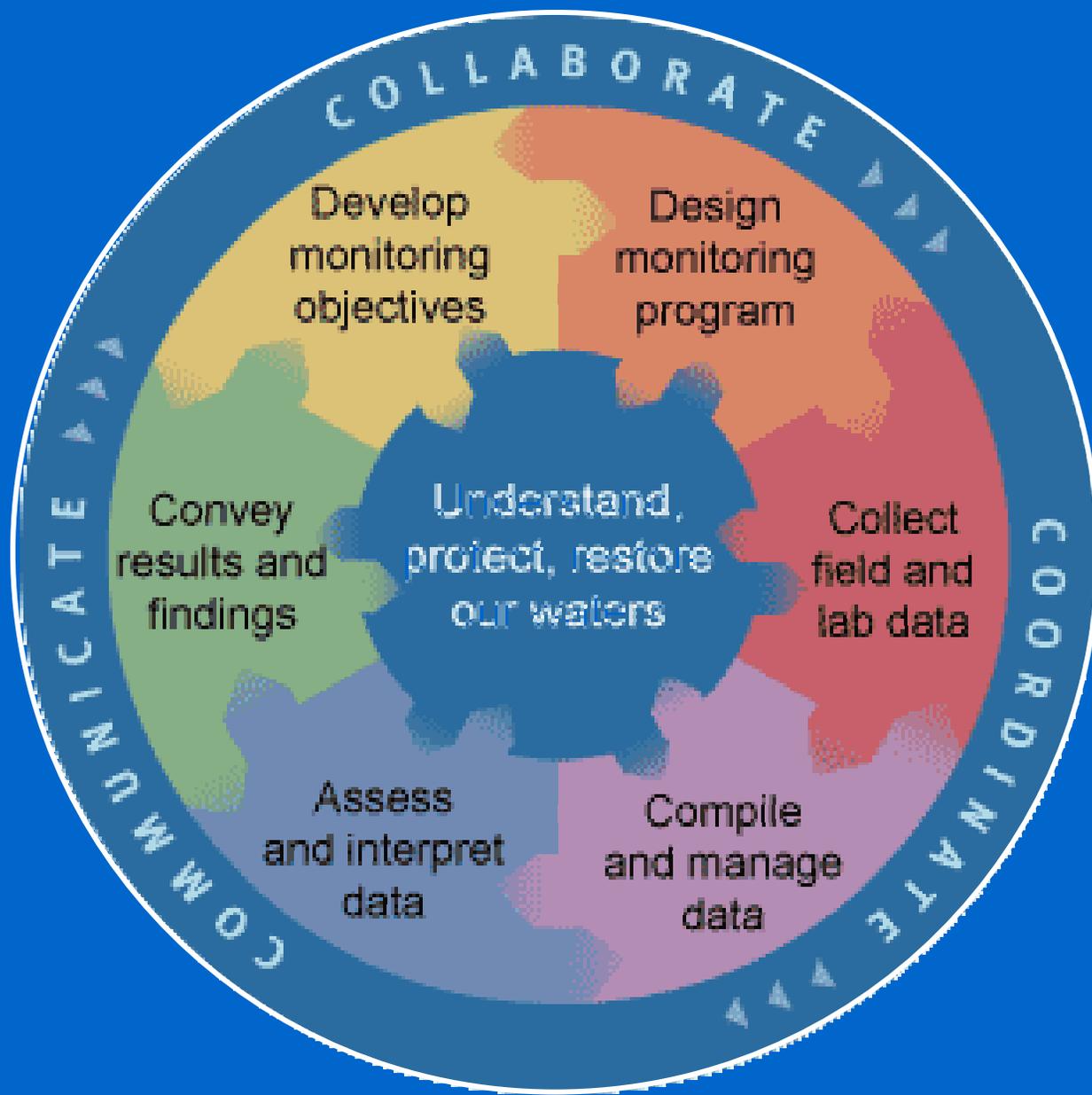


PAEP

*Environmental
Monitoring Plan*

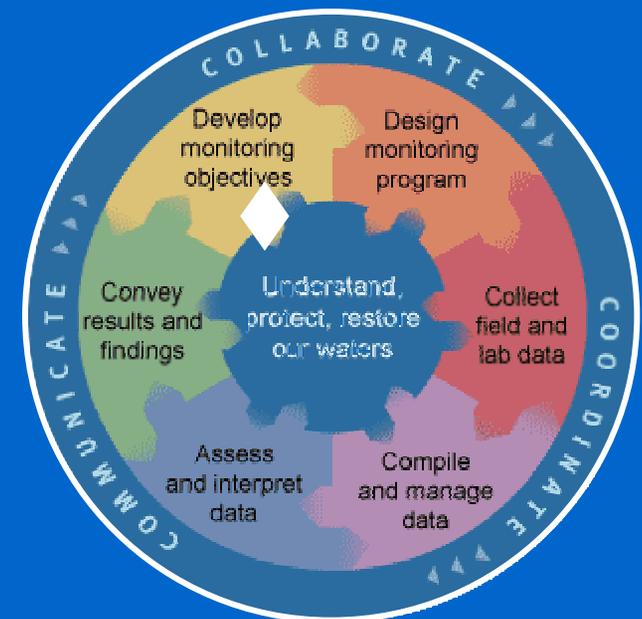
QAPP





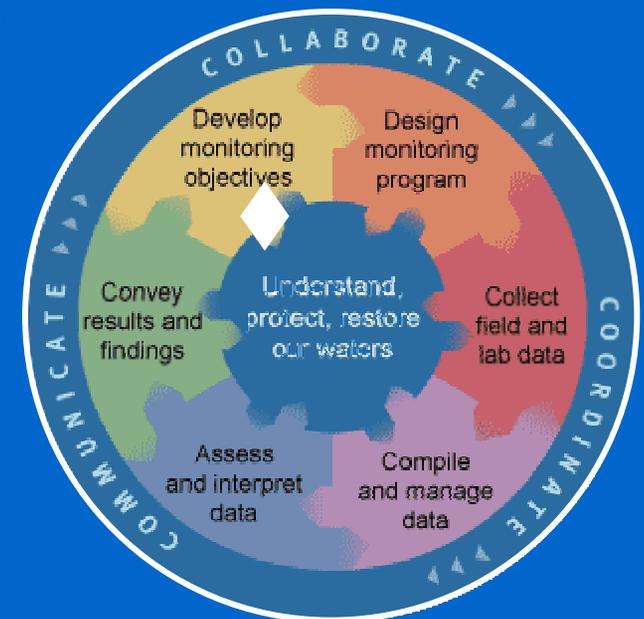
Develop Monitoring Objectives

- ◆ Problem description
- ◆ Watershed description
- ◆ Summary of existing information
- ◆ Summary of ongoing monitoring



Monitoring Objectives - Examples

- ◆ Characterize waters – Identify changes
