Watershed Monitoring and Assessment Design Workbook

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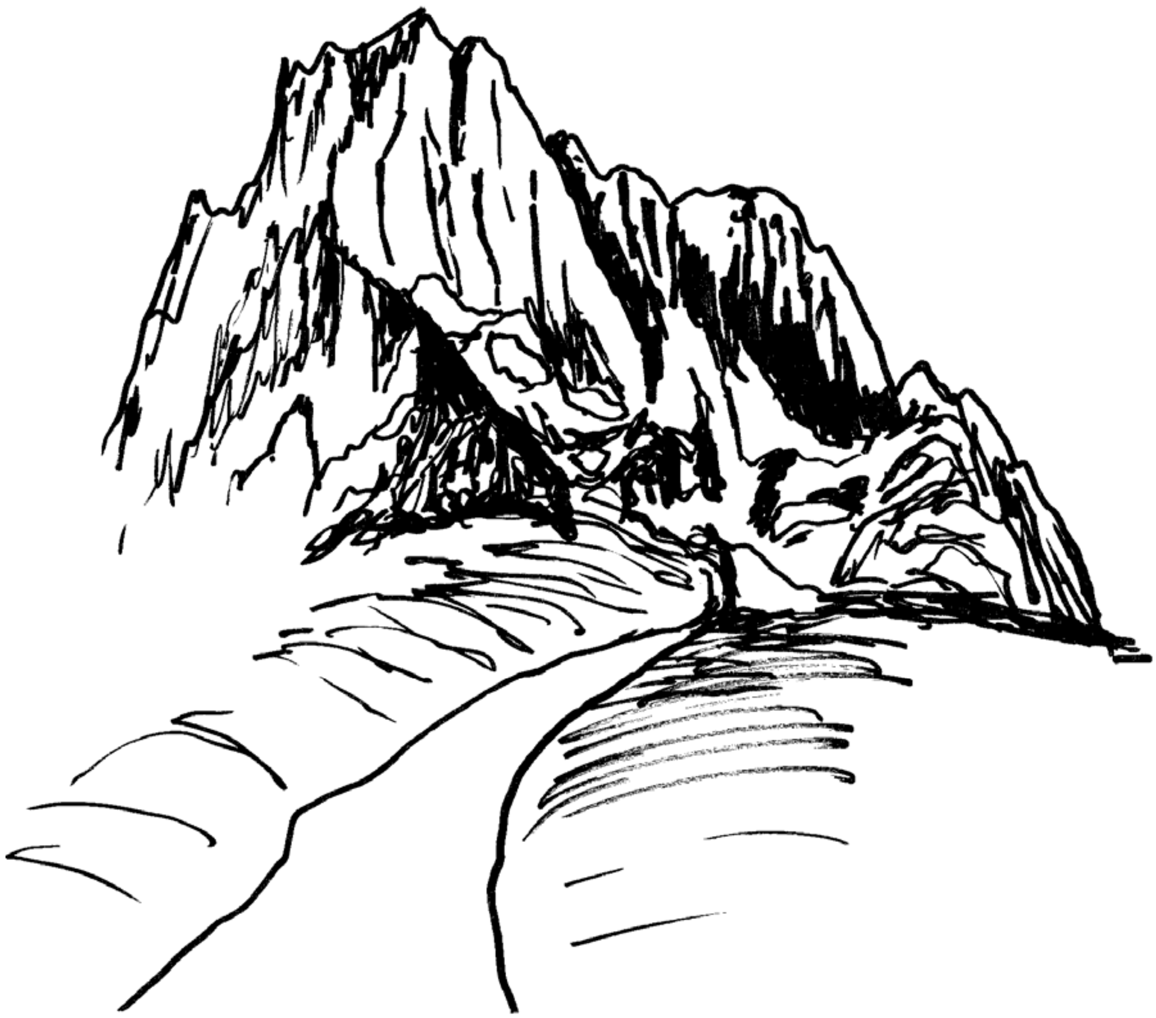

By Barb Horn and Geoff Dates

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Rocky Mountain Watershed Network Presents:

WATERSHED MONITORING AND ASSESSMENT DESIGN WORKBOOK

Written and Compiled By:

Barb Horn and Geoff Dates

Funded by:

United States Environmental Protection Agency, Region VIII

Illustrations by:

Pat Howard, Tim Shields (Phase 1, Step 5 Decision Tree), & Lera Main (cover sketch)

For More Information Contact:

Barb Horn at barb.horn@state.co.us or 970/382-6667, rmwn.org

With Special Thanks to:

River Network
Colorado Division of Wildlife
Rocky Mountain Watershed Membership
Tina Laidlaw
Peter Ismert
Steve Dickens
Angie Becker Kudelka
Kristy Miller
Brian Bromelow
Joshua Walton
Margaret McCoy

PHASE 4: EVALUATION DESIGN: Measure Success

Step 16 – Who Will Do What? (Task Identification)
Step 17 – Evaluation of Effectiveness (of Plan and Implementation)
Step 18 – Documentation and Communication

Introduction and Summary of Phase 4

This is probably the second most important Phase. The majority of time and resources is spent on developing the technical sample design, actual collection and in the turning data into information functions. This Phase provides the opportunity to plan and focus on components that ensure monitoring and assessment activities can be evaluated, will be credible and you will be able to document success or failure. The steps in this Phase provide the bookend for accountability, evaluation and sustainability.

The first step asks you to document who will be responsible for each of the various monitoring and assessment design components during implementation. In addition your challenge is to define how each of the components/individuals will communicate with each other to create an information system not a data generating system.

The second step is the meet of the plan's evaluation helping 1) evaluate the plan against organization or groups resources, 2) define evaluation for each design components during implementation and finally 3) evaluating multiple monitoring and assessment projects within and organization or watershed to look for cost savings, opportunities to leverage and credibility. In this step you will conduct a review of all the needs and gaps identified in each individual step and produce an action plan to fulfill those needs. One of the last basic tasks in each step is to evaluate any gaps or needs you have to fully achieve that step.

The final step encourages you to document the larger monitoring and assessment plan and all the potential sub-plans. If you complete all these workbooks and the last basic task you will have a documented monitoring and assessment plan. You may possible have information blueprint-data pathway fact sheets for each monitoring question per assessment type as well. These are excellent communication tools for those not familiar with your M & A effort. The "information blueprint" tells the reader for each monitoring question, the details of why you are sampling (desired outcomes, monitoring reason and data use combination or assessment type, targeted decision maker and their information needs in the form of what indicators and benchmarks, where, when, methods and data quality objectives, how plan to turn data into information through summaries and analysis, interpretation and conclusions and information needed for reporting/delivery. It also provides definitions for ambiguous terms and a cost estimate. In essence it is a tool that lists the details for each monitoring question per assessment type.

You may also have developed sub-plans such as a *Master Inventory List, Inventory Action Plan*, *Data Management Plan, Quality Assurance and Control Plan* or others. These can be referred to in the final monitoring and assessment documentation.

Additional tasks in Phase 4 guide you through a process that allows you to evaluate multiple monitoring and assessment types, activities or programs either within your organization or within your watershed. You would do this to determine overlap versus unique niche, opportunities to stream-line and develop efficiencies, opportunities to partner, compliment and expand value (if can communicate this) and finally a method to communicate to funders, constituencies, and the like how each monitoring indicator, station, effort is connected to each other as well as to the larger desired outcomes and watershed vision.

Once this plan has been evaluated and reviewed, you implement. Once implementation starts, you have planned evaluation points and methods that allow you to modify your monitoring and assessment plan and implementation to stay on course to meet desired outcomes. If you do not evaluate, you probably will not modify the plan or implementation in a measurable manner and will likely veer from achieving desired outcome or generating information needed by desired decision makers. Of course all the Steps in this Phase depend upon the information you have generated in Phase 1, 2 and 3. Task identity should be defined, evaluation should be planned and implemented and your plan should be documented and communicated. Just think, it could be your data that makes a difference 100 years from now, who will know what you meant if you don't "keep" the knowledge somewhere?

The Steps in Phase 4 include:

Step 16: **Who Will Do What? (Task Identification)**
Identify who will be responsible for this plan.

Step 17: **Evaluation of Effectiveness (of Plan and Implementation)**
How will you plan to evaluate each monitoring and assessment component, evaluation after implementation and finally the ability to evaluate multiple M & A efforts within organization or watershed to discover leverage, collaboration and for credibility? Action Plan to fulfill identified needs in order to fully implement plan.

Step 18: **Documentation and Communication**
Documentation of the plan and subcomponents and a plan to communicate your efforts through peer review, fact sheets, etc.

How to Use this Workbook

The overview section provides more introduction and basic background and information. It is highly recommended you read this before you start any Phase or Step. Each Phase and Steps are designed to develop and produce a Watershed Monitoring and Assessment Plan. Each Phase focuses on one critical aspect of a M & A Plan.

The format of each step is designed for you to understand 1) what you can accomplish, 2) why the products of this step are important, 3) what products you will produce, 4) basic steps (activities and worksheets) to produce the products, 5) worksheets and instructions, 6) background and content if you need more understanding to complete basic tasks, 7) case studies, 8) references and 9) resources. Four basic tasks are the same for each step. In the first two basic tasks we ask you to determine who should be involved in planning this step and to identify and evaluate what decisions have already been made regarding the specific step.

The last two basic steps involve putting the products of that step into a master Monitoring and Assessment Plan and to identify any needs you still have regarding that step in order to fully implement your M & A plan and place those in an Action Plan. Thus, both the Monitoring and Assessment Plan and Action Plan are accumulative, adding to an existing document and list after each step. At the end, you have a documented M & A plan and one of the last tasks has you prioritize your Action Plan (from all steps) on a timeline.

The worksheets are designed to be modified to meet your needs and completed electronically. However, they can be completed by hand as well. This is why they are simply formatted in word. The workbook comes with a compact disc for this purpose.

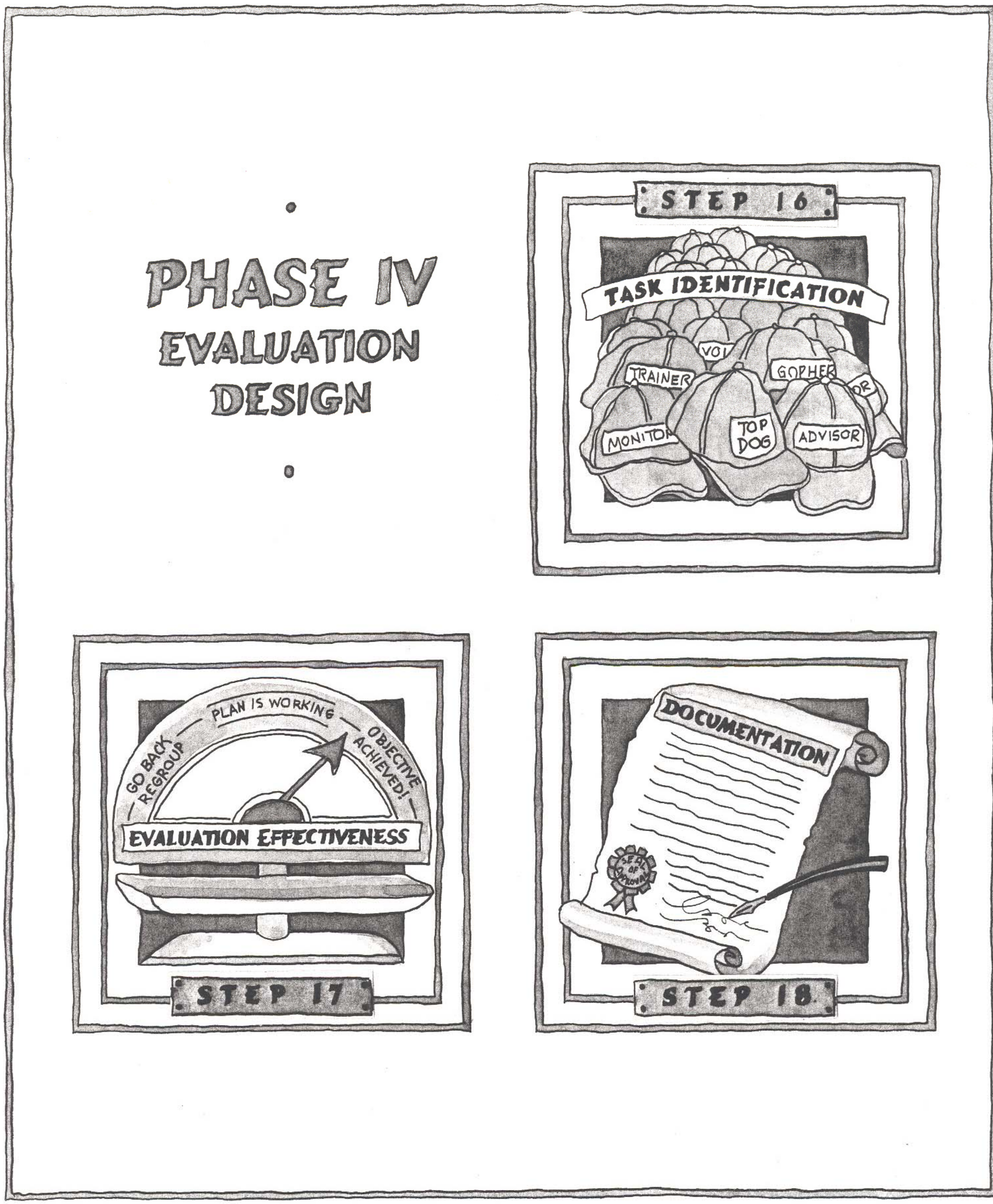
Remember that planning is dynamic, never complete, an iterative and not linear process. The amount of time and rigor you spend on each step is based upon your specific needs. If you skip a step, know why you skipped it. If you don't need to document or communicate or integrate components then don't, but know why. We are suggesting that every monitoring and assessment activity should address or consider all Phases and Steps at the appropriate level.

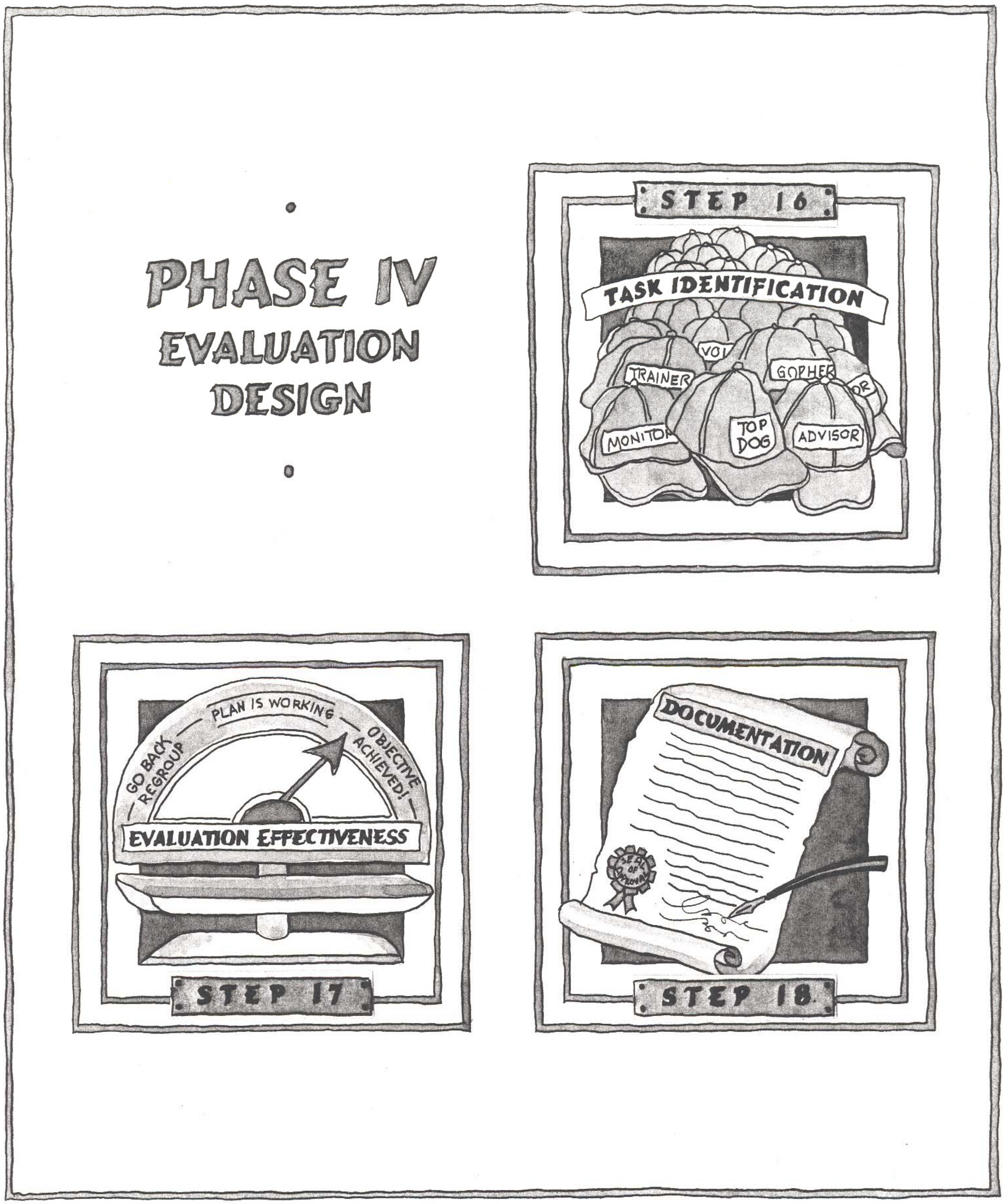
Start where you are with what is known and expand your horizons. If the step seems too much for your needs, complete what you need and leave the rest. If it seems overwhelming, start with something and do it well. There is no right or wrong, no time limit, just start somewhere. Planning, implementing monitoring and assessment activities is not a black and white science. Embrace that you often will be "breaking trail", there is not clean answers for everything even though there are experts out there, but use what you can that they provide.

In the end if you can justify and articulate your monitor and assessment activities to someone, and can evaluate your results against your goals, then you have succeeded.

Watershed Monitoring and Assessment Design Workbook Phase and Step Illustration

Steps in:


PHASE IV
EVALUATION
DESIGN
STEP 16
TASK IDENTIFICATION
TRAINER
GOPHER
TOP DOG
ADVISOR
PLAN IS WORKING
GO BACK REGROUP
OBJECTIVE ACHIEVED!
EVALUATION EFFECTIVENESS
STEP 17
DOCUMENTATION
STEP 18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TOP DOG
ADVISOR
PLAN IS WORKING
GO BACK REGROUP
OBJECTIVE ACHIEVED!
EVALUATION EFFECTIVENESS
STEP 17
DOCUMENTATION
SEAL OF APPROVAL
STEP 18

Step 16: Who Will Do What? (Task Identification)

"….we shape our dwellings and afterwards our dwellings shape us."

Sir Winston Churchill

About This Step – *This step is designed to accomplish 1 thing:*

1. Help you plan a data delivery and communication strategy for getting your data out to the people who will use it

Why Do This Step

This is an often overlooked or taken for granted step. In order for a monitoring program to operate smoothly, participants, both paid and volunteer, need to be clear about their role and the tasks assigned to them. It is also important to these roles and responsibilities should be "formalized" and documented. Further, this needs to be communicated to everyone. This is particularly true for large and complex programs, with lots of moving pieces.

