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Designing Monitoring and Evaluation Approaches for Learning

An FOS How-To Guide

February 2019

This guide provides high-level guidance on designing monitoring and evaluation approaches for conservation projects and programs. It is based on the Adaptive Management principles and practices in the Conservation Measure Partnership's *Open Standards for the Practice of Conservation*.

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Contents

Purpose of FOS How-To Guides

This guide is one in a series of how-to guides designed to help conservation practitioners using the *Open Standards for the Practice of Conservation* develop and operationalize their strategic plans. These guides are stand-alone documents, but practitioners will get the most value out of them when they use them together to support the broader process of moving from planning (Step 2) to implementation (Step 3).[1]

The current list of guides (available at www.fosonline.org/resources) includes:

- Conceptualizing and Planning Conservation Projects and Programs (manual for implementing Steps 1 and 2 of the *Open Standards*)
- Conceptual Models: An FOS How-To Guide
- Results Chains: An FOS How-To Guide
- Designing Monitoring and Evaluation Approaches for Learning: An FOS How-To Guide (this guide)
- Developing High-Level Work Plans and Budgets: An FOS How-To Guide

FOS staff will continue to develop guides and other training materials for various steps across the *Open Standards* cycle. As the guides are published, they will be available on the FOS website and the *Open Standards* website (along with a peer-reviewed rating). The *Open Standards* website also contains implementation and operationalization guidance from other organizations, with Bush Heritage Australia providing numerous documents and examples based on their own experiences.

Overview

If the conservation community wants to learn from and improve our conservation efforts, we need to be able to understand what is working, what is not, and why. This requires that we develop good monitoring plans that help us determine progress on key results and answer priority questions. An important start to a good monitoring plan is identifying key results, knowledge gaps, and/or questions and the associated indicators for which you need to collect data. An equally important step

[1] For guidance on Steps 1 and 2 of the Open Standards, see FOS's manual, Conceptualizing and Planning Conservation Projects and Programs, as well as FOS How-To Guides on conceptual models and results chains (available from www.fosonline.org).

is thinking about your monitoring and evaluation (M&E) design, as your M&E design will affect how confident you are in the data you collect and any associations you may discover.

We define M&E design as the approach a team takes to structure monitoring and/or evaluation – including sampling methods, use (or not) of controls and comparisons, timing of interventions, and timing of observations (Margoluis, Stem, Salafsky, & Brown, 2009). You and your team may find it useful to review these concepts and take an iterative approach to developing your M&E design, being careful to appropriately balance implementation and monitoring priorities.

M&E design is important because it helps your team set up how it will do monitoring according to your needs. For example, if you wish to monitor your effectiveness and need a high level of certainty that your efforts are causing desired results, then you should consider comparing what is happening in the area (or on the topic) where you are working with what is happening in a similar area where you are not working. You will also likely want to measure key variables before, during, and after you take action. If you do not need this high level of certainty, perhaps you would choose to focus only on the area (or topic) where you are taking action and then look at key variables before and after you take action. Likewise, you may not need to monitor every strategy in your plan; for some, you may even decide to schedule a periodic discussion and informal assessment among team members. All of these approaches are completely acceptable, but which approach your team chooses will be informed by various decisions about your M&E design. This guide walks you through those various decisions

TIP!

Try not to get caught up in terminology – focus on getting the information your team needs to make decisions. M&E should help teams fill important knowledge gaps and understand what is working, what is not working, and why so that they can learn and adapt.

This guide intends to help you and your team understand some terms and concepts you may have heard. In presenting this information, we are not suggesting which designs are best, as this is context-specific. As such, the most rigorous designs that provide teams with greater certainty are not necessarily the best. Indeed, in many conservation projects, it is rarely possible