- ◆ Identify specific water quality problems
- ◆ Gather information to design pollution prevention or remediation programs
- ◆ Determine whether program goals are being met



Monitoring Objectives - Questions

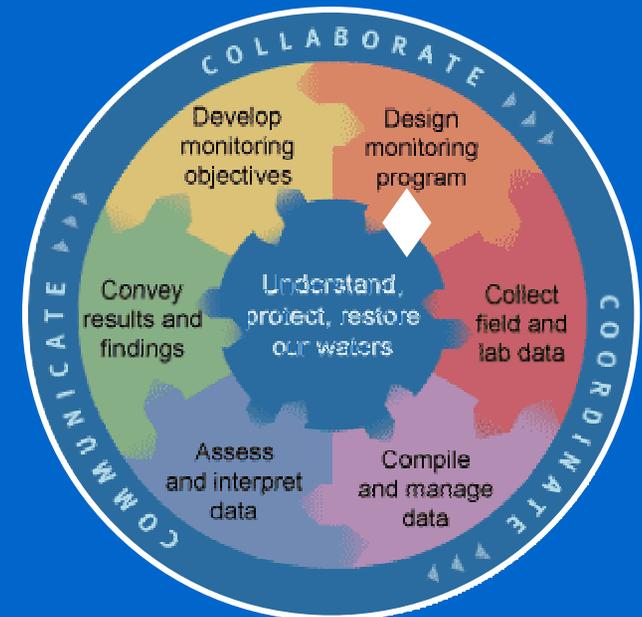
- ◆ Did the project reduce nutrient loads to the downstream river?
- ◆ Did the project reduce streambed sedimentation?
- ◆ What are the baseline water quality conditions in the watershed?