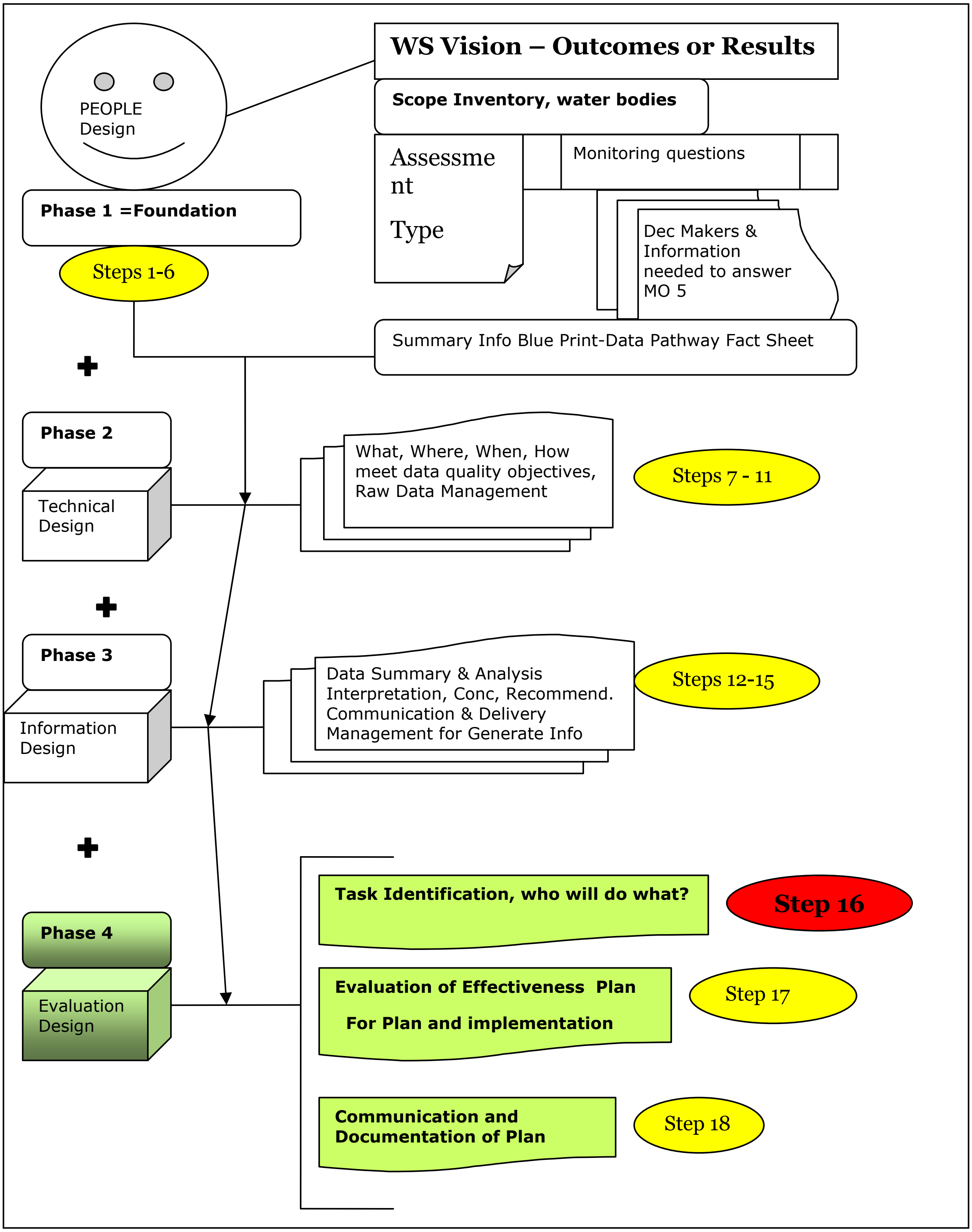
Where are we in the Big Picture Illustration?

Phase 1	Step 1: Share Watershed Vision and Desired Outcomes (Results) Step 2: Scope Inventory (Physical, People and Information) Step 3: Identify Monitoring Reason(s) and Data Use(s) (Assessment Type) Step 4: Develop Monitoring Questions (Refinement of Monitoring Reason) Step 5: Target Decision Makers and Info Needs (Refinement of Data Use) Step 6: Summarize with Information Blue Print-Data Pathway Fact Sheet)
Phase 2	Step 7: What Will You Monitor? Step 8: When Will You Monitor? Step 9: Where Will You Monitor? Step 10: How Will You Monitor to Meet Data Quality Objectives? Step 11: Management of Raw Data (Data Management Plan Part 1)
Phase 3	Step 12: Data Summary and Analysis Step 13: Interpretation, Conclusions and Recommendations Step 14: Communicating and Delivery Step 15: Management to Generate Info (Data Management Plan Part 2)
Phase 4	Step 16: Who Will Do What? Task Identification Step 17: Evaluation of Effectiveness (of Plan and Implementation) **Step 18: Documentation and Communication (of M & A Plan)**

Product (see Figure Phase 4 Product List):

✓ A task and timeline that lists the various tasks, who will do them, and when.

Phase 4 Product Illustration:



What Should Be Done Before This Step

The results from Phase 1 or the people orientation provides the foundation for Phase 2 Steps. Thus, ideally you need to have identified a watershed vision and desired outcomes with associated assumptions and external factors. Defined combination of monitoring reasons and uses, we call Assessment types. For each assessment type a list of monitoring questions the data is to answer and how that question will be answered. For each monitoring question, a list of targeted decision makers, their decision, how they make that decision and what information they need to make the decision. A format to document and summarize the results, we have suggested the information blueprint.

The results from Phase 2 provide the foundation for Phase 3 Steps. This includes the monitoring design, the what, when, where, how and quality assurance and control plan for generating data/results.

Finally, the results from Phase 3 to this point should be identified. The first Step in Phase 3, Step 11 Part A, results in a list of what data and meta-data you are generating that needs managing, a decision on what minimum information you will require through out managing the data, and an illustration of how data will travel through the various processes. Part B, takes the first cut at identifying system support decisions, such as database design, data result relationships with meta-data, hardware/software decisions, graphics, GIS/Web considerations, naming conventions, miscellaneous thorns to consider, user considerations, process tools and safety measures.

Steps 12-15 in Phase 3 are designed to help you determine specifically what processes and tools you plan to start with in order to turn results into information through analyses, interpretation, making recommendations and reporting. In theory, these were first identified in Phase 1, as you selected targeted decision makers and tried to determine their information needs, including how and what they needed for the above functions. Step 15, is once the data-to-information processes, tools are identified, the data management needs of these processes can be identified. This leads to developing Part 2 of the Data Management Plan, management for turning results (Data Management Plan 1) into information for delivery and utilization.

This step helps you determine who will be responsible for implementing this monitoring and assessment plan.

Basic Tasks

Basic Tasks are numbered to correlate with the overall 1-18 Steps provided in these guidance modules followed by the basic task sequence step to complete. For example Step 4, basic task 2 would be numbered as Basic Task Step 4.2, Step 3.3 correlates to Step 3, Basic Task 3.

16.1 Identify who will make the decisions about this step and who should be involved in the planning process (they may be different).

16.2 Self Assessment: If you've been monitoring before you've undertaken this process, has your data communication about and delivery of your story been effective?

16.3 Identify and document tasks and a timeline for carrying them out

16.4 Update *Data Management Plan Part 1*. See provided outline in Step 11, edit or develop your own for these items.

16.5 Update *Inventory Master List* and *Plan.*

16.6 Update *Information Blueprint – Data Pathway Fact Sheet* for each monitoring question.

16.7 Place Products in your *Watershed Monitoring and Assessment Plan*.

16.8 Place your identified gaps and needs regarding this step in the *Action Plan* (what you need to plan to complete this step and or overall monitoring and assessment plan).

Worksheets

Work sheets are listed below. Not all Basic Tasks have an associated work sheet. To simplify completion of products for each step, the worksheets or broken into small subsets of tasks. This requires moving the results of one task into the next task and will seem redundant, especially if completing worksheets by hand. Worksheets are provided in word here for ease of reproducibility. These are a starting point; we encourage you to customize these and reproduced them in an electronic format, in Excel for example, where it is easy to move information from one area to another by cutting and pasting.

Work Sheets are numbered to correlate with Basic Steps and the overall Steps in these guidance modules. Each consecutive work sheet is lettered a, b, c and so forth, preceded by the Basic Task sequence step, preceded by the Step number. For example, Worksheet Step 4.2.a and Step 4.2.b, correlates to Step 4, Basic Task 2, Worksheet a and Worksheet b. In theory worksheet a needs to be completed before worksheet b.

Worksheet 16.2.a **Self Assessment Step 16 Worksheet and Products to be completed Prior to this Step, Part 1 and Part 2**

Worksheet 16.3.a **Identify and document tasks and a timeline for carrying them out**

Worksheet 16.7.a **Place Products in your *Watershed Monitoring and Assessment Plan.***

Worksheet 16.8.a **Place your identified gaps and needs regarding this step in the *Action Plan* (what you need to plan to complete this step and or overall monitoring and assessment plan).**

How to Do the Worksheets

For Sheet 16.2.a Self Assessment Step 16 Worksheet and Products to be completed Prior to this Step, Part 1 and Part 2.

Part 1. Complete the self assessment section of the worksheet to evaluate what you have or what decisions have already been made. This will help you focus on what you need from this step and incorporate valuable existing information or products into this plan.

Part 2. Next, to prepare to complete this step the following, you need to have the following items addressed:

- ✓ Desired set of outcomes or results that the monitoring and assessment activities will be designed to help achieve
- ✓ Identified monitoring and assessment activities, specific combinations of a monitoring reason plus an associated data use; we call this an Assessment Type. You may have multiple Assessment Types.
- ✓ For each Assessment Type, the list of specific monitoring questions the monitoring and assessment will be designed to answer.
- ✓ For each monitoring question, the targeted decision makers, the type of decisions they will make and the information they need to make them (as specific as possible).
- ✓ A minimal scoping inventory that identifies the watershed boundary and water bodies you are focusing on (rivers, lakes or wetlands), physical attributes of water bodies (including status, uses, etc.), relevant cultural or historical aspects, existing data sets or monitoring efforts and others in the watershed who either you want to influence or could help you implement.
- ✓ Technical sample plan including what monitor (indicators, benchmarks, criteria, etc.), where and when monitor, how will meet data quality objectives (methods, how good does the data need to be for decision makers, quality assurance and control measures), and how will manage and verify raw data/information.
- ✓ Plans for data analyses and developing findings
- ✓ Plans for interpretation, conclusions and recommendations
- ✓ Plans for communicating and delivering raw data, data summaries or analysis, interpretation, conclusions or recommendations to each targeted decision maker according to their information needs.
- ✓ Data management needs in order to support tasks around generating information, data summary, analysis, interpretation, conclusions, recommendations, communication and delivery

This is the ideal list, if you do not have any of these, they become a gap or need that should be addressed before any data is collected or analyzed, even if the answers aren't perfect or you don't have a large degree of confidence surrounding them, they should be attempted as the starting point. This is what you are evaluating in this step-your monitoring and assessment plan.

Worksheet 16.2.a Self Assessment Step 16 Worksheet and Products to be completed Prior to this Step, Part 1.

Part 1 Self Assessment of Known Evaluation Products and Processes

1. **Determine if you "have" or "don't have" the item, mark the appropriate box. If you don't have it and determine you don't need it, explain why in the comments document. You may not need to know but perhaps your target decision makers, board or membership might want to know.**

2. **If you have the item "documented", mark that box. If so, list in the comments where, hard copy, chapter in a document, electronic file name and location, etc. The assumption is you value the ultimate goal to document and communicate your M & A plan, activities and results.**

3. **If you have the item, assess the use of it, use the scale below or provide your own answer and comments.**

   Rating Scale for USE:
   0=doesn't exist so use is nil
   1=don't know why would need or understand item
   2=exists, don't know where it is, if it is used, etc. so use is essentially nil
   3=exists and use some of time
   4=exists and use all the time
   5=wish it existed, would use it lots

4. **If you have the item, assess the effectiveness of it, just because something exists or is used does not mean it is effective in its use, use the effectiveness scale below or provide your own answer and comments.**

   Rating Scale for EFFECTIVENESS, assumes material exists:
   0=not effective or functional at all
   1=incomplete (all elements are not there) and some existing parts need revising
   2=incomplete but what is there is okay
   3=complete (all elements are there), some parts okay but need revising
   4=complete and effective

Item	Have	Don't Have	DOC	Assessment of Use (Scale 0-5)	Assessment of value / effectiveness (Scale 0-4)	Comments/Notes
45. List of all individuals involved in monitoring effort and role						**Phase 3 Step 14**

*DOC=Documentation, *M & A= Monitoring and Assessment

5. To make this assessment useful, determine what your gaps and needs are regarding this step in order to focus your effort in completing this step.

Worksheet 16.2.a Self Assessment Step 16 Worksheet and Products to be completed Prior to this Step, Part 2.

Part 2 Products to be completed before this step, in order to complete this step

Item	Response
Desired set of outcomes or results that the monitoring and assessment activities will be designed to help achieve:	
Assessment Types, specific combination of one monitoring reason and data use(r):	
For each Assessment Type, the list of specific monitoring questions:	
For each monitoring question, the targeted decision makers, the type of decisions they will make and the information they need to make them (as specific as possible):	
Watershed(s) and Water bodies of focus:	
Physical attributes of water bodies (status, use, etc.)	
Existing Data or monitoring efforts:	
Indicators, benchmarks and criteria list:	
List of monitoring locations/rationale:	
List of monitoring frequencies:	
Methods list, list of data quality objectives (methods, how good does the data need to be for decision makers), quality assurance and control measures)	
Plan for raw data management and support mechanisms:	
Monitoring results summarized using statistics, graphs and tables.	
The results of your comparison of your data with your benchmarks summarized	
The results of your comparison of your QC data with your data quality objectives	
A method to develop a set of findings from the data set	
Plan or starting point for making interpretations, conclusions and recommendations	

Plan to communicate and deliver appropriate information to each targeted decision maker	
Data management plan to support the generation and delivery of information to targeted decision makers.	

For Sheet 16.3.a Identify and document tasks and a timeline for carrying them out

What are the various tasks you need to do to begin implementing you monitoring plan? Do you need to get additional training? Hold a fundraiser? Organize them on this worksheet. Please also refer back to any tasks you identified in previous steps. Steps 7 & 12 contain places where trainings may have associated tasks you want to list here. The following is a brief explanation of the introductory rows and then each column worksheet 11.1:

Monitoring Goal or Assessment: (Optional) You have the option to create a task list for your entire monitoring program, or for each goal you are trying to accomplish. If you find the task/timeline list to be too overwhelming for your entire monitoring program, use this line to identify a specific goal, and make as many copies of this form as needed.

Dates Covered by Timeline: Choose dates that include a full monitoring season. Many groups choose to follow a calendar year (January to December) because that includes the prep time before a season and the analysis time after a season.

1) Target Start Date and 2) Target End Date: Write down the dates that you plan to begin and end the planned activity. You may want to use this as a sorting tool later on. (For example, you can sort by this column to look up all the tasks that need to be started this month.)

3) Main Category: This is a sorting tool to help you group the tasks and start to make sense of them. Create your own categories as you see fit. Suggested categories are: Planning, Communication/Management, Monitoring Activities, and Post-Monitoring Activities.

4) Activity/Tasks Description: Now, what needs to get done? Here are some specific task/activity examples using the categories from Column 3.

Category: **Planning**

Activity/Task: Hold Fundraiser, Get additional training in volunteer recruitment, Find a lab, Call the lab to see about water sample cost, Purchase equipment.

Category: **Communication/Management of Volunteers**

Activity/Task: Initial call for volunteers (advertise to members, in paper, radio) Hold training for volunteers, Mid-season communication (phone call or personal visit), Send a postcard mid-season, Keep track of monitoring lists/names, Send out a “Turn in your Data Reminder.”

Category: **Monitoring Activities**

Activity/Task: Collect grab samples, Drive samples from field to lab, Conduct Habitat Assessment, Collect Macroinvertebrates, Assess quality control measures.

Category **Post-Monitoring Activities**

Activity/Task: Data Entry, Data Validation, Checking data entry for errors, Data Analysis & Interpretation, Write Report, Send Data to Data users, Present findings, Attend city council meetings, Evaluate your monitoring season/program

5) Person(s) Responsible to Organize/Evaluate: List who is in charge to arrange and organize this task. This person should also lead the evaluation (if necessary) for the task

6) Resources (Human and Financial) to Carry-out Task: List who is in charge to implement this task. This may be maybe more people (get as specific as you necessary for your group – e.g. Jane is booking the hall, Joe is getting food, etc.)

7) Fill in Date When Done: When the task is finished, sign off on it, by writing in the date completed.

Worksheet 16.3.a Task Identification and Timeline

Monitoring Situation: Goal or Assessment:

Dates covered by timeline:

Target Start Date	**Target End Date**	**Main Category** (Planning, Mgt,, Monitoring, Post-Monitoring)	**Task / Activity Description**	**Person(s) Responsible to Organize/ Evaluate**	**Other Resources** (human or financial) **to Carry-Out Task**	**Fill in Date** when done

For Sheet 16.7.a **Add products of Step to** *Monitoring and Assessment Plan.*

➡ Task Identification and Plan and Communication Structure

Worksheet 16.7.a **Add products of Step to** ***Monitoring and Assessment Plan.***

If you completed any Steps this Worksheet is cumulative, use that document. If you have not you complete that aspect that is highlighted for your plan documentation. **Italics mean a sub plan that might be attached or live somewhere else, location of document and contact is what would go in the plan.*

I. People Design, Phase 1
    A. Shared Watershed Vision and Desired Outcomes (Step 1)
        1. Logic Model of Desired Outcomes/Results and activities/target audiences to employ to achieve outcomes
    B. Keepers of the M & A Plan (Step 1)
    C. Watershed Boundary (Step 2)
    D. Water bodies of Interest (Step 2)
    E. Scope Inventory Master List* (Step 2)
        1. Physical Inventory * (Step 2)
        2. People Inventory* (Step 2)
        3. Information Inventory* (Step 2)
            a. Existing Monitoring Efforts (Step 2)
            b. Existing Data Sources (Step 2)
        4. Inventory Action Plan* (Step 2)
    F. Assessment Type(s) List – Monitoring Reason + Use (Step 3)
        1. Monitoring Question(s) (Step 4)
        2. Targeted Decision Maker(s) (Step 5)
            a. Information Needs (Step 5)
        3. Information Blue Print – Data Pathway Fact Sheet Per Monitoring Question* (Step 6), including Cost Estimate
II. Technical Design, Phase 2
    A. What (Indicators, Benchmarks, etc.) and why? (Step 7)
    B. When and why? (Step 8)
    C. Where and why? (Step 9)
    D. W(how) will meet data quality objectives? (Step 10)

1. Data quality objectives (Step 5 and 10)
2. Quality Assurance and Control Measures (Quality Assurance and Control Plan)* (Step 10)

E. Data Management for Raw Data (Data Management Plan Part 1)* (Step 11)

III. Information Design, Phase 3

A. Data Analyses (Step 12)

1. Starting Point (Step 12)
2. Changes (Later)

B. Data Interpretation, Conclusions, Recommendations

1. Starting Point (Step 13)
2. Changes (Later)

C. Communication and Delivery

1. Starting Point (Step 14)
2. Changes (Later)

D. Management Plans to Generate Information (Data Management Plan Part 2)* (Step 15)

IV. Evaluation Design, Phase 4

A. ➨Who Will Do What? (Step 16)

1. ➨Task Identification Matrix (Step 16)
2. ➨Communication Structure and Tools (Step 16)

B. Evaluation Plans (Step 17)

1. Evaluation Plans for M & A Components (Step 17)
2. Evaluation Plans for M & A Implementation (Step 17)
3. Evaluation of inter/intra M & A Activities (Step 17)

C. Documentation and Communication (Step 18)

1. M & A Plan (**this document**, updated Sub documents) (Step 18)
2. Communication and Peer Review Plan (Step 18)
3. Action Plan* (Step 17)

For Sheet 16.8.a **Place your identified gaps and needs regarding this step in the Action Plan (what you need to plan to complete this step and or overall monitoring and assessment plan).**

Worksheet 16.8.a **Final Action Plan Part 1, Summary:**

If you have completed each Step, or for those you have, you have a cumulated list of gaps and needs related to that Step. Use that same worksheet/document. If you did not complete each Step, look at what each Step is supposed to accomplish and record what your gaps and needs are related to that topic. The goals is to get the gaps and needs in one place to evaluate and prioritize.