Potential Data Uses & Users

Citizens	Program support, stewardship building
Legislators	Policy development, progress evaluation
Regulators	Evaluate compliance, program efficacy, assessment
Resource Mgrs	Policy development, progress evaluation
Local Government	Planning, program implementation
Environmental Groups	Evaluate programs & policies, ID issues
Scientists	Improve understanding

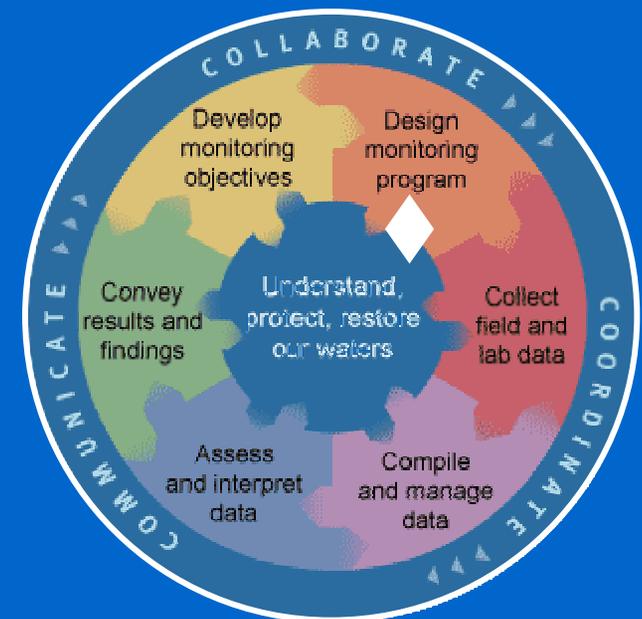
Design Monitoring Program

- ◆ Where will monitoring occur?
- ◆ What parameters or conditions will be measured?
- ◆ How will the parameters be measured?
- ◆ When will the monitoring occur?
- ◆ How will samples be collected?