Phase 1 Step 1: (completed in Step 1)
Phase 1 Step 2: (completed in Step 2)
Phase 1 Step 3: (completed in Step 3)
Phase 1 Step 4: (completed in Step 4)
Phase 1 Step 5: (completed in Step 5)
Phase 1 Step 6: (completed in Step 6)
Phase 2 Step 7: (completed in Step 7)
Phase 2 Step 8: (completed in Step 8)
Phase 2 Step 9: (completed in Step 9)
Phase 2 Step 10: (completed in Step 10)
Phase 2 Step 11: (completed in Step 11)
Phase 3 Step 12: (completed in Step 12)
Phase 3 Step 13: (completed in Step 13)
Phase 3 Step 14: (completed in Step 14)
Phase 3 Step 15: (completed in Step 15)
Phase 4 Step 16: Task Identification and Communication Plan
Phase 4 Steps, 17 and 18: Will add Action and Needs as complete each Step and at the end prioritize

Background Content

Organizing your monitoring activities involves a set of tasks that produces and builds on the technical decisions you have made in your study design.

Major Tasks

- ✓ Find a lab (if needed)
- ✓ Purchase equipment
- ✓ Recruit and organize volunteers
- ✓ Train field and lab volunteers
- ✓ Monitoring
- ✓ Quality assurance
- ✓ Analyze your results
- ✓ Report your results
- ✓ Present your results
- ✓ Evaluate your study design

Who Will Carry Out (Position Title)

- ✓ The scope of your monitoring program will determine how many and what kind of people you will need to carry it out. Following are some possible positions that you might recruit volunteers to do. Note that some may become paid positions, if the workload is such that it's unreasonable to expect a volunteer to do it. The major responsibility of each position is described briefly.

Possible Program Coordination Positions

These positions carry much of the responsibility for making sure that there are people in place to carry out the monitoring. They may become paid positions.

Program Coordinator: Oversees all the monitoring program tasks listed in the previous section to see that they are carried out.

Volunteer Trainer: Trains the volunteers on how to carry out their jobs. Note that this might be the program coordinator, lab coordinator, volunteer coordinator, data management coordinator or a consulting person or organization.

Lab Coordinator: Oversees and coordinates the lab analysis of samples and does the training of any laboratory volunteers. If you have recruited an outside lab to run your analyses or quality control samples for you, be sure to identify the person in that lab who will be responsible for reporting to you and answering any questions you may have.

Quality Assurance Officer: Responsible for seeing that your quality assurance measures are carried out. If you have produced a Quality Assurance Project Plan, this person would be responsible for seeing that it is carried out. Note that this could be the program coordinator the lab coordinator, or a person outside of your program.

Volunteer Coordinator: Assures that volunteers are in place to carry out the tasks, including recruiting and scheduling volunteers, communicating with them on a regular basis to be sure that they are having a good experience and thanking or rewarding them for the work they are doing.

Data Management Coordinator: Assures that all the field and lab data are computerized for summary and analysis. This may include setting up the software for data entry, and producing the data summary, while also overseeing volunteers that enter the data, validating the data.

Technical Committee: Provides advice and assistance to the program coordinator in preparing the study design, troubleshooting problems and interpreting your results (see study design Step 1, "Getting Started" for more information on organizing a technical committee).

Possible Monitoring Positions

Field Monitor: Collects and records samples, observations and measurements in the field and drops them off at a sample drop-off point or a lab.

Sample Runner: Transports samples from a sample drop-off point (if you have one) to the lab. Note that this may be unnecessary in a small watershed where samplers drop their samples off at the lab.

Laboratory Analyst: Analyzes and records the results for field samples. Lab analysts work under the supervision of the lab coordinator.

Data Entry Volunteer: Enters the field and lab data into a computer. Works under the supervision of the data management coordinator. May also validate data entered by another volunteer.

Speaker: Makes public presentations about the program and the monitoring results

You should develop job descriptions for each of these positions before you recruit people to fill them.

Technical Committee

Form a technical committee of people who can provide you with advice and assistance in preparing your study design and by collecting information on the resource conditions and issues in your watershed.

Sample Job Description: Technical Committee

Role: Advise project staff on the technical aspects of the program.

Responsibilities:

- ✓ Decide on data use goals and data quality objectives to address the program goals and objectives;
- ✓ Develop study questions;
- ✓ Review and comment on the study design;
- ✓ Recommend, review and comment on quality assurance/quality control procedures;
- ✓ Assist staff in solving technical problems with the monitoring;
- ✓ Review and comment on drafts of manuals and training materials;
- ✓ Review protocols annually andAssist staff in interpreting the results;
- ✓ Review and comment on reports;
- ✓ Attend two meetings and be available as needed for advice; and
- ✓ Commit to about 20 hours per year to review documents, attend meetings and provide telephone consultation.

Ask the resource people you identified in study design Step 2 (page 2-7) to serve on the committee. Give or send them a copy of the job description and be clear as to what is expected of them in terms of their time and expertise. Remember, you're asking professionals to donate services. The least you can do is let them know the extent of the donation you are requesting so they can decide if it's something they can do.

Areas Of Expertise

Determine what expertise you need on your technical committee. Suggested areas of expertise include:

- ✓ Stream/lake biology
- ✓ Stream/lake chemistry
- ✓ Stream/lake hydrology
- ✓ How state agencies work
- ✓ Local river/lake uses and problems
- ✓ Data interpretation
- ✓ Data management
- ✓ Business environmental compliance
- ✓ Field and lab methods
- ✓ Laws and regulations

Members

Identify the resource people you will approach to be on your technical committee. Don't forget local businesses. They often have environmental compliance staff who can provide good expertise and good connections with the business community.

Case Study 1

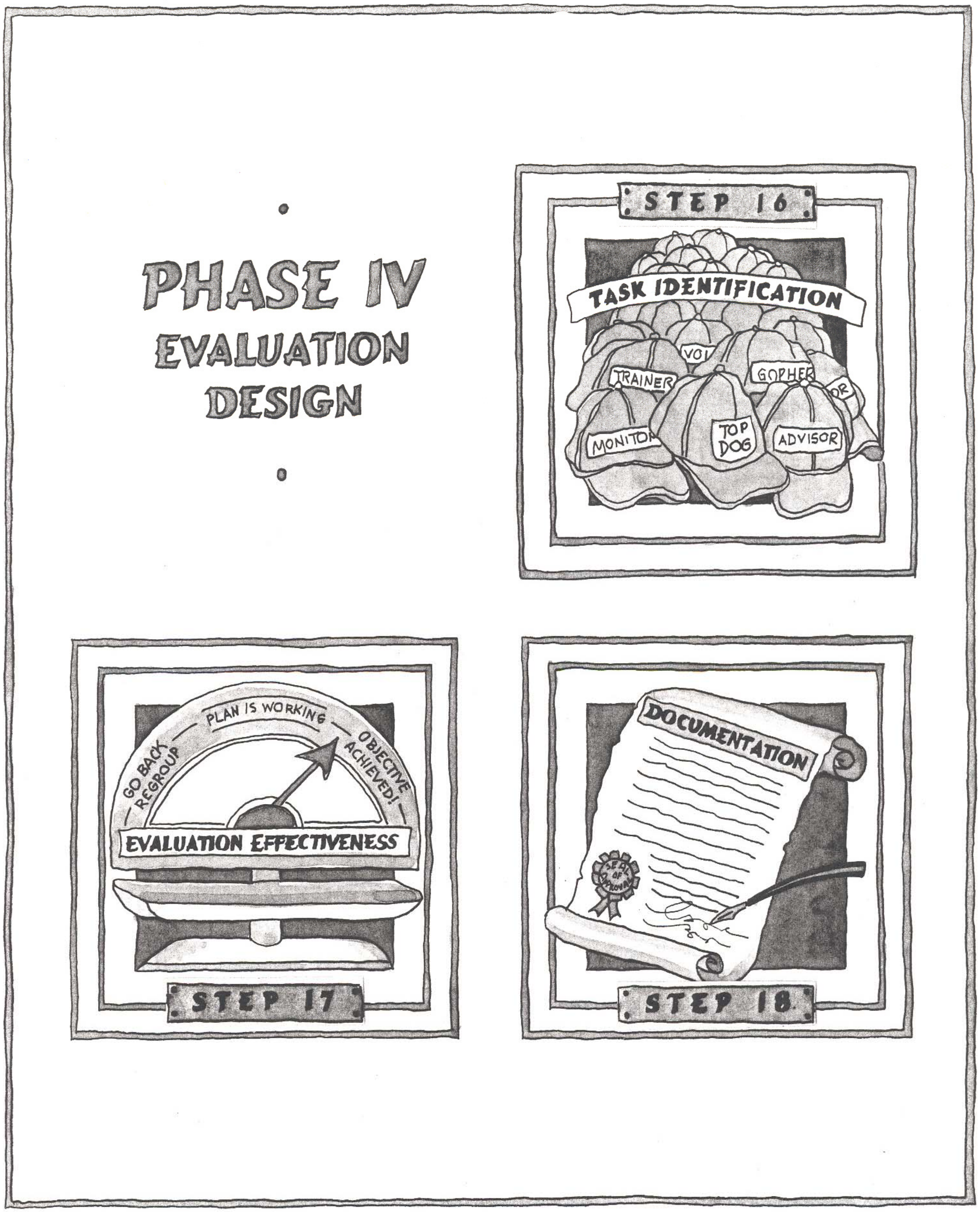
Case Study 2

References

U.S. E.P.A. 1997. Volunteer Stream Monitoring: A Methods Manual EPA 841-B-97-003. U.S. Environmental Protection Agency, Office of Water 4503F, Washington DC.

U.S. E.P.A. 1991. Volunteer Lake Monitoring: A Methods Manual EPA 440/4-91-002. U. S. Environmental Protection Agency, Office of Water, Washington DC.

Resources



PHASE IV
EVALUATION
DESIGN
STEP 16
TASK IDENTIFICATION
TRAINER
GOPHER
MONITOR
TOP DOG
ADVISOR
PLAN IS WORKING
GO BACK REGROUP
OBJECTIVE ACHIEVED!
EVALUATION EFFECTIVENESS
STEP 17
DOCUMENTATION
SEAL OF APPROVAL
STEP 18

Step 17: Evaluation of Effectiveness (of Plan and Implementation)

"I'm beginning to believe that we know everything, all that history, is part of us, when a secret is revealed, our lives are made suddenly clearer to us, as the unnatural heaviness of unspoken truth is dispersed. Perhaps we are like stones, history embedded in us, we hold sorrow deep and cannot weep until history is sung."

Susan Griffin

About This Step – *This step is designed to accomplish 5 things:*

1. Finalize Information Blueprint-Data Pathway Fact Sheet for each Monitoring Question per Assessment Type.
2. Produce Evaluation Process to assess effectiveness of Watershed Monitoring and Assessment Plan:
   - Who and What evaluate When
   - How evaluate, rigor
   - I will know Management Objective A is met when…XYZ
   - Reporting
   - When will M & A Plan be evaluated and revised?
3. Conduct cost analyses and final decisions for starting point, organizational mission and resource evaluation, for all Assessment Types and associated monitoring question Information Blue Print-Data Pathway Fact Sheets.
4. If desired or necessary, identification of this monitoring and assessment plan's a) alignment and connection with other monitoring and assessment projects within your organization; or b)

alignment and connection with monitoring and assessment projects within the same watershed.

5. Identification of gaps and needs to build capacity and work towards, Final Action Plan.

Why Do This Step?

Evaluation. What do you want to be able to say? Do you want to know if monitoring results actually answers the posed monitoring questions? Do you want to know if your data was used by your targeted decision maker and how? Do you want to know the reason your data wasn't used or a decision made because of something in your control? Do you want to know that the life energy and resources used in monitor has furthered progress towards your desired outcomes and watershed vision? Do you want to know that all the parts of your monitoring design work together in a manner to perform as an information system and if not why? Where is the break down? Do you want to know how to connect and communicate that connection between multiple monitoring projects within your organization or within your watershed? What do you want to know? Can you afford to implement this plan? What else do you need and how will you get it? Hopefully you want to have answers for all the above questions. If you have taken the time to plan you can answer and evaluate all of these questions.

The final essential component to plan then is what you need to evaluate, who do you need to evaluate, when do you need to evaluate what components? How might you evaluate each component, each responsible team, and the system as whole? What are the indicators of success? What do you need to document, what should you track and report? These are the type of evaluation questions we intend to address. Identify the problems, short-comings and over zealous areas in each phase. Develop change strategy, timing and action plan. We are putting resources into planning in hopes of reducing waste down the line. Evaluate costs upfront in order to adjust plan before implementation.

We have been spending all our time thus far in the planning part of a watershed assessment and associated monitoring activities. After we plan our evaluation and finalize our documentation, then we can start implementation. Many programs start with implementation, not planning. But now you are ready to implement your plan, yes we are finally for the process our plan was designed to guide. There are six major phases to the implementation process: plan, implement, fully manage data to generate information, report/take action-take information to decision-making process, evaluate, adjust monitoring design. We have a few tips and highlights about each process phase.

Alignment. Why would we want to align multiple assessment (types) within our organization or within our watershed?

1. to discover the overlap and efficiency opportunities by identifying common areas between organization Assessment types or combinations of monitoring reason and uses/users, common areas might include:

   - monitoring questions
   - targeted decision makers and thus information needs

- variables and indicators
- stations
- benchmarks, reference sites and or criteria
- frequencies
- time-lines
- methods, data quality objectives, quality assurance and control measures
- analytical, interpretation and reporting procedures/methods
- data management needs (design and support decisions)
- evaluation points, audience, processes and schedules

The ability to communicate the savings in efficiency and cost as well as communicate the unique aspects (avoid appearance of duplication) to board, funder, stakeholders, employees, peers, community, etc. is invaluable.

2. To discover the overlap and efficiency opportunities by identifying common areas between others conducting monitoring and assessment activities with yours, ask them for the same information you provided in your plan. Identifying the common areas listed above can provide the opportunity to:

- Collaborate and cover more area, indicators, frequency, identify areas to leverage, compliment and partner
- Reduce costs
- Increase data assurance an control measures
- Streamline on the ground monitoring, laboratory analysis, data to information functions
- Identify your niche in the watershed, what you are doing that others are not. If there is overlap we know why and its function.
- Provide credibility and accountability to your plan and results, demonstrating you have planned, researched and documented your plan, it is clear what you are doing, why and how
- Information for our prioritization process, if others are doing what we are, maybe we can focus elsewhere or expand the scope.

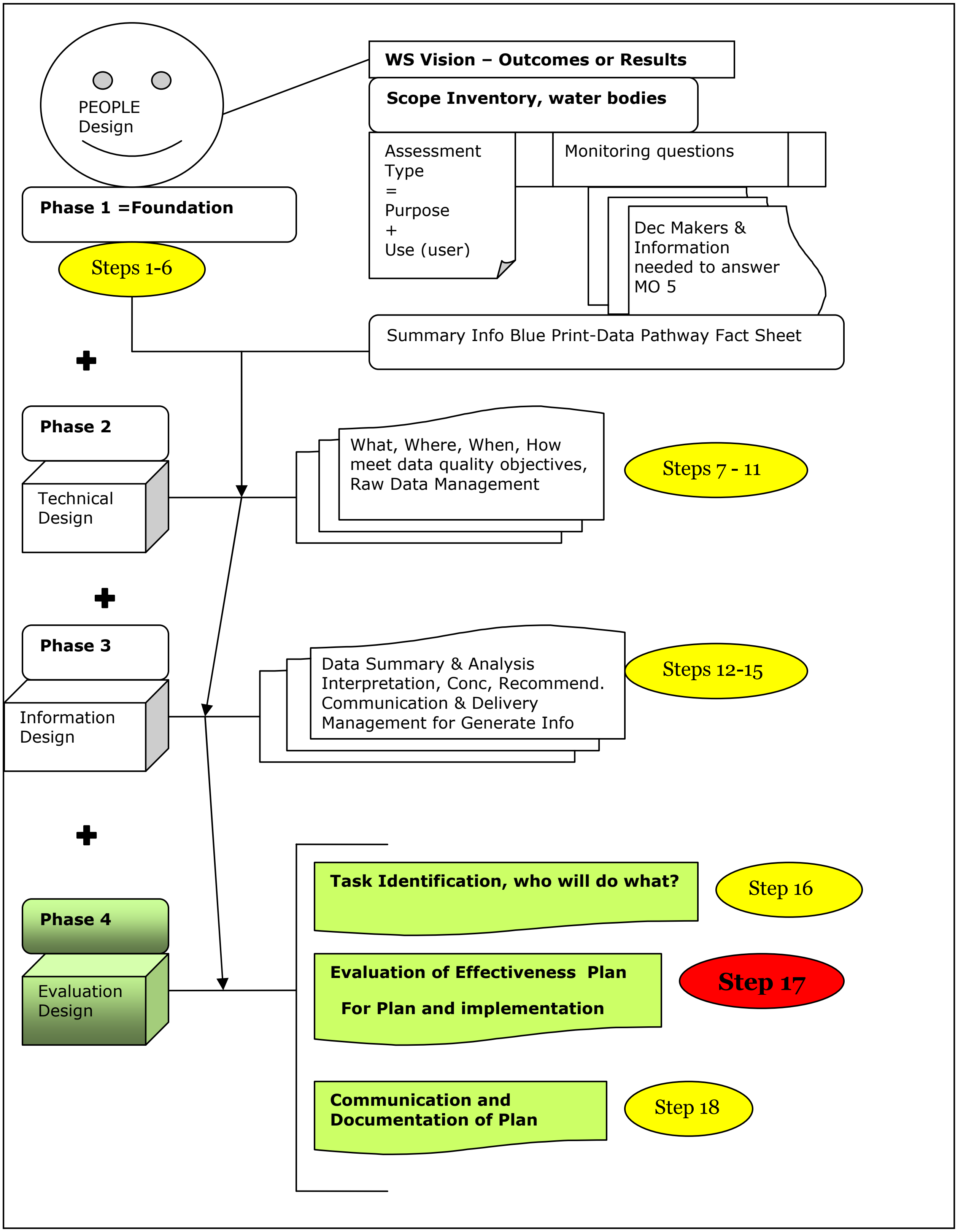
Where are we in the Big Picture Illustration?

Phase 1	Step 1: Share Watershed Vision and Desired Outcomes (Results) Step 2: Scope Inventory (Physical, People and Information) Step 3: Identify Monitoring Reason(s) and Data Use(s) (Assessment Type) Step 4: Develop Monitoring Questions (Refinement of Monitoring Reason) Step 5: Target Decision Makers and Info Needs (Refinement of Data Use) Step 6: Summarize with Information Blue Print-Data Pathway Fact Sheet)
Phase 2	Step 7: What Will You Monitor? Step 8: When Will You Monitor? Step 9: Where Will You Monitor? Step 10: How Will You Monitor to Meet Data Quality Objectives? Step 11: Management of Raw Data (Data Management Plan Part 1)
Phase 3	Step 12: Data Summary and Analysis Step 13: Interpretation, Conclusions and Recommendations Step 14: Communicating and Delivery Step 15: Management to Generate Info (Data Management Plan Part 2)
Phase 4	Step 16: Who Will Do What? Task Identification **Step 17: Evaluation of Effectiveness (of Plan and Implementation)** Step 18: Documentation and Communication (of M & A Plan)

Product (see Figure Phase 4 Product List):

- ✓ Final Information Blue Print-Data Pathway Fact Sheet for every monitoring question per Assessment Type as a starting point.
- ✓ A determined point and frequency at which we will evaluate the entire monitoring and assessment plan after implementation, data generation, transformation and delivery end point.
    a. Phase 1 = people orientation of watershed vision, outcomes, monitoring and assessment activities, Assessment Types, associated monitoring questions and how we will answer them, targeted decision makers, their information needs and data quality objectives
    b. Phase 2 = monitoring orientation for what collect, when, where, how and quality assurance and control needed
    c. Phase 3 = data management plan and starting point for data analyses, interpretation, recommendations, reporting, delivery and data utilization
    d. Phase 4 = evaluation and documentation (here)
- ✓ Overall evaluation of our starting point, the plan we just completed for cost and relevance. Make appropriate adjustments to the plan.
- ✓ A mechanism to identify and communicate the connection between multiple monitoring and assessment plans within our organization or within the watershed.
- ✓ A Final Action Plan, identified gaps and needs, prioritized and a plan to fulfill them to fully implement M & A Plan.

Phase 4 Product Illustration:



What Should Be Done Before This Step

The results from Phase 1 or the people orientation provides the foundation for Phase 2 Steps. Thus, ideally you need to have identified a watershed vision and desired outcomes with associated assumptions and external factors. Defined combination of monitoring reasons and uses, we call Assessment types. For each assessment type a list of monitoring questions the data is to answer and how that question will be answered. For each monitoring question, a list of targeted decision makers, their decision, how they make that decision and what information they need to make the decision. A format to document and summarize the results, we have suggested the information blueprint.

The results from Phase 2 provide the foundation for Phase 3 Steps. This includes the monitoring design, the what, when, where, how and quality assurance and control plan for generating data/results.

The results from Phase 3 provide the foundation and starting point for turning data/results into information. This step identifies the tools and processes for analyses, interpretation, reporting, delivery and data utilization. In addition, this step documents the necessary data management system that will support a data point through the process of generation, validation, entry, storage and retrieval to analyses, interpretation, reporting and delivery. All of this should be defined and documented at this point and will be a significant part of evaluation.

Basic Tasks

Basic Tasks are numbered to correlate with the overall 1-18 Steps provided in these guidance modules followed by the basic task sequence step to complete. For example Step 4, basic task 2 would be numbered as Basic Task Step 4.2, Step 3.3 correlates to Step 3, Basic Task 3.

17.1 Identify who will make the decisions about this step and who should be involved in the planning process (they may be different).

17.2 Self Assessment: Identify what decisions have been made and their effectiveness.

17.3 Complete Final Information Blue Print-Data Pathway Fact Sheet or equivalent for every monitoring question per Assessment Type as a starting point.

17.4 Finalize data pathway illustration for each Assessment Type, include evaluation points now.

17.5 Evaluation Planned and documented for each monitoring and assessment plan component, that includes what evaluated, who evaluated, who is doing the evaluating and at what schedule and by target audience if meaningful.

17.6 Conduct cost analyses and final decisions for starting point, organizational mission and resource evaluation, for all Assessment Types and associated monitoring question Information Blue Print-Data Pathway Fact Sheets (each Blue Print has a cost estimate).

17. 7 If appropriate, Identify and illustrate how multiple assessment Types within organization overlap or are unique. Identify opportunities to reduce duplication and increase efficiency.

17.8 If appropriate, Identify and illustrate how multiple assessment Types within watershed overlap or are unique. Identify opportunities to reduce duplication, increase collaboration, cooperation, efficiency, influence, scope and scale.

17.9 Complete *Final Action Plan* by combining all gaps/needs from each Step into one document, review and plan how to fulfill, summarize, evaluate, prioritize and plan to fulfill.

17.10 Update *Data Management plan part 1 or 2.*

17.11 Update *Inventory Master List* and *Plan.*

17.12 Place Products in your *Watershed Monitoring and Assessment Plan.*

Worksheets

Work sheets are listed below. Not all Basic Tasks have an associated work sheet. To simplify completion of products for each step, the worksheets or broken into small subsets of tasks. This requires moving the results of one task into the next task and will seem redundant, especially if completing worksheets by hand. Worksheets are provided in word here for ease of reproducibility. These are a starting point, we encourage you to customize these and reproduced them in an electronic format, in Excel for example, where it is easy to move information from one area to another by cutting and pasting.

Work Sheets are numbered to correlate with Basic Steps and the overall Steps in these guidance modules. Each consecutive work sheet is lettered a, b, c and so forth, preceded by the Basic Task sequence step, preceded by the Step number. For example, Worksheet Step 4.2.a and Step 4.2.b, correlates to Step 4, Basic Task 2, Worksheet a and Worksheet b. In theory worksheet *a* needs to be completed before worksheet *b*.

Worksheet 17.2.a	**Self Assessment Step 17 Worksheet and Products to be completed Prior to this Step, Part 1 and Part 2**
Worksheet 17.3.a	**Final Information Blue Print- Data Pathway Fact Sheet for every monitoring question per Assessment Type as a starting point**
Worksheet 17.4.a	**Evaluation Planned and documented for each monitoring and assessment plan component, that includes what evaluated, who evaluated, who is doing the evaluating and at what schedule**
Worksheet 17.4.b	**Evaluation by target audience or decision maker (elaboration), if meaningful**
Worksheet 17.7.a	**If appropriate, Identify and illustrate how multiple assessment Types within organization overlap or are unique. Identify opportunities to reduce duplication and increase efficiency.**
Worksheet 17.8.a	**If appropriate, Identify and illustrate how multiple assessment Types within watershed overlap or are unique. Identify opportunities to reduce duplication, increase collaboration, cooperation, efficiency, influence, scope and scale.**
Worksheet 17. 9.a	**Complete** *Final Action Plan* **to review, evaluation and plan to meet all gaps/needs to fully implement M & A Plan. Summary of all gaps and needs is worksheet a.**
Worksheet 17.9.b	**Prioritize and Plan to fulfill gaps and needs is worksheet b**
Worksheet 17.10.a	**Add products of Step to** *Monitoring and Assessment Plan*

How to do Worksheets

For Sheet 17.2.a Self Assessment Step 17 Worksheet and Products to be completed Prior to this Step, Part 1

Part 1. Complete the self assessment section of the worksheet to evaluate what you have or what decisions have already been made. This will help you focus on what you need from this step and incorporate valuable existing information or products into this plan.

Part 2. Next, to prepare to complete this step the following, you need to have the following items addressed:

- ✓ Desired set of outcomes or results that the monitoring and assessment activities will be designed to help achieve
- ✓ Identified monitoring and assessment activities, specific combinations of a monitoring reason plus an associated data use; we call this an Assessment Type. You may have multiple Assessment Types.
- ✓ For each Assessment Type, the list of specific monitoring questions the monitoring and assessment will be designed to answer.
- ✓ For each monitoring question, the targeted decision makers, the type of decisions they will make and the information they need to make them (as specific as possible).
- ✓ A minimal scoping inventory that identifies the watershed boundary and water bodies you are focusing on (rivers, lakes or wetlands), physical attributes of water bodies (including status, uses, etc.), relevant cultural or historical aspects, existing data sets or monitoring efforts and others in the watershed who either you want to influence or could help you implement.
- ✓ Technical sample plan including what monitor (indicators, benchmarks, criteria, etc.), where and when monitor, how will meet data quality objectives (methods, how good does the data need to be for decision makers, quality assurance and control measures), and how will manage and verify raw data/information.
- ✓ Starting point, or what you think you need to do to summarize, analyze data, interpret analyses, formulate interpretations and make recommendations. Any management tools you need to turn raw data into information while maintaining data integrity.
- ✓ Starting point for who you will deliver the data/results/information to, how, what format, when and who will deliver it. Including as many reporting needs as possible.
- ✓ Identification of who is responsible for documentation, implementation and evaluation of this plan.

This is the ideal list, if you do not have any of these, they become a gap or need that should be addressed before any data is collected or analyzed, even if the answers aren't perfect or you don't have a large degree of confidence surrounding them, they should be attempted as the starting point. This is what you are evaluating in this step-your monitoring and assessment plan.

Worksheet 17.2.a Self Assessment Step 17 Worksheet and Products to be completed Prior to this Step, Part 1.

Part 1 Self Assessment of Known Evaluation Products and Processes

1. **Determine if you "have" or "don't have" the item, mark the appropriate box. If you don't have it and determine you don't need it, explain why in the comments document. You may not need to know but perhaps your target decision makers, board or membership might want to know.**

2. **If you have the item "documented", mark that box. If so, list in the comments where, hard copy, chapter in a document, electronic file name and location, etc. The assumption is you value the ultimate goal to document and communicate your M & A plan, activities and results.**

3. **If you have the item, assess the use of it, use the scale below or provide your own answer and comments.**

   Rating Scale for USE:

   0=doesn't exist so use is nil
   1=don't know why would need or understand item
   2=exists, don't know where it is, if it is used, etc. so use is essentially nil
   3=exists and use some of time
   4=exists and use all the time
   5=wish it existed, would use it lots

4. **If you have the item, assess the effectiveness of it, just because something exists or is used does not mean it is effective in its use, use the effectiveness scale below or provide your own answer and comments.**

   Rating Scale for EFFECTIVENESS, assumes material exists:

   0=not effective or functional at all
   1=incomplete (all elements are not there) and some existing parts need revising
   2=incomplete but what is there is okay
   3=complete (all elements are there), some parts okay but need revising
   4=complete and effective

Item	Have	Don't Have	DOC	Assessment of Use (Scale 0-5)	Assessment of Value / Effectiveness (Scale 0-4)	Comments
46. Evaluation of Plan and implementation of plan, process to review M & A results AND adjust M & A plan?						
47. Ability to communicate alignment between multiple M & A within organization? Within watershed?						
48. Identified gaps and needs and associated action plan to fulfill to fully implement M & A plan?						
OTHER?						

*DOC=Documentation, *M & A= Monitoring and Assessment

5. To make this assessment useful, determine what your gaps and needs are regarding this step in order to focus your effort in completing this step.

Worksheet 17.2.a Self Assessment Step 17 Worksheet and Products to be completed Prior to this Step, Part 2. *Part 2 Products to be completed before this step, in order to complete this step*

Item	Response
Desired set of outcomes or results that the monitoring and assessment activities will be designed to help achieve:	
Assessment Types, specific combination of one monitoring reason and data use(r):	
For each Assessment Type, the list of specific monitoring questions:	
For each monitoring question, the targeted decision makers, the type of decisions they will make and the information they need to make them (as specific as possible):	
Watershed(s) and Water bodies of focus:	
Physical attributes of water bodies (status, use, etc.)	
Existing Data or monitoring efforts:	
Indicators, benchmarks and criteria list:	
List of monitoring locations/rationale:	
List of monitoring frequencies:	
Methods list, list of data quality objectives (methods, how good does the data need to be for decision makers), quality assurance and control measures)	
Plan for raw data management and support mechanisms:	
Monitoring results summarized using statistics, graphs and tables.	
The results of your comparison of your data with your benchmarks summarized	
The results of your comparison of your QC data with your data quality objectives	
A method to develop a set of findings from the data set	
Plan or starting point for making interpretations, conclusions and recommendations	
Plan to communicate and deliver appropriate information to	

each targeted decision maker	
Data management plan to support the generation and delivery of information to targeted decision makers.	
Identification of who is responsible for documentation, implementation and evaluation of this plan-task identification	

For Sheet 17.3.a **Final Information Blue Print- Data Pathway Fact Sheet for every monitoring question per Assessment Type as a starting point.**

We suggest you find a tool or mechanism to document and communicate how you will answer each monitoring question per Assessment Type. We provide the Information Blue Print-Data Pathway Fact Sheet as a tool. We like this tool because it illustrates in detail how the monitoring question will be answered, when and the cost. This provides an excellent evaluation tool that is easy to update (versus a large M & A Plan or document). I can evaluate if I answered the monitoring question. I can make statements about the success, failure and evolution of the M & A activity. I can evaluate the monitoring and assessment activities in context with all other activities to we conduct to achieve desired outcomes, I can be accountable.

If an indicator changes I can track that change. If my data summary or analyses metrics or plans change, I can document that. If I compile all the Monitoring Question Blue Prints for each Assessment Type I can evaluate common indicators, stations, decision makers, reporting needs, etc. and thus be cost effective.

And finally I have tool to communicate what we are doing, how we are doing it, when and the progress. This is important for funding, credibility, accountability. It also helps retain institutional memory and staff turnover. It documents our niche and allows others to replicate, complement or assist with our effort.

Edit the following worksheet to meet your needs. Copy and complete for every monitoring objective. Assemble each set of Blue Prints for each Assessment Type.

Worksheet 17.3.a Final Information Blue Print- Data Pathway Fact Sheet

Complete a Blue Print for each Monitoring Question per Assessment Type (See Phase 1, Step 6 for explanation of each item)

Assessment Type: __	**Reason**	**Use**
Monitoring Question Fact Sheet (1 of ___) :		

Information Blueprint #	**Your Response**
1. Watershed Vision and Desired Outcomes this is design to help	
2. Scoping Inventory needs related to Assessment Type	
3. Existing data or monitoring efforts that are of quality to use here	
4. Targeted Decision Makers	
5. Technical info needed by Decision Makers (what, where, when, how, raw data mngt):	
6. DQO's and Qa/Qc needed	
7. Decision makers needs for analyses (summaries, illustrations, metrics, indexes, statistics, etc.)	
8. Decision Maker Benchmarks	
9. Decision makers needs for interpretation, conclusion or recommendations (assessment protocol, criteria, method, process, statistical hypothesis):	
10. Communication & Delivery needs of Decision-maker, organization/others	
11. Monitoring objective is met when XYX…..":	
12. Monitoring System Product:	
13. Evaluation Date	
14. Assumptions and External Factors	
15. Definitions for ambiguous terms:	
16. Ball Park Estimate of $	

For Sheet 17.4.a **Evaluation Planned and documented for each monitoring and assessment plan component, that includes what evaluated, who evaluated, who is doing the evaluating and at what schedule.**

Evaluation is easy and difficult. We suggest that you identify known evaluation points and how you will evaluate what, who and when in a manner that you can document the evaluation and results. If you are creating and information rich system, versus a data poor, then the system is affected by changes in the individual components. The analogy might the be check ups on your car, you get the oil changed every 3,000 miles, tires every other year, belts and hoses every 25,000 miles, etc. The result of each of those evaluations affects the overall performance of the car and your safety and arrival. Likewise, you want to develop the micro-evaluations and ability to transfer the results to other parts of the system. How will you do that?

We provide a table to document the evaluation points, modify and reorganize as need. This is the master check up list. In Phase 1, Step 1 Worksheet $$ 1.xx, helps you identify who makes the various M & A decisions that might help with evaluation as well. If it is helpful illustrate the various components and who is responsible and then document the evaluation for it. This can help identify what needs to be evaluated, then by whom and when it makes sense. See the following example.

Example

Watershed Vision and Desired Outcomes	*Statewide Stakeholder group involved in M & A*	5 Yrs or if legislation changes
Assessment Types	*Program Director, aquatic biologist*	
Monitoring Reason and questions Targeted Decision Makers, DQO's Targeted Decision Makers info needs	*Program Director, organization biologists and Dept of Health*	
Technical Sample Design	*Program Director, align with Dept of Health*	Once a year or when DOH changes
Sample Collection Sample Analyses Raw Data Management	*Program Director, contractor and volunteers*	Monthly sub processes
Data summary and analyses	*Program Director, Dept of Health and interested users*	Annual Rpt, technology changes
Data Interpretation, Conc, Rec Data Delivery	*Program Director, Contractor*	
Management to generate info	*Program Director, contractor, volunteer, Dept of Health and interested users*	
Task Id	*Program Director, Contractor*	Staff changes, contract renewal
Evaluation	*Program Director, contractor, volunteer, Dept of Health and interested users*	Annual work plan
Documentation	*Program Director, Contractor*	Annual update responsibility matrix

Worksheet 17.4.a Evaluation Planned and documented for each monitoring and assessment plan component.

Pick the ones that are meaningful, edit them with your own words and turn into and evaluation plan you can track.

Major Monitoring Evaluation Activity	What?	Who?	When?	How?
1. Each monitoring question can be answered?	Indicator list, benchmark, complete sentence			
2. Information Blue Print-Data Pathway Fact Sheet	Summary of what doing to answer monitoring ?			
3. If Each decision maker received data/information and resulting decision(s)	Delivery, Result, modifications, implications for M & A Plan?			
4. Overall Assessment Type M & A Activity	Success, Failure, modifications to M & A Plan?			
5. Technical Design-What	To answer monitoring?, goals of assessment type, decision maker needs and desired outcomes?			
6. Technical Design-When	To answer monitoring?, goals of assessment type, decision maker needs and desired outcomes?			
7. Technical Design-Where	To answer monitoring?, goals of assessment type, decision maker needs and desired outcomes?			
8. Technical Design-How, methods, data quality objectives, Qa/Qc	To answer monitoring?, goals of assessment type, decision maker needs			

	and desired outcomes? Lab vs. Field, etc.			
9. Quality Assurance and Control Plan?				
10. Data Summary or Analyses?	Tools, methods, metrics, etc?			
12. Data Interpretation, Conclusion, Recommendation	Tools, Methods, etc.?			
13. Data Reporting or Delivery mechanisms	Reporting formats, methods, delivery frequency, etc.? Audience changes?			
14. Data management of raw data, data management plan?	Improvements, error reduction, form updates, software upgrades, etc?			
13. Management tools for generating information?	Improvements, changes, upgrades, etc.?			
14. M & A Plan, document	Overall M & A document			
15. Inventory Master List, Action Plan	Inventory documentation, gaps and needs?			
16. Evaluation Plan, protocols?	Are they adequate, the right ones, etc. ?			
17. Staff or partner changes associated with M & A implementation	Training, carry on institutional knowledge by?			
18. Watershed boundary or water bodies of focus	Changes in status or use, expand, reduce, etc.?			
19. Targeted Decision Makers	Are they still the right ones? New ones?			
20. Targeted Decision Makers information needs	Have their needs changed?			