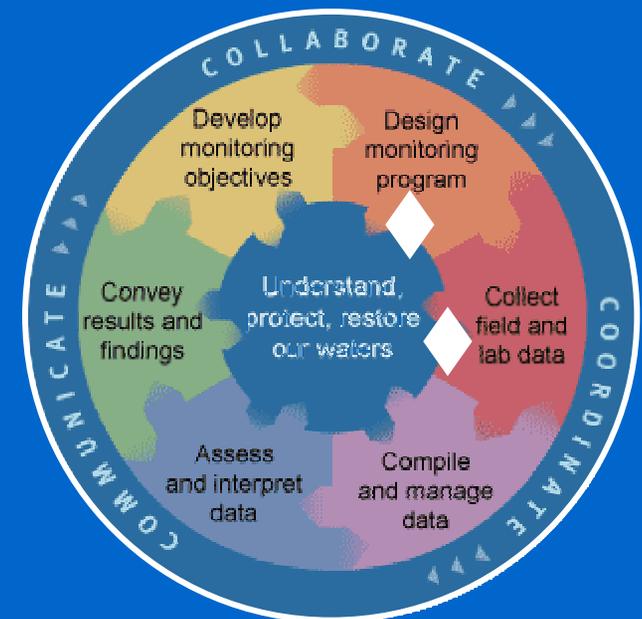
Site Selection

- ◆ Census
- ◆ Probabilistic site selection
- ◆ Targeted site selection

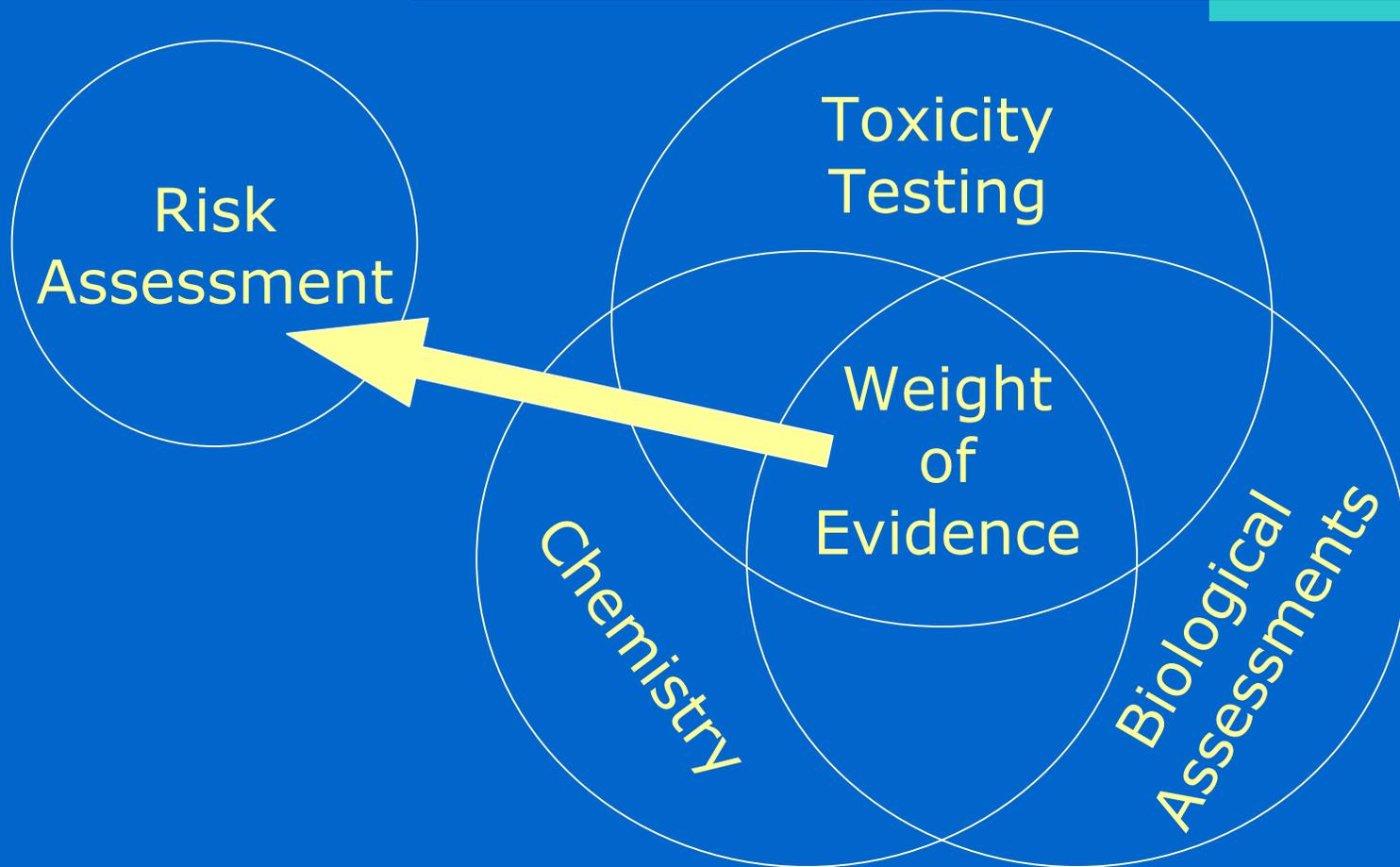


Indicators

“...A measurable feature that provides managerially and scientifically useful evidence of environmental and ecosystem quality or reliable evidence of trends in quality.”