21. Who is involved with this effort?	Still right folks, need more, less, targeted individuals, etc.?			
22. Communication re: M & A Plan	Need to do more/less with whom?			
23. Desired Outcomes	Same, adjust, etc.?			
24. Watershed Vision	Are we closer? How do we know?			
25. Action Plan to identify and fulfill gaps and needs	What do we need, how build capacity to get?			

Worksheet 17.4.b Evaluation Planned and documented for each target audience or decision maker.

Pick the ones that are meaningful, edit them with your own words and turn into and evaluation plan you can track, you could add a "who" column..

Group/Audience	How Follow-up Will Happen:	Schedule (times/year)
Citizen Volunteer Monitors	Send monitoring report	1 time/year – usually in December or January
	Data report & recognition picnic	1/year
	Training session	1/ year – spring
	Phone call, letter	2/year personal during season (at least)
Data Users	Send monitoring report	1 time/year usually in December or January
	Phone call	1/year in February at least with each data user to talk about any changes and to check-in to see how they have been using report.
ETC.		

For Sheet 17.7.a **If appropriate, Identify and illustrate how multiple assessment Types within organization overlap or are unique. Identify opportunities to reduce duplication and increase efficiency.**

You can take the Information Blue Print-Data Fact Sheet for each monitoring question or an equivalent and evaluate them for redundancy, overlap and consistency. You are looking for ways to streamline and/or efficiencies. For example, you could make a list of all indicators and what Assessment Types they each serve. You could make a list of all stations and what Assessment Types they each serve. You can do this with targeted decision makers, duplicate information and reporting needs. Once this evaluation is complete, summarize the information in a meaningful way. It might be valuable to your board, funders and stakeholders to understand how each Assessment Type is different (for valid reasons) and how they are the same (efficiencies). If your data pathway per monitoring question is summarized in a functional way, this evaluation is not that difficult or time consuming for the benefits. This way as a manager, you can streamline your resources.

If the individuals or entities accountable to different M & A Plan components are responsible for multiple Assessment Types, then you can stream line evaluation as well.

We have provided some example tables that might help you evaluate the common areas between Assessment Types and associated monitoring questions, to identify important differences and to distinguish efficiencies of overlaps. Make any M & A adjustments that might increase efficiencies across Assessment Types. Edit, adapt the following worksheets or create your own.

The common areas of overlap of to identify might be by:

- ✓ Indicator
- ✓ Station
- ✓ Waterbody
- ✓ Decision Maker (also in Data Use))
- ✓ Information need
- ✓ Benchmark or criteria

Worksheet 17.7.a Identify and illustrate how multiple assessment Types within organization overlap or are unique. Identify opportunities to reduce duplication and increase efficiency.

Step 1. List all Assessment Types Evaluating and their monitoring reason and use(r).

Example of Worksheet 17.7.a

Assessment Type	Monitoring Reason	Data Use(r)
A1-a	Condition/Trend	Watershed Association
A1-b	Condition/Trend	Dept of Health 305(b) report
CII-a	Effectiveness Evaluation	Watershed Association
CII-b	Effectiveness Evaluation	State Non Point Source Team for Sediment BMP's implemented
ETC.		

Step 2. First look for common monitoring reasons and data use(r), you can list the specific data user versus "data use", adapt to your work:

Assessment Type	Monitor Reason 1	Monitor Reason 2	Monitor Reason 3	Monitor Reason 4	Data Use 1	Data Use 2	Data Use 3	Data Use 4
AI-a	x				x			
AI-b	x					x		
CII-a		x			x			
CII-b		x					x	
ETC.								

Step3. Choose a variable from the list in the instructions or use your own to evaluate:

Indicator	AI-a	AI-b	CII-a	CII-b	Ass Type	Ass Type	Ass Type	Ass Type
Diss Oxygen	x	x	x	x				
Temperature	x	x		x				
Bugs		x	x					
Etc.		x	x					
Station								
Sta 82	x			x				
Sta 3	x	x		x				
Sta 56	x	x	x					
Etc.								
Waterbody								
Jones Cr, Segment 5			x	x				
Jones Cr, Segment 6			x	x				
Blue Creek	x	x						
Clear Lake	x	x						
Etc.								
Info Need								
305(b) Report		x		x				
Layman Report	x		x					
Etc.								
Benchmark								
Reference Site 4	x	x						
Reference Site 12a			x					
Diss Oxy Stream Standard	x	x	x	x				
Etc.								
Other								

Step 4. Review and evaluate, look for overlap/efficiencies and opportunities to collaborate.

For Step 17.8.a **If appropriate, Identify and illustrate how multiple assessment Types within watershed overlap or are unique.**

Use the same tables in Worksheet 17.7.a but include the source of the monitoring effort. You can use this to evaluate another monitoring and assessment effort as well. If valuable draw your own cog and wheel diagram.

Worksheet 17.8.a **Identify Assessment Types evaluating, summarize by Assessment Type, indicator, station, water body, information need, benchmark or any meaningful variable.**

Step 1. List all Assessment Types, source and evaluating and their monitoring reason and use(r).

Example of Worksheet 17.8.a

Assessment Type	Source	Monitoring Reason	Data Use(r)
A1-a	US	Condition/Trend	Watershed Association
A1-b	US	Condition/Trend	Dept of Health 305(b) report
A1 Outside	Health Dept	Condition/Trend	Health Dept (self)
CII-a	US	Effectiveness Evaluation	Watershed Association
CII-b	US	Effectiveness Evaluation	State Non Point Source Team for Sediment BMP's implemented
CII-Outside	Soil Conservation District	Effectiveness Evaluation	Membership and Grant Source
ETC.			

Step 2. First look for common monitoring reasons and data use(r), you can list the specific data user versus "data use", adapt to your work:

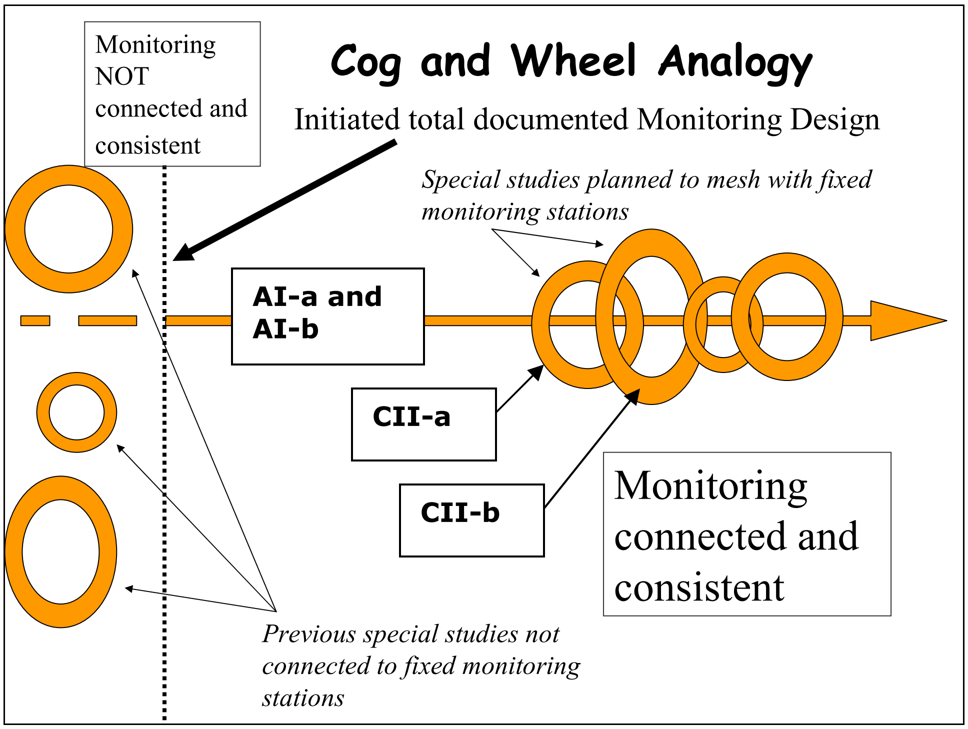
Assessment Type	Monitor Reason 1	Monitor Reason 2	Monitor Reason 3	Monitor Reason 4	Data Use 1	Data Use 2	Data Use 3	Data Use 4
AI-a	x				x			
AI-b	x					x		
AI-Outside	x				x			
CII-a		x			x			
CII-b		x					x	
CII-Outside		x						
ETC.								

Step3. Choose a variable from the list in the instructions or use your own to evaluate:

Indicator	AI-a	AI-b	AI-Outside	CII-a	CII-b	CII-Outside	Ass Type	Ass Type
Diss Oxygen	x	x	x	x	x	x		
Temperature	x	x	x		x	x		
Bugs		x	x	x				
Etc.		x		x				
Station								
Sta 82	x				x			
Sta 3	x	x			x			
Sta 56	x	x		x		x		
Etc.								
Waterbody								
Jones Cr, Segment 5			x	x	x			
Jones Cr, Segment 6				x	x			
Blue Creek	x	x	x			x		
Clear Lake	x	x				x		
Etc.								
Info Need								
305(b) Report		x	x		x			
Layman Report	x			x		x		
Etc.								
Benchmark								
Reference Site 4	x	x	x					
Reference Site 12a				x				
Diss Oxy Stream Standard	x	x	x	x	x			
Etc.								
Other								

Step 4. Review and evaluate, look for overlap/efficiencies and opportunities to collaborate.

Step 5. Illustrate a Cog and Wheel diagram if useful: Example below shows before planning and after that AI-a and AI-b are the cog, and CII-a and CII-b are wheels, shorter term different focus but have some common stations, indicators, water bodies or decision makers in this example.:



Step6. It also might be helpful to assess Assessment Types on a temporal scale. See the examples 1-3 in the background and Content Section. Do this if meaningful, it can help with planning and evaluation for efforts that do the same then with multiple water bodies or multiple things in several water bodies. In either case there is are activities that occur over a time span.

For Step 17. 9.a **Complete *Final Action Plan* to review, evaluation and plan to meet all gaps/needs to fully**

After each step you added to the Action Plan remaining gaps and needs associated with that step. This worksheet has you review and evaluate these gaps and needs in context with each other. Then you prioritize them and develop a plan how to fulfill those needs within the next month to five years.

Worksheet 17.9.a Final Action Plan Part 1, Summary:

If you have completed each Step, you have a cumulated list of gaps and needs related to that Step. If you have not, look at what each Step is supposed to accomplish and record what your gaps and needs are related to that step. The goals is to get the gaps and needs in one place to evaluate and prioritize.

Phase 1 Step 1:
Phase 1 Step 2:
Phase 1 Step 3:
Phase 1 Step 4:
Phase 1 Step 5:
Phase 1 Step 6:
Phase 2 Step 7:
Phase 2 Step 8:
Phase 2 Step 9:
Phase 2 Step 10:
Phase 2 Step 11:
Phase 3 Step 12:
Phase 3 Step 13:
Phase 3 Step 14:
Phase 3 Step 15:
Phase 4 Step 16:
Phase 4 Step 17:
Phase 4 Step 18:

Worksheet 17.9.b Final Action Plan Part 2, What Action Will you Take?

From the Gaps and Needs list in Worksheet 17.9.a, prioritize and plan by placing every item in the following table and complete the table. If the time frames are not meaningful or column headings, edit.

Within the next month?	**Who will do it?**	**When/timing?**	**Obstacles / Challenges?**
Within the next 3 months?	**Who will do it?**	**When/timing?**	**Obstacles / Challenges?**
Within the next month?	**Who will do it?**	**When/timing?**	**Obstacles / Challenges?**
Within the next 6 months?	**Who will do it?**	**When/timing?**	**Obstacles / Challenges?**
Within 1 year?	**Who will do it?**	**When/timing?**	**Obstacles / Challenges?**
Within 2 years?	**Who will do it?**	**When/timing?**	**Obstacles / Challenges?**
Within 5 years?	**Who will do it?**	**When/timing?**	**Obstacles / Challenges?**

For Sheet 17.10.a **Add products of Step to** *Monitoring and Assessment Plan.*

- Final Information Blue print–Data Pathway Fact Sheet for each monitoring question per Assessment Type
- Cost Analyses
- Evaluation Plan
- Documentation of overlap and opportunities for multiple M & A within organization and/or watershed.
- Final Action Plan

Worksheet 17.10.a Monitoring and Assessment Plan

If you completed any Steps this Worksheet is cumulative, if you have not you could complete all items. You can rearrange the order, edit the content now or when complete to be more meaningful.

I. People Design, Phase 1
   A. Shared Watershed Vision and Desired Outcomes (Step 1)
      1. Logic Model of Desired Outcomes/Results and activities/target audiences to employ to achieve outcomes
   B. Keepers of the M & A Plan (Step 1)
   C. Watershed Boundary (Step 2)
   D. Water bodies of Interest (Step 2)
   E. Scope Inventory Master List* (Step 2)
      1. Physical Inventory * (Step 2)
      2. People Inventory* (Step 2)
      3. Information Inventory* (Step 2)
         a. Existing Monitoring Efforts (Step 2)
         b. Existing Data Sources (Step 2)
      4. Inventory Action Plan* (Step 2)
   F. Assessment Type(s) List – Monitoring Reason + Use (Step 3)
      1. Monitoring Question(s) (Step 4)
      2. Targeted Decision Maker(s) (Step 5)
         a. Information Needs (Step 5)
      3. Information Blue Print – Data Pathway Fact Sheet Per Monitoring Question* (Step 6), including Cost Estimate
II. Technical Design, Phase 2
   A. What (Indicators, Benchmarks, etc.) and why? (Step 7)
   B. When and why? (Step 8)
   C. Where and why? (Step 9)
   D. W(how) will meet data quality objectives? (Step 10)
      1. Data quality objectives (Step 5 and 10)

2. Quality Assurance and Control Measures (Quality Assurance and Control Plan)* (Step 10)

E. Data Management for Raw Data (Data Management Plan Part 1)* (Step 11)

III. Information Design, Phase 3

A. Data Analyses (Step 12)

1. Starting Point (Step 12)
2. Changes (Later)

B. Data Interpretation, Conclusions, Recommendations

1. Starting Point (Step 13)
2. Changes (Later)

C. Communication and Delivery

1. Starting Point (Step 14)
2. Changes (Later)

D. Management Plans to Generate Information (Data Management Plan Part 2)* (Step 15)

IV. Evaluation Design, Phase 4

A. Who Will Do What? (Step 16)

1. Task Identification Matrix (Step 16)
2. Communication Structure and Tools (Step 16)

B. Evaluation Plans (Step 17)

1. ➨Evaluation Plans for M & A Components (Step 17)
2. ➨Evaluation Plans for M & A Implementation (Step 17)
3. ➨Evaluation of inter/intra M & A Activities (Step 17)

C. Documentation and Communication (Step 18)

1. M & A Plan (**this document**, updated Sub documents) (Step 18)
2. Communication and Peer Review Plan (Step 18)
3. ➨Action Plan* (Step 17)

**Italics mean a sub plan that might be attached or live somewhere else, location of document and contact is what would go in the plan*

Background and Content

Final Information Blue Print-Data Pathway Fact Sheet for every monitoring question per Assessment Type as a starting point

Using the Information Blue Prints drafted in Step 6, Phase 1, Worksheet $$6.1.a. Edit and finalize according to the results generated in Phase 2 and Phase 3. Complete for each monitoring question per Assessment Type. This will help set the stage to determine what to evaluate when, because this documents the starting point. These blueprints also provide a communication tool for what we are doing and not doing as well as a way to track changes as we evolve and adapt.

Final modification to your data pathway diagram or flow chart

The data pathway is the planned path that each data/result generated will take from generation to end point and in between. The end point is when the data as information is delivered to a decision maker for a decision and that has been evaluated. Phase 1 helps determine the people orientation for data gathering or monitoring and assessment. Which provides the foundation for Phase 2, the monitoring design that determines, what, where, when, how and quality of data collected. The results of Phase 2, helps determine the needs for data management in Phase 3. Phase 3 also plans the starting point for how data results will transform into information through analyses, interpretation, reporting and delivery and the associated data management needs. Phase 4, finalizes the data pathway by identifying who is responsible for what, what evaluation will occur and final documentation of the plan's starting point.

If it is helpful illustrate this pathway for each Assessment Type and set of monitoring questions, you can add the who's and evaluation pieces to the pathway.

Identification and determination of evaluation points and processes for each component of the plan as it is implemented

Evaluation is a process itself it involves:

- Observe-What are we doing? What are the current conditions? What resources are being depleted and what new ones have become available? Do audits, energy (of building), skill and talent audit (of staff), etc.
- Orient-What trends are developing? How is our plan working? Are we making progress toward our goals? How do we know? What new obstacles or allies have emerged?
- Decide-In light of those changing conditions – and in concert with our vision –what new plan or action do we need to undertake?
- Act – And then do it again – observe, orient, decide, act and keep doing it.

You must do this continuously, because working towards a vision is a dynamic, evolving process in which conditions continuously change. It is very important to remember that success changes the game, so that doing what you did before will not give you the same result. The hardest thing of all—

because we get tunnel vision under stress—is deciding what to do when things are not working. Stop what you're doing? Don't do it harder. Don't do it longer. Don't throw more resources at it. Instead, back off, regroup, and work through the change management model to resolve the problem.

Any process of change is a complex system. It is goal-driven, interactive, and has both positive and negative feedback loops built in. It's even self-organizing. But it won't operate in a vacuum. It needs a vision to drive it.

For each monitoring and assessment component important for your evaluation describe:

- How Follow Will Happen: Note the ways you plan to follow-up. Will each monitor get a personal phone call or visit at least once a year? How will you find out if your data users have made any decisions with your data?
- Who is the audience(s) of the evaluation, might be multiple audience to consult.
- Who will conduct the evaluation and
- What frequency or schedule will evaluation be planned?
- Document the evaluation plan

You can organize this in several ways, organize how ever it is meaningful. Two examples below provide an evaluation plan by component and then by audience.

Major Monitoring Evaluation Activity	What?	Who?	When?	How?
1. Each monitoring question can be answered?	Indicator list, benchmark, complete sentence			
2. Information Blue Print-Data Pathway Fact Sheet	Summary of what doing to answer monitoring ?			
3. If Each decision maker received data/information and resulting decision(s)	Delivery, Result, modifications, implications for M & A Plan?			
4. Overall Assessment Type M & A Activity	Success, Failure, modifications to M & A Plan?			
5. Technical Design-What	To answer monitoring?, goals of assessment type, decision maker needs and desired outcomes?			
ETC. (see worksheet)				

Table 2

Group/Audience	How Follow-up Will Happen:	Schedule (times/year)
Citizen Volunteer Monitors	Send monitoring report	1 time/year – usually in December or January
	Data report & recognition picnic	1/year
	Training session	1/ year – spring
	Phone call, letter	2/year personal during season (at least)
Data Users	Send monitoring report	1 time/year usually in December or January
	Phone call	1/year in February at least with each data user to talk about any changes and to check-in to see how they have been using report.

Organizational Capacity and Cost analyses

Review the cost analyses of each phase, by reviewing the costs of each monitoring question per Assessment Type cost estimate or in your own way. Assess you current capacity and what you need to develop for the future. Prioritize and decide, adjust the plan accordingly.

Tips to Consider for Implementation of Watershed Monitoring & Assessment Plan

You may consider piloting various aspects of the program before full fledge implementation. This could include piloting indicators, timing, locations, methods, data analyses methods, and reporting.

Implementation of your watershed assessment monitoring plan –

- Pilot aspects of the plan prior to full implementation, such as methods, equipment, software, processes, access to sites, install staff gauges, etc. Collect data, small scale test, test time period, etc.
- Peer review of plan components, monitoring design's ability to answer monitoring questions, database design to support management of result and data to information functions, quality assurance, control and data quality objectives, etc.
- Acquire site location information and associated meta-data
- Review results at design times in targeted processes, incorporate quality assurance and control information, review results, meet data quality objectives-data reliability
- Define and determine data utilization plan, how will report and deliver data to decide if decision was made or not and the role your information provided in that decision
- Evaluate, evaluate, evaluate
- Document, edit, document, edit and document

Alignment with other organization or watershed monitoring and assessment Types or activities

Organizational. You might develop a simple visual, such as a table, that illustrates your monitoring projects together, with purposes, planned activities, and locations and timing all included. This overview incorporates you monitoring activities with the outcome/result they were design to help achieve. The information blue print in Step 6, Phase 1 is created for every monitoring question associated for each Assessment Type. If those were completed, edited after Phase 2 and Phase 3 Steps, they could be used to assess for overlap, redundancy and identify differences.

Example 1

Is a simple attempt to list all Assessment Types and evaluate their common monitoring reasons or data use or users, first list all Assessment Types, then compare them.

Assessment Type	Monitoring Reason	Data Use(r)
A1-a	Condition/Trend	Watershed Association
A1-b	Condition/Trend	Dept of Health 305(b) report
CII-a	Effectiveness Evaluation	Watershed Association
CII-b	Effectiveness Evaluation	State Non Point Source Team for Sediment BMP's implemented
ETC.		

Assessment Type	Monitor Reason 1	Monitor Reason 2	Monitor Reason 3	Monitor Reason 4	Data Use 1	Data Use 2	Data Use 3	Data Use 4
AI-a	x				x			
AI-b	x					x		
CII-a		x			x			
CII-b		x					x	
ETC.								

Example 2

Here is an example comparing Assessment Types by a variety of variables:

Indicator	AI-a	AI-b	CII-a	CII-b	Ass Type	Ass Type	Ass Type	Ass Type
Diss Oxygen	x	x	x	x				
Temperature	x	x		x				
Bugs		x	x					
Etc.		x	x					

Station								
Sta 82	x			x				
Sta 3	x	x		x				
Sta 56	x	x	x					
Etc.								
Waterbody								
Jones Cr, Segment 5			x	x				
Jones Cr, Segment 6			x	x				
Blue Creek	x	x						
Clear Lake	x	x						
Etc.								
Info Need								
305(b) Report		x		x				
Layman Report	x		x					
Etc.								
Benchmark								
Reference Site 4	x	x						
Reference Site 12a			x					
Diss Oxy Stream Standard	x	x	x	x				
Etc.								
Other								

Example 3

Is an attempt to illustrate the temporal aspects of a monitoring and assessment program that includes the same effort and process applied to multiple water bodies over time, such as trend assessment might do. Resources and variability doesn't allow for all 10 watersheds or water bodies below to be monitored, assessed, develop management tools (action) and a watershed action plan in one year.

	First Stage of WS Assessment and Plan							Second Stage	
Water body or	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10

subshed										
1	A	A P	A P I	→	→	→	→	→	A N	A I
2	A	A P	A P I	→	→	→	→	→	A N	A I
3	A	A P	A P I	→	→	→	→	→	A N	A I
4		A	A P	A P I	→	→	→	→	→	A N
5		A	A P	A P I	→	→	→	→	→	A N
6		A	A P	A P I	→	→	→	→	→	A N
7			A	A	A P I	→	→	→	→	→
8			A	A	A P I	→	→	→	→	→
9			A	A	A P I	→	→	→	→	→
10			A	A	A P I	→	→	→	→	→

A=WS Assessment, monitoring, interpret, evaluate P=watershed planning
I=implementation of WS management tools N=new watershed plan

Example 4

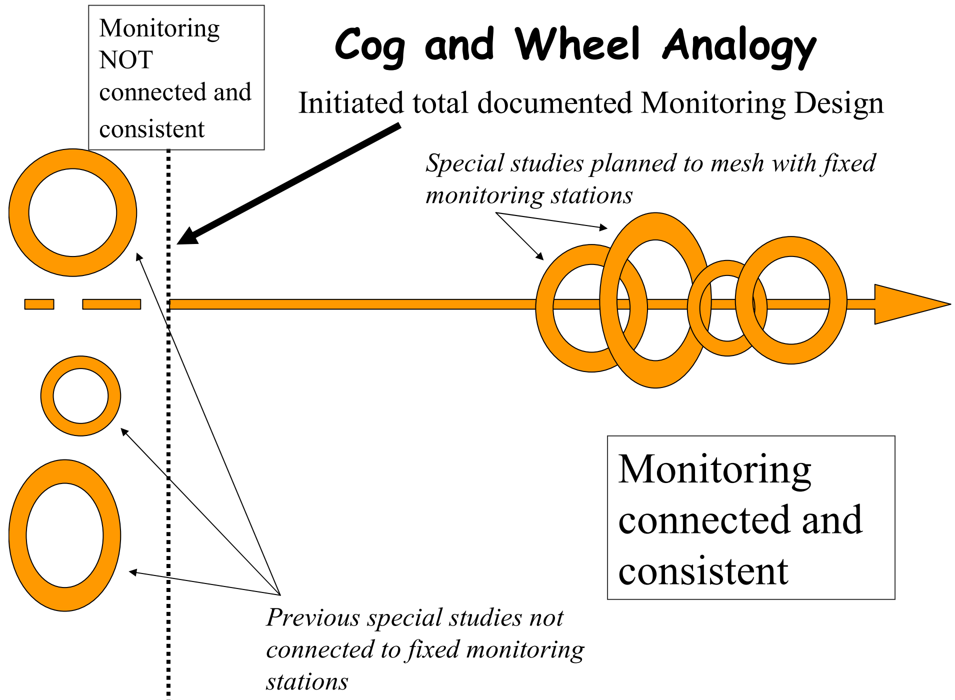
Is another attempt to illustrate a temporal aspect. Here, one Assessment Type and multiple water bodies, but different activities each year. This could be completed for all Assessment Types and help with the evaluation of overlap.

Assessment Type = Monitoring reason + Data use or user:					
Waterbody	Year 1	Year 2	Year 3	Year 4	Year 5
1	C,B,P,D,M	C,B,P,D,R,M,L,H	C,B,P,D,R,M,E	C,B,P,D,M	C,B,P,D,R,M,E
2	C,B,P,D,M, L	C,B,P,D,R,M, L	E	E	C,B,P,D,R
3	H	C,B,P,D,R	E	E	C,B,P,D,R
4	H	C,B,P,D,R	E	E	C,B,P,D,R
5	C,B,P,D,M	C,B,P,D,M	C,B,P,D,M	C,B,P,D,M,R	E

Activity Label from Watershed Assessment Monitoring Design:
C=chemical sampling M=monitoring evaluation
B=Biological sampling L=Landscape assessment
P=Physical habitat H=human sampling, use perception survey
D=data analyses, interpretation E=education campaign
R=data reporting

Example 5

This example is a visual to show how each Assessment Type is related to long term fixed monitoring stations or a baseline long term set of stations desired for trend assessment for example. It is referred to as the cog and wheel diagram. The cog is the long term fixed monitoring stations that are used for appropriate Assessment Types, like trend analyses for a targeted decision maker. The wheels are other Assessment Types that use the same stations, indicators, frequency, etc. as the long term monitoring stations. The cog can be any common component or set of common components – you define it. The wheels size and diameter might indicate differences, in say frequency, duration, decision maker again, you define. This just illustrates how they all are related or not related.



This diagram can help illustrate how long term and short term Assessment Types or monitoring efforts overlap or are connected, and if not, perhaps why. One option is that the cog is your Assessment Types that are long term, permanent in nature or the nucleus of your program. Each wheel has its own monitoring questions, own set of indicators, own set of data purposes, users and decision makers, possible its own set of outcomes. The cog then is the commonality of locations, indicators, data purposes, data uses and or decision makers. It all should be derived from a common vision, mission and desired set outcomes. If a project has no commonality, it is not a wheel on the cog, but can be illustrate as a wheel in the basin. It is perfectly okay to have a wheel not on the cog as long as you know why and that project is as well defined and planned as those on the cog.

Any tool that allows you to track, communicate and manage multiple projects within your organization. You want to have strategic overlap, if there is overlap of:

- Indicators per location, purpose, use or decision makers
- Location per purpose, use and decision makers
- Data purposes per decision makers
- Data uses per decision makers
- Reporting per decision makers

Once all your monitoring projects, which we know assumed, are connected to desired outcomes, mission and vision, have defined monitoring questions; and the associated monitoring design is developed (what, where, when, how, data quality, data management, data analyses, data interpretation, data conclusions, data reporting and evaluation) you can utilize the cog and wheel illustration.

Watershed. You can do the same visual as you produced for your own multiple assessment types, if you have the information from the other monitoring entities.

You can use any table, illustration or cog and wheel analogy for other watershed assessment efforts and monitoring projects in your defined watershed. You need to be able to answer the same basic questions about other monitoring efforts as you defined for your own. You may not need to know the organizations visions, outcomes and structural alignment but you do need to know (and in theory they do to):

- Monitoring reason(s)
- Intended data use(s)
- Monitoring question(s)
- Targeted decision maker(s)
- What monitor
- Where monitor
- When monitor
- How monitor
- Data quality
- Evaluation of Monitoring

If you cannot identify how multiple monitoring projects are connected or how they are not, either within your organization or watershed, it should be identified as a need and goal.

Finalize Action Plan to meet gaps and needs to fully implement M & A Plan

If you completed each step in these workbooks, or some of them, you identified gaps and needs that exist in order to fully implement your new or revised monitoring and assessment plan. If you have not completed any other steps, you can develop a list of gaps and needs by reviewing what each of the steps produce and where you are with those products and processes. You can also complete the self assessment worksheet provided in the Overview or in each step. If you do not have any gaps or needs, then count your blessings and move on to implementation, evaluation and achieving your desired results.

If you do have a list of gaps and needs, chances are they will not be fulfilled unless you plan some action to do so. We suggest putting them together in context with each other and your organizational capacity, prioritize them and plan action steps to achieve. This is what we call the Final Action Plan and should accompany your monitoring and assessment plan and be updated as frequently as the plan. This places your needs in context with an activity (monitoring and assessment), which now should be linked with desired outcomes, a watershed vision and your organization mission. This can be very powerful tool to for planning and communication with boards, funders, stakeholders and decision makers.

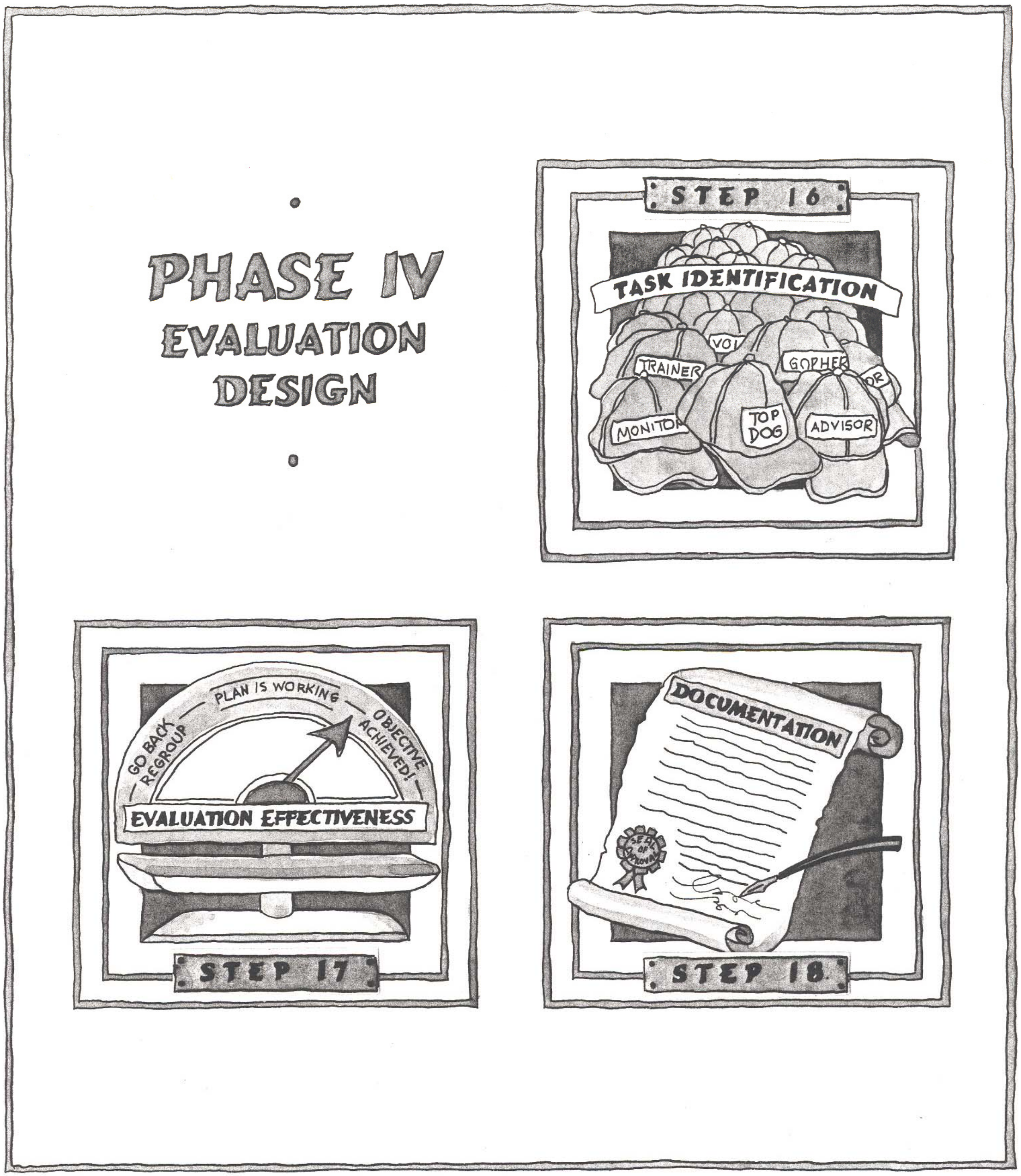
Case Study 1:

Case Study 2:

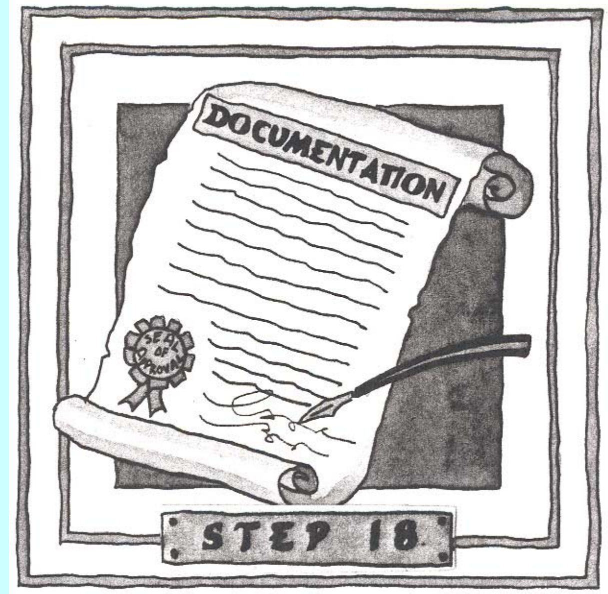
References

Resources

Contents in Phase 4, *Step 17 Resource Guide*:


PHASE IV
EVALUATION
DESIGN
STEP 16
TASK IDENTIFICATION
TRAINER
GOPHER
TOP DOG
ADVISOR
PLAN IS WORKING
GO BACK REGROUP
OBJECTIVE ACHIEVED!
EVALUATION EFFECTIVENESS
STEP 17
DOCUMENTATION
STEP 18

Step 18: Documentation and Communication (of Monitoring and Assessment Plan)



"If the idea of mentoring were reawakened in the culture, we wouldn't go to therapy looking for a mother, a father, a teacher—all in one person, we wouldn't need therapy as much if individuals had more of their own practice, with nature, art, music, or a spiritual discipline, it must be a practice that invites dedication."

James Hillman

About This Step - *This step is designed to accomplish 4 things:*

1. Documentation of *Watershed Monitoring and Assessment Plan*
   - Mechanism to summarize plan, such as each set of Information Blue Prints – Data Pathway Fact sheets for each monitoring question per Assessment Type.

2. Documentation of sub-plans such as Action Plan (gaps and needs remaining to fully implement M & A Plan), Master Inventory List, Inventory Action Plan, Data Management and Quality Assurance and Control Plan for example.
3. Identify what needs to be communicated to whom and when regarding the monitoring Plan
   - Internal Review
   - Peer Review
   - Stakeholder Review
   - Decision Maker Review

4. Mechanism to summarize and communicate monitoring and assessment activities in context with all other activities and target audiences that are designed to achieve desired outcomes, such as

the Logic Model which articulates outcomes, associated activities/audiences, inputs, assumptions and external factors.

Why Do This Step?

Documentation takes time, often time we push off to the side. Documentation is a very important part of your monitoring design's effectiveness and accountability. Documentation provides:

- Organizational and WS Assessment Accountability
- Organizational and WS Assessment Credibility
- Baseline where you started, why, assumptions and external factors
- Institutional knowledge and history
- Transition and training tool
- Opportunity for peer review
- Communication what you are doing and why (and by default what you aren't doing)
- Misuse of data or misrepresentation of data

A result of this workshop you will have documentation on each step we have laid out. You came with an assessment of each step, what is available, how it is used and if it is effective. You leave each step with a synopsis of what you want to might need, want to change, create or celebrate. If you put these individual pieces together, you have a documented watershed assessment monitoring design.

Communication is as important as documentation. Once you have documentation in whatever form, pieces or a whole, you can get feedback from internal staff or constituents, peers, stakeholders and or decision makers. This is an opportunity to involve people to participate in collecting the very information they may be fearful of. It is much easier to find synergy and solutions when all parties were part of developing the design that if information is presented cold. The process of collecting the information, analyzing it and so forth builds trust, creates an opportunity for all needs to be on the table. When all needs are on the table, we don't blame as much we can look at ways to get needs met, this is the place most solutions will be generated.