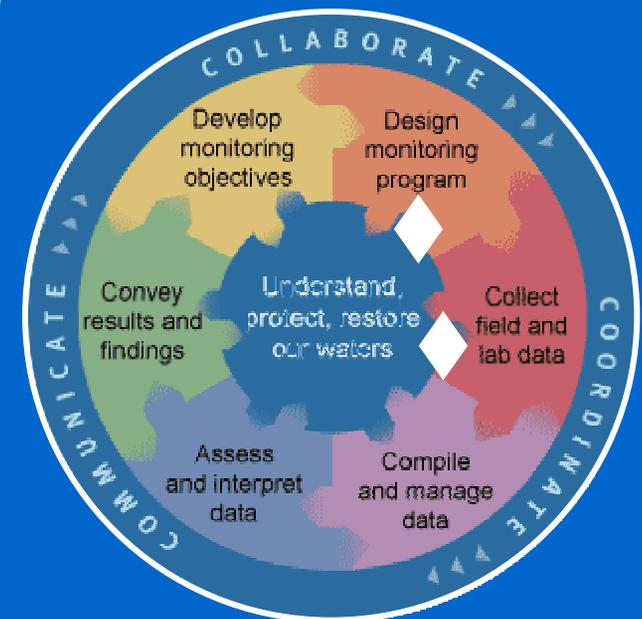


Approaches to Water Quality Assessment



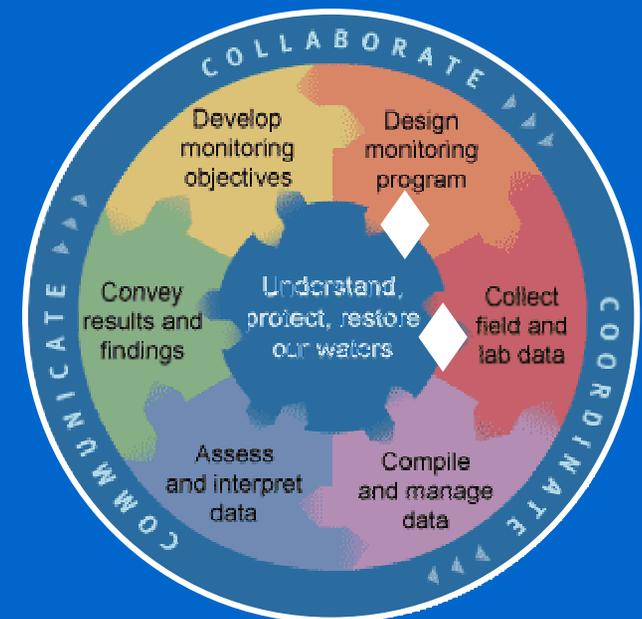
Indicator Selection

- ◆ Scientific validity
- ◆ Practicality
- ◆ Programmatic considerations



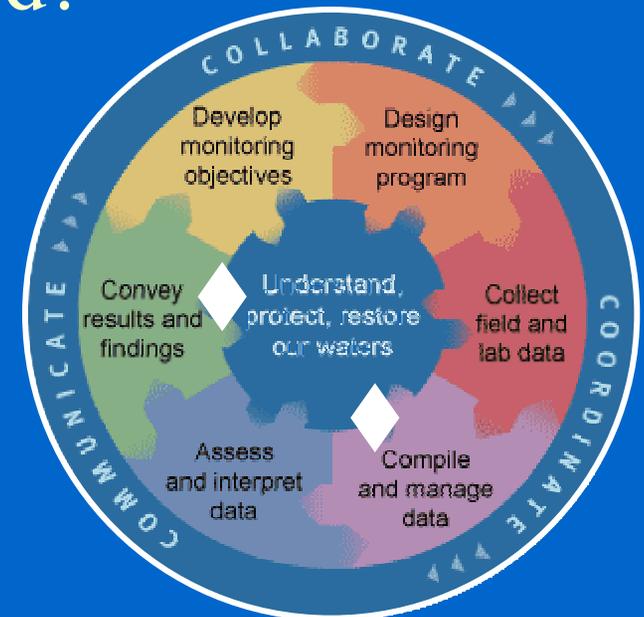
Quality Assurance

- ◆ Quality assurance/Quality control (QA/QC)
- ◆ Quality assurance project plan (QAPP)
 - Methods
 - *Data Quality Objectives*
 - Performance Audits
 - Corrective Action
 - Data Validation



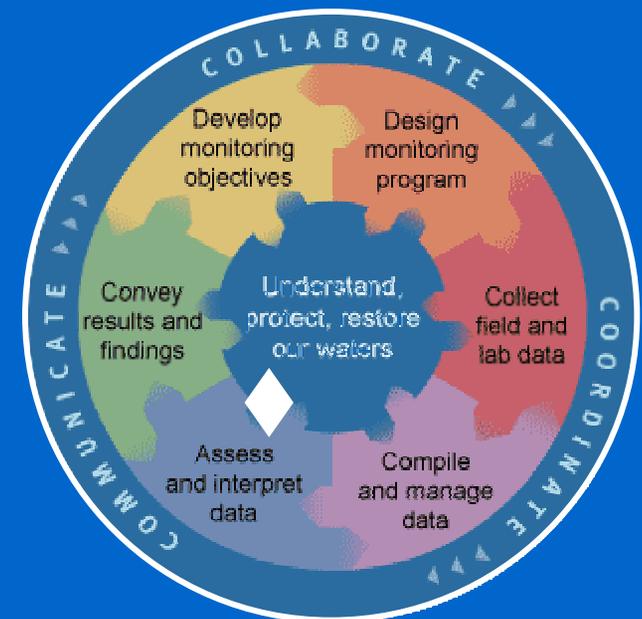
Data Management & Reporting

- ◆ Who will use the monitoring data?
- ◆ How will the data be used?
- ◆ How will the data be managed?
- ◆ How will the data be summarized/analyzed?
- ◆ How and to whom will the data be reported?



Data Assessment & Interpretation

- ◆ Are the data credible?
 - QA evaluation
 - Technical Review
- ◆ What do the results mean?
 - Were the questions answered?
 - Does the program need adjustment?
 - Am I done?



Attributes of a Well Designed Monitoring Program

- ◆ Up-front stakeholder “buy-in”
- ◆ Clear objectives
- ◆ Scientifically sound design
- ◆ Uses available information
- ◆ Comparable methods
- ◆ Indicates environmental condition
- ◆ Timely data evaluation
- ◆ Regular program evaluation & refinement
- ◆ Regular reporting

Reality Check

- ◆ Monitoring:
 - Takes time
 - Is expensive
 - Can be controversial
- ◆ Resources exist!
 - Websites
 - Resource and Regulatory Agencies

Questions?

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