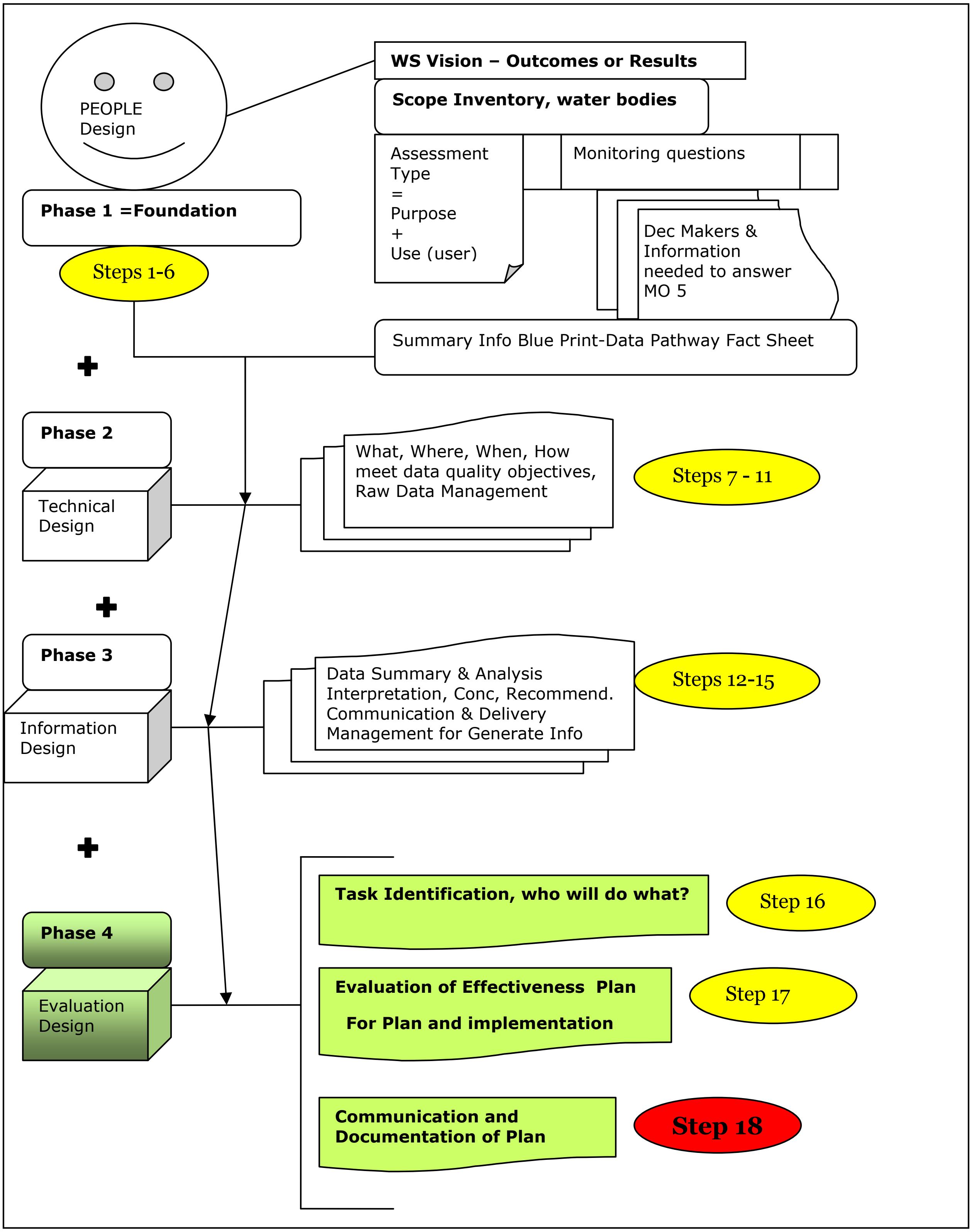
Where are we in the Big Picture Illustration?

Phase 1	Step 1: Share Watershed Vision and Desired Outcomes (Results) Step 2: Scope Inventory (Physical, People and Information) Step 3: Identify Monitoring Reason(s) and Data Use(s) (Assessment Type) Step 4: Develop Monitoring Questions (Refinement of Monitoring Reason) Step 5: Target Decision Makers and Info Needs (Refinement of Data Use) Step 6: Summarize with Information Blue Print-Data Pathway Fact Sheet)
Phase 2	Step 7: What Will You Monitor? Step 8: When Will You Monitor? Step 9: Where Will You Monitor? Step 10: How Will You Monitor to Meet Data Quality Objectives? Step 11: Management of Raw Data (Data Management Plan Part 1)
Phase 3	Step 12: Data Summary and Analysis Step 13: Interpretation, Conclusions and Recommendations Step 14: Communicating and Delivery Step 15: Management to Generate Info (Data Management Plan Part 2)
Phase 4	Step 16: Who Will Do What? Task Identification Step 17: Evaluation of Effectiveness (of Plan and Implementation) **Step 18: Documentation and Communication (of M & A Plan)**

Products (see Figure Phase 4 Product List):

- ✓ A documented monitoring and assessment plan that states what your are doing and not doing, that is derived and connected from a watershed vision and related outcomes and linked to targeted decision makers information needs and decision process, thus can be evaluated.
- ✓ Sub-documentation to support t the M & A Plan if appropriate, such as Master Inventory List or Data Management Plan.
- ✓ A plan to communicate this monitoring and assessment plan with targeted audiences for designed purposes (feedback, to inform, to gain participation, to start a dialogue, etc.).
- ✓ A mechanism to communicate to those who don't know, how monitoring and assessment activities relate to other activities and target audiences employed to achieve desired outcomes, the logic model with inputs, assumptions and external factors.

Phase 4 Product Illustration:



What Should Be Done Before This Step

The results from Phase 1 or the people orientation provides the foundation for Phase 2 Steps. Thus, ideally you need to have identified a watershed vision and desired outcomes with associated assumptions and external factors. Defined combination of monitoring reasons and uses, we call Assessment types. For each assessment type a list of monitoring questions the data is to answer and how that question will be answered. For each monitoring question, a list of targeted decision makers, their decision, how they make that decision and what information they need to make the decision. A format to document and summarize the results, we have suggested the information blueprint.

The results from Phase 2 provide the foundation for Phase 3 Steps. This includes the monitoring design, the what, when, where, how and quality assurance and control plan for generating data/results.

The results from Phase 3 provide the foundation and starting point for turning data/results into information. This step identifies the tools and processes for analyses, interpretation, reporting, delivery and data utilization. In addition, this step documents the necessary data management system that will support a data point through the process of generation, validation, entry, storage and retrieval to analyses, interpretation, reporting and delivery. All of this should be defined and documented at this point and will be a significant part of evaluation.

Finally, how you plan to evaluate this monitoring and assessment plan you will determine here and this will be part of the documentation and communication plan as a result of the last Step.

Basic Tasks

Basic Tasks are numbered to correlate with the overall 1-18 Steps provided in these guidance modules followed by the basic task sequence step to complete. For example Step 4, basic task 2 would be numbered as Basic Task Step 4.2, Step 3.3 correlates to Step 3, Basic Task 3.

18.1 Identify who will make the decisions about this step and who should be involved in the planning process (they may be different).

18.2 Self Assessment: Identify what decisions have been made and their effectiveness.

18.3 Identification and completion of Sub-Plans or Documents to include in the overall M & A Plan. The possible sub-plans identified in these workbooks include:

Inventory Master List and *Inventory Action Plan*

Information Blue Print – Data *Pathway Fact Sheet*

Data Management plan part 1 or 2

Quality Assurance and Control Plan

Evaluation Plan

Action Plan (to fill gaps and needs to fully implement M & A Plan)

18.4 Finalize *Watershed Monitoring and Assessment Plan* and Documentation from Phase 1-4. Reorganize outline/content if appropriate.

18.5 Determine audiences and communication purpose and strategy (for approval, credibility, support, assistance, etc.).

18.6 Determine mechanism to summarize and communicate monitoring and assessment activities in context with all other activities and target audiences that are designed to achieve desired outcomes, such as the Logic Model which articulates outcomes, associated activities/audiences, inputs, assumptions and external factors (if needed and if M & A Plan will not suffice).

18.7 Prepare for Implementation!

Worksheets

Work sheets are listed below. Not all Basic Tasks have an associated work sheet. To simplify completion of products for each step, the worksheets or broken into small subsets of tasks. This requires moving the results of one task into the next task and will seem redundant, especially if completing worksheets by hand. Worksheets are provided in word here for ease of reproducibility. These are a starting point, we encourage you to customize these and reproduced them in an electronic format, in Excel for example, where it is easy to move information from one area to another by cutting and pasting.

Work Sheets are numbered to correlate with Basic Steps and the overall Steps in these guidance modules. Each consecutive work sheet is lettered a, b, c and so forth , preceded by the Basic Task sequence step, preceded by the Step number. For example, Worksheet Step 4.2.a and Step 4.2.b, correlates to Step 4, Basic Task 2, Worksheet a and Worksheet b. In theory worksheet a needs to be completed before worksheet b.

Worksheet 18.2.a **Self Assessment Step 18 Worksheet and Products to be completed Prior to this Step, Part 1 and Part 2**

Worksheet 18.3.a **Identification and completion of Sub-Plans or Documents to include in the overall M & A Plan. The possible sub-plans identified in these workbooks include:**

Inventory Master List and Inventory Action Plan
Information Blue Print – Data Pathway Fact Sheet
Data Management plan part 1 or 2
Quality Assurance and Control Plan
Evaluation Plan
Action Plan (to fill gaps and needs to fully implement M & A Plan)

Worksheet 18.4.a **Document** *Watershed Monitoring and Assessment Plan* **components from Phase 1-4.**

Worksheet 18.5.a **Determine mechanism to summarize and communicate monitoring and assessment activities in context with all other activities and target audiences that are designed to achieve desired outcomes, such as the Logic Model which articulates outcomes, associated activities/audiences, inputs, assumptions and external factors (if needed and if M & A Plan will not suffice).**

Worksheet 18.6.a **Determine audiences and communication strategy and purposes**

How to do Worksheets

For Sheet 18.2.a Self Assessment Step 18 Worksheet and Products to be completed Prior to this Step, Part 1

Part 1. Complete the self assessment section of the worksheet to evaluate what you have or what decisions have already been made. This will help you focus on what you need from this step and incorporate valuable existing information or products into this plan.

Part 2. Next, to prepare to complete this step the following, you need to have the following items addressed:

- ✓ Desired set of outcomes or results that the monitoring and assessment activities will be designed to help achieve
- ✓ Identified monitoring and assessment activities, specific combinations of a monitoring reason plus an associated data use; we call this an Assessment Type. You may have multiple Assessment Types.
- ✓ For each Assessment Type, the list of specific monitoring questions the monitoring and assessment will be designed to answer.
- ✓ For each monitoring question, the targeted decision makers, the type of decisions they will make and the information they need to make them (as specific as possible).
- ✓ A minimal scoping inventory that identifies the watershed boundary and water bodies you are focusing on (rivers, lakes or wetlands), physical attributes of water bodies (including status, uses, etc.), relevant cultural or historical aspects, existing data sets or monitoring efforts and others in the watershed who either you want to influence or could help you implement.
- ✓ Technical sample plan including what monitor (indicators, benchmarks, criteria, etc.), where and when monitor, how will meet data quality objectives (methods, how good does the data need to be for decision makers, quality assurance and control measures), and how will manage and verify raw data/information.
- ✓ Starting point, or what you think you need to do to summarize, analyze data, interpret analyses, formulate interpretations and make recommendations. Any management tools you need to turn raw data into information while maintaining data integrity.
- ✓ Starting point for who you will deliver the data/results/information to, how, what format, when and who will deliver it. Including as many reporting needs as possible.
- ✓ Identification of who is responsible for documentation, implementation and evaluation of this plan.
- ✓ Documentation of Monitoring and Assessment Plan and any relevant sub-documents.

This is the ideal list, if you do not have any of these, they become a gap or need that should be addressed before any data is collected or analyzed, even if the answers aren't perfect or you don't have a large degree of confidence surrounding them, they should be attempted as the starting point. This is what you are evaluating in this step-your monitoring and assessment plan.

Worksheet 18.2.a Self Assessment Step 18 Worksheet and Products to be completed Prior to this Step, Part 1.

Part 1 Self Assessment of Known Evaluation Products and Processes

1. **Determine if you "have" or "don't have" the item, mark the appropriate box. If you don't have it and determine you don't need it, explain why in the comments document. You may not need to know but perhaps your target decision makers, board or membership might want to know.**

2. **If you have the item "documented", mark that box. If so, list in the comments where, hard copy, chapter in a document, electronic file name and location, etc. The assumption is you value the ultimate goal to document and communicate your M & A plan, activities and results.**

3. **If you have the item, assess the use of it, use the scale below or provide your own answer and comments.**

   Rating Scale for USE:
   0=doesn't exist so use is nil
   1=don't know why would need or understand item
   2=exists, don't know where it is, if it is used, etc. so use is essentially nil
   3=exists and use some of time
   4=exists and use all the time
   5=wish it existed, would use it lots

4. **If you have the item, assess the effectiveness of it, just because something exists or is used does not mean it is effective in its use, use the effectiveness scale below or provide your own answer and comments.**

   Rating Scale for EFFECTIVENESS, assumes material exists:
   0=not effective or functional at all
   1=incomplete (all elements are not there) and some existing parts need revising
   2=incomplete but what is there is okay
   3=complete (all elements are there), some parts okay but need revising
   4=complete and effective

Item	Have	Don't Have	DOC	Assessment of Use (Scale 0-5)	Assessment of Value / Effectiveness (Scale 0-4)	Comments
49. List who was included in the development or review of M & A design.						
50. Documentation of Monitoring and Assessment Plan or any aspect of?						
51. Communication of Plan, activities to do so						
OTHER?						

*DOC=Documentation, *M & A= Monitoring and Assessment

5. To make this assessment useful, determine what your gaps and needs are regarding this step in order to focus your effort in completing this step.

Worksheet 18.2.a Self Assessment Step 18 Worksheet and Products to be completed Prior to this Step, Part2.

Part 2 Products to be completed before this step, in order to complete this step

Item	Response
Desired set of outcomes or results that the monitoring and assessment activities will be designed to help achieve:	
Assessment Types, specific combination of one monitoring reason and data use(r):	
For each Assessment Type, the list of specific monitoring questions:	
For each monitoring question, the targeted decision makers, the type of decisions they will make and the information they need to make them (as specific as possible):	
Watershed(s) and Water bodies of focus:	
Physical attributes of water bodies (status, use, etc.)	
Existing Data or monitoring efforts:	
Indicators, benchmarks and criteria list:	
List of monitoring locations/rationale:	
List of monitoring frequencies:	
Methods list, list of data quality objectives (methods, how good does the data need to be for decision makers), quality assurance and control measures)	
Plan for raw data management and support mechanisms:	
Monitoring results summarized using statistics, graphs and tables.	
The results of your comparison of your data with your benchmarks summarized	
The results of your comparison of your QC data with your data quality objectives	
A method to develop a set of findings from the data set	
Plan or starting point for making interpretations, conclusions and recommendations	
Plan to communicate and deliver appropriate information to	

each targeted decision maker	
Data management plan to support the generation and delivery of information to targeted decision makers.	
Identification of who is responsible for documentation, implementation and evaluation of this plan-task identification	
Documentation of monitoring and assessment plan and plan to communicate the contents	
Evaluation Plan	

For Step 18.3.a Identification and completion of Sub-Plans or Documents to include in the overall M & A Plan.

The possible sub-plans identified in these workbooks include:

- Inventory Master List and Inventory Action Plan
- Information Blue Print – Data Pathway Fact Sheet
- Data Management plan part 1 or 2
- Quality Assurance and Control Plan
- Evaluation Plan
- Action Plan (to fill gaps and needs to fully implement M & A Plan)

Worksheet 18.3.a Sub Plan versus *M & A Plan* Documentation Identification

If useful identify where each component will be documented. If you have completed the workbook Steps, or some of them you have been using the Monitoring and Assessment Outline. If that works, skip this worksheet, if not, use this or some tool to determine where each piece is/will be documented. Where Documented is filled in with examples, delete and complete for yourself.

Major Monitoring And Assessment Product to Document	Where Documented (Examples provided)	Who Responsible?	Update Frequency
1. Each monitoring question can be answered?	M & A, Info Blue Print-Pathway Fact Sheet		Planned evaluation time
2. Information Blue Print-Data Pathway Fact Sheet	M & A		Planned evaluation time
3. If Each decision maker received data/information and resulting decision(s)	M & A, Info Blue Print-Pathway Fact Sheet		Planned evaluation time
4. Overall Assessment Type M & A Activity	M & A, Info Blue Print-Pathway Fact Sheet		Planned evaluation time, Annually
5. Technical Design-What	M & A, Info Blue Print-Pathway Fact Sheet and Operating/Procedures Manual		Planned evaluation time
6. Technical Design-When	M & A, Info Blue Print-Pathway Fact Sheet and Operating/Procedures Manual		Planned evaluation time
7. Technical Design-Where	M & A, Info Blue Print-Pathway Fact Sheet and Operating/Procedures Manual		Planned evaluation time
8. Technical Design-How, methods, data quality objectives, Qa/Qc	M&A, Info Blue Print-Pathway Fact Sheet and Operating/Procedures Manual		Planned evaluation time
9. Quality Assurance and Control Plan?	M & A as appendix, stand alone document, part of operation and procedures manual		Annual

10. Data Summary or Analyses?	M & A, Info Blue Print		Annual
12. Data Interpretation, Conclusion, Recommendation	M & A, Info Blue Print		Annual
13. Data Reporting or Delivery mechanisms	M & A, Info Blue Print and operation procedure manual		Annual, after each delivery
14. Data management of raw data, data management plan?	Data Management Plan, In operation procedure manual		Monthly
13. Management tools for generating information?	Data Management Plan, In operation procedure manual		Biannual
15. Inventory Master List, Action Plan	Master Inventory List and Action Plan, Appendix to M & A Plan		Annual
16. Evaluation Plan, protocols?	M & A Plan		Annual
17. Staff or partner changes associated with M & A implementation	M & A Plan		As needed
18. Watershed boundary or water bodies of focus	M & A Plan, maps		Annual
19. Targeted Decision Makers	M & A Plan		Annual
20. Targeted Decision Makers information needs	M & A Plan		Annual
21. Who are the responsible parties, contributors	M & A Plan		As needed
22. Communication re: M & A Plan	M & A Plan		As needed
23. Desired Outcomes	M & A Plan, on literature, in strategic planning document		5 Years
24. Watershed Vision	M & A Plan, on literature		5 Years
25. Action Plan to identify and fulfill gaps and needs	M & A Plan		Annual

For Sheet 18.4.a **Document** *Watershed Monitoring and Assessment Plan* **components from Phase 1-4.**

Worksheet 18.4.a **Monitoring and Assessment Plan, Document Outline:**

*A M & A plan synopsis, which does not have to include every detail and set of instructions, but should include all the major elements that tie why you are doing (phase 1) with what you are doing (phase 2) with how you will use it (phase 3) with how do you know it worked (phase 4). If you completed all steps or some, this is a cumulative effort or can be completed from scratch. Reorganize before complete if desire or after to be more meaningful. *Italics mean a sub plan that might be attached or live somewhere else, location of document and contact is what would go in the plan*

I. People Design, Phase 1

   A. Shared Watershed Vision and Desired Outcomes (Step 1)

      1. Logic Model of Desired Outcomes/Results and activities/target audiences to employ to achieve outcomes

   B. Keepers of the M & A Plan (Step 1)

   C. Watershed Boundary (Step 2)

   D. Water bodies of Interest (Step 2)

   E. Scope Inventory Master List* (Step 2)

      1. Physical Inventory * (Step 2)

      2. People Inventory* (Step 2)

      3. Information Inventory* (Step 2)

         a. Existing Monitoring Efforts (Step 2)

         b. Existing Data Sources (Step 2)

      4. Inventory Action Plan* (Step 2)

   F. Assessment Type(s) List – Monitoring Reason + Use (Step 3)

      1. Monitoring Question(s) (Step 4)

      2. Targeted Decision Maker(s) (Step 5)

         a. Information Needs (Step 5)

      3. Information Blue Print – Data Pathway Fact Sheet Per Monitoring Question* (Step 6)

II. Technical Design, Phase 2

   A. What (Indicators, Benchmarks, etc.) and why? (Step 7)

   B. When and why? (Step 8)

C. Where and why? (Step 9)

D. W(how) will meet data quality objectives? (Step 10)

1. Data quality objectives (Step 5 and 10)

2. Quality Assurance and Control Measures (Quality Assurance and Control Plan)* (Step 10)

E. Data Management for Raw Data (Data Management Plan Part 1)* (Step 11)

III. Information Design, Phase 3

A. Data Analyses (Step 12)

1. Starting Point (Step 12)

2. Changes (Later)

B. Data Interpretation, Conclusions, Recommendations

1. Starting Point (Step 13)

2. Changes (Later)

C. Communication and Delivery

1. Starting Point (Step 14)

2. Changes (Later)

D. Management Plans to Generate Information (Data Management Plan Part 2)* (Step 15)

IV. Evaluation Design, Phase 4

A. Who Will Do What? (Step 16)

1. Task Identification Matrix (Step 16)

2. Communication Structure and Tools (Step 16)

B. Evaluation Plans (Step 17)

1. Evaluation Plans for M & A Components* (Step 17)

2. Evaluation Plans for M & A Implementation (Step 17)

3. Evaluation of inter/intra M & A Activities (Step 17)

C. Documentation and Communication (Step 18)

1. M & A Plan (**this document**, updated Sub documents) (Step 18)

2. Communication and Peer Review Plan (Step 18)

3. Action Plan* (Step 17)

For Sheet 18.5.a **Determine mechanism to summarize and communicate monitoring and assessment activities in context with all other activities and target audiences that are designed to achieve desired outcomes, such as the Logic Model which articulates outcomes, associated activities/audiences, inputs, assumptions and external factors (if needed and if** *M & A Plan* **will not suffice).**

Worksheet 18.5.a **Illustrate and Communicate M & A activities and Plan in context with all organization activities/audiences to achieve outcomes/vision.**

If useful, use the Logic Model, outcomes, activities/audience, inputs, assumptions and external factors. This was presented in Phase 1, Step 1 as a model to summarize the information generated around desired outcomes, all possible activities to conduct and audiences to target in order to achieve the outcomes. Take your draft from Phase 1 Step 1 and modify it, include it the overall M & A Plan as the connection to other efforts. The background and content on the Logic Model is provided in Phase1, Step1 Background Content Section.

Situation is Watershed Vision, organization Mission, etc. or the context for the list of outcomes. Worksheet Tip, copy and print landscape. The information does not have to appear in this format on one page. Remember this isn't the place to document how you will "do" the activities, but how the activities are connected to a larger set of outcomes.

<table>
<tr><td colspan="5">Situation:</td></tr>
<tr><td colspan="2">Outputs
Activities Audience</td><td colspan="3">Desired Outcomes</td></tr>
<tr><td>What We do</td><td>Who we Target</td><td>Short Term</td><td>Mid Term</td><td>Long Term</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="3">Assumptions:</td><td colspan="2">External Factors</td></tr>
</table>

For Sheet 18.6.a Determine audiences and communication strategy and purposes.

EXAMPLE Worksheet 18.6.a Appropriate Review for appropriate audience and purpose.

First identify the audiences that should review this plan, components of the plan or implementation of the plan. Then identify what they need to review and why, then when it will happen. Possible categories include:

- Internal Review, some entire plan, some relevant components
- Peer Review
- Stakeholder Review
- Decision Maker Review
- Etc.

Possible purposes include:

- Approval
- Accuracy
- Support continuum (acknowledge, buy in, all the way to contribute)
- Specific Assistance
- Credibility
- Information, Education or Understanding
- Etc.

EXAMPLE TABLE:

Reviewer List Names If Possible	What Review	Purpose	When Review
Internal Review – Board	Plan, via summary and connection to outcomes, organization mission and resources	Approval of Project, $	Before Start, once
Internal Review –staff	Relevant parts to their specific duties, , results/conclusions	Accuracy, Buy in, Inform	Before Start, once, during implementation provide changes, when done
Internal Review -lab	Lab analysis, qa/qc plan	Accuracy, Inform	Before Start, once, during implementation provide changes
Internal Review - Contractor	Plan, , results/conclusions	Assist, Understanding Support	Before Start, once, during implementation provide changes, when done
Peer Review – Membership and Stakeholders	Plan, entire or summary, , results/conclusions	Inform, Education, Support (access to sites), Credibility	Before Start, once, as they desire, when done

Peer Review – XYZ Agency	Plan, technical design	Inform, accuracy, credibility, support	Before Start
Decision Maker 1	Plan, results/conclusions	Inform, Support, Buy in Credibility	Before Start, when done
Decision Maker 2	Plan Technical Design, results/conclusions	Inform, accuracy, credibility	Before Start., when done

Worksheet 18.6.a Appropriate Review for appropriate audience and purpose.

First identify the audiences that should review this plan, components of the plan or implementation of the plan. Then identify what they need to review and why, then when it will happen. Edit or modify table to fit your needs.

Reviewer List Names If Possible	What Review	Purpose	When Review

Background and Content

*Documentation of **Watershed Monitoring and Assessment Plan** and Associated Sub-Plans*

It is neither right or wrong, better or worse if you have your watershed assessment and monitoring design documented within one large document, or several documents. The important task is that your plan is documented and the people who need to know where it is and what is in it know, and how it will be updated appropriately.

The advantage of have at least a synopses of your watershed assessment and monitoring plan in one document is that it might be more functional and available for more purposes, increasing credibility, accountability, reproducibility, compatibility and decrease data misuse or misrepresentation. A synopsis does not have to include every detail and set of instructions but should include all the major elements that tie why you are doing (phase 1) with what you are doing (phase 2) with how you will use it (phase 3) with how do you know it worked (phase 4).

The outline provided in these workbooks attempts to narrow and focus the minimal, ideal information you need in order to produce and effective plan (to implement) and that key entities usually desire to know. Those entities include your organization, circle of influence (members, stakeholders, partners, etc.), decision makers and relevant target audiences. Documentation, much like planning, is a task that is often put on the back burner or minimized. The benefits out way the time and resources to document your M & A efforts, you spend the resources somewhere, on planning and documentation or down the line, trying to figure out what did, doing, is it working, why did so and so do that, etc.

That said, the outline below follows the linear path that these workbooks present the material. It can be rearranged and edited after the information is inserted and additional organization specific information added. Conversely it can be rearranged before hand. The order as well as the content should be meaningful to who you need it to matter too.

I. People Design, Phase 1

- D. Shared Watershed Vision and Desired Outcomes (Step 1)
  1. Logic Model of Desired Outcomes/Results and activities/target audiences to employ to achieve outcomes
- E. Keepers of the M & A Plan (Step 1)
- F. Watershed Boundary (Step 2)
- G. Water bodies of Interest (Step 2)
- H. Scope Inventory Master List* (Step 2)
  1. Physical Inventory * (Step 2)
  2. People Inventory* (Step 2)
  3. Information Inventory* (Step 2)

        a. Existing Monitoring Efforts (Step 2)
        b. Existing Data Sources (Step 2)
    4. Inventory Action Plan* (Step 2)

I. Assessment Type(s) List – Monitoring Reason + Use (Step 3)
    1. Monitoring Question(s) (Step 4)
    2. Targeted Decision Maker(s) (Step 5)
        a. Information Needs (Step 5)
    3. Information Blue Print – Data Pathway Fact Sheet Per Monitoring Question* (Step 6)

II. Technical Design, Phase 2

J. What (Indicators, Benchmarks, etc.) and why? (Step 7)

K. When and why? (Step 8)

L. Where and why? (Step 9)

M. W(how) will meet data quality objectives? (Step 10)
    1. Data quality objectives (Step 5 and 10)
    2. Quality Assurance and Control Measures (Quality Assurance and Control Plan)* (Step 10)

N. Data Management for Raw Data (Data Management Plan Part 1)* (Step 11)

III. Information Design, Phase 3

O. Data Analyses (Step 12)
    1. Starting Point (Step 12)
    2. Changes (Later)

P. Data Interpretation, Conclusions, Recommendations
    1. Starting Point (Step 13)
    2. Changes (Later)

Q. Communication and Delivery
    1. Starting Point (Step 14)
    2. Changes (Later)

R. Management Plans to Generate Information (Data Management Plan Part 2)* (Step 15)

IV. Evaluation Design, Phase 4

S. Who Will Do What? (Step 16)

1. Task Identification Matrix (Step 16)
2. Communication Structure and Tools (Step 16)

T. Evaluation Plans (Step 17)

1. Evaluation Plans for M & A Components* (Step 17)
2. Evaluation Plans for M & A Implementation (Step 17)
3. Evaluation of inter/intra M & A Activities (Step 17)

U. Documentation and Communication (Step 18)

1. M & A Plan (**this document**, updated Sub documents) (Step 18)
2. Communication and Peer Review Plan (Step 18)
3. Action Plan* (Step 17)

Some addition information that might be useful that is not apparent in the above outline includes:

1. A description of the organization, vision, mission, outcomes, relevant background or history, partnerships, stakeholders, context setting and contact information.
2. A summary of the inventory completed/available, existing data, limiting factors or information that is important to how you got to this point.
3. A description of the geographic and time boundaries, maps and photos.

The Master Plan might have the major decisions and elements summarized in one document. You might have a master plan for each monitoring reason or for your entire watershed assessment, for which monitoring is probably one aspect. Micro documentation is appropriate for specific instructions needed along the way, say for all sample collection, analyses, the data management plan, etc. The Master Plan can list all the associated micro documentation, including data base structures and linkages, so somewhere it is at least all listed. Someone who didn't know the program could then relate it all and know what information goes with each plan.

It is ideal to create a 'responsibility' matrix that lists who is responsible for updating certain sections or documents and at what frequency. This is very helpful for managers to provide effective oversight.

Some common documents that would count toward documentation of certain components of a watershed assessment include:

- SOP - Sample Operating Procedures – describes all procedures that need to be standardized for sampling and analyses. You can extend this into all aspects of watershed assessment monitoring to include equipment care, training, database management, data analysis, interpretation and reporting.
- SAP - Sample Analyses Plan – describes your plan for sample analyses. Essentially what you have done in Phase 2.
- QAPP - Quality Assurance Project Plan – describes how good your data needs to be for the uses you claim it will be used.
- SD – Study or Sample Design - typically describes Phase 2 components, sometimes includes Phase 3 also. Rarely includes Phase 1 or Phase 4 at all or in any depth.
- Data Management Plan - describes how you will manage the data to support transformation of monitoring results into information
- Documentation of existing Inventory (Physical like maps, status assessments, etc.) , Cultural/Historical (interviews, surveys, anecdotes, etc.), existing data sources, monitoring efforts, people of influence, supporters, etc.)

These potential sub-plans are focused topics for special audiences and may or may not be necessary for your needs. Some have considerable overlap as well. If they do exist, they should be aligned, updated and connected to all other watershed monitoring and assessment documentation. One approach that has worked for some groups that want documentation in one place but still need these separate documents for other reasons is to have one main document, and with most word processing software you can link text between documents. This means you only have to update one section of text and it will automatically be updated for the other document. You can make these subdocuments appendices of a larger document as well.

The benefits of M & A documentation far out weigh the resources or effort to do so. Documentation of our work along with planning often gets the short end of the resource stick. It is our contention that the resources are spent somewhere. Resources are either focused and expended on a well planned effort that is documented, so that it can be evaluated, reproduced, provide credibility and opportunity for collaboration. This is what builds and information system that is information rich and not data poor. Conversely, lack of planning and documentation sucks resources from the system in a chronic sort of way. Time is spent trying to figure out success/failure or what results really are, what does this data mean, what the purpose was, why won't anyone use our data, where is that error coming from, is this effort worth it, who is responsible, what do you mean we spent $$$, and so on. It is a silent sort of undocumented resource drain that planning and documentation can eliminate or minimize.

Identify what needs to be communicated to whom and when regarding the monitoring Plan

Review of your plan, implementation, results and conclusions are part of planning and documentation. Once you have both the micro and macro documentation you can determine the appropriate level of review.

- *Internal Review* – internal in your organization, staff, boards, volunteers, constituents, you define.

- *Peer Review*. – others in the watershed conducting the same work, you define peer.
- *Stakeholder Review* – others that have an interest in what you are doing or will be doing as a result of the assessment
- *Decision Maker Review* – if your targeted decision makers reviewed your watershed assessment monitoring plan before you started monitoring, you can incorporate their changes, receive feedback on items you created in their absence of information and perhaps gain their buy in to your effort.

You need to identify the purpose or need for the review, when and how it will be conducted as well, some possible reasons include:

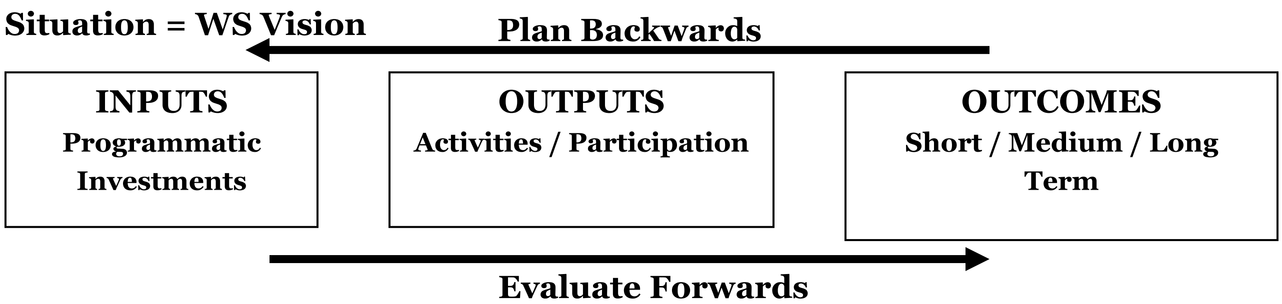
- Approval
- Accuracy
- Support continuum (acknowledge, buy in, all the way to contribute)
- Specific Assistance
- Credibility
- Information, Education or Understanding

The more formal and rigorous the decision making process is, usually the more stringent and defined the decision makers information needs are, and thus it is probably more important and effective to involve those decision makers in the planning, implementation, interpretation and evaluation. This is ideal for all monitoring and assessment reasons, but more so for the formal/legal type of monitoring reasons. As with any of these steps, the amount of time and rigor is up to you and your needs.

Develop a mechanism to illustrate and communicate how this M & A plan and results fit into a larger context of activities and target audiences to achieve the same desired outcomes as the M & A Plan.

Some of the activities were not monitoring and assessment related, such as conduct and education campaign, or purchase a conservation easement. We had you focus on those items that did relate to monitoring and assessment and the rest of the Steps flushed out the details. Now it is time to put the final monitoring and assessment plan back into a context with all other activities and associated target audiences to achieve desired results. Why is this valuable and important? First, it serves as an excellent communication tool for those not associated with the planning or implementation to understand how all the pieces, programs, activities and efforts all fit together to achieve the same set of desired outcomes. Second, it provides a mechanism to plan evaluation of how effective each activity and audience is at moving closer to the desired outcomes and as a collective whole are you making progress? And finally the logic model provides a tool to articulate, communicate and plan to keep your organization outcome driven not activity driven (doing something for the sake of doing it not knowing what the activity is designed to achieve).

The Logic Model was presented in Phase 1 Step 1, please refer to that Background and Content Section for the premise.



With the Logic Model you describe the situation first, for us it is our watershed vision, second the desired outcomes, results or changes we want, third the outputs or activities we will do and the audiences we will reach. You plan with the end in mind and evaluate the outputs effectiveness in achieving outcomes. Finally you add the inputs, assumptions and external factors playing on the situation.

In illustration below the Logic Model displays all the necessary components. The situation, inputs, outputs, outcomes (short term, medium and long term), assumptions and external factors. The example provided below is the blank format. See how it connects the various components.

Situation:					
Inputs	**Outputs** **Activities Audience**		**Outcomes**		
What we Invest	What We do	Who we Target	Short Term	Mid Term	Long Term
Assumptions:			**External Factors**		

Monitoring and Assessment Plans are one of the "what we do" and "who we target", each assessment type can be listed. It is valuable to have the assumptions and external factors listed as well. Often it is changes in assumptions or external factors that existed at initial planning and implementation that changes, affecting our ability to complete the M & A plan, but we didn't know them to start with. Give it a try.

Case Study 1:

Case Study 2:

References

Science Policy Council Handbook Peer Review, USEPA Office of Science Policy, Office of Research and Development, Washington, D.C., December 2000, EPA 100-B-00-001, www.epa.gov, about 200 pages. Might be overkill for this type of peer review but does provide some thought on how to conduct and document a peer review, formal or informal.

Resources:

Contents in Phase 4, *Step 18 Resource Guide*:

Closure of Phase 4 / Implementation

What you potentially accomplished:

In Phase 1, Steps one through six, you provided the foundation for planning the remaining components of a Watershed Monitoring and Assessment Plan, which is scientific, defensible and can be evaluated. This effort connects a sample design with the people the data was intended to serve as well as the science questions it is intended to answer. Evaluation is important for both aspects.

You developed a watershed vision and associate outcomes. Identified monitoring and assessment activities that would help achieve those outcomes. You also delineated the watershed boundary, identified water bodies of interest and discovered what physical, people and information is relevant to your monitoring and assessment activities. You refined this by identifying specific combinations of data purpose and use and called this an Assessment Type. For each Assessment Type you listed specific monitoring questions the data was to answer and how it would be answered, based on the information needs of targeted decision makers. You summarized all of this in an information blue print – data pathway fact sheet.

In Phase 2, Steps seven through twelve, you used the information from Phase 1 to design how samples will be gathered and analyzed. This includes what, where, when, how and the quality. In addition you planned how you would manage that raw data, validate it, and store it ready to be retrieved for further processes. You identified benchmarks

In Phase 3, Steps 12-15, you used the information from Phase 1 and 2 to plan the starting points for turning data into information through analyses, interpretation, conclusions, recommendations and delivery to a decision maker(s).

Phase 4 had you identify who is responsible for what aspects of this monitoring and assessment plan, how you will evaluate the plan itself as well as implementation. You identified gaps and needs and developed an action plan to fulfill those needs in order to fully implement this plan. You completed the starting point for each monitoring question using the information blueprint – data pathway fact sheet or equivalent summary/communication tool. In addition, Phase 4 provided ways for you to find efficiencies and communicate how multiple monitoring and assessment programs align within your organization or watershed. Finally, you documented this plan and developed a mechanism to communicate relevant aspects, including peer reviews.

What you potentially produced:

Final documents for:

- *Master Inventory List* (physical, people and information)
- *Inventory Action Plan* (to gather information data don't have)
- *Data Management Plan Part 1 and 2*
- Assessment Type(s)
  - *Technical Design*
  - *Information Design*

Evaluation Plan
Information Blue print – Data Pathway Fact Sheet (summary of every monitoring question per Assessment Type on why doing, what, when, where, how, generation of information, delivery, evaluation and cost)

- *Watershed Monitoring and Assessment Plan*

Italics = sub-plans or items produced in planning process, to edit with information from remaining Phases

Where will you go from here?

Congratulations you can begin implementation and evaluation, only to re-visit this plan soon!

Time to celebrate and implement *Monitoring and Assessment Plan, Action Plan, Inventory Action Plan* and *Data Base Management Plans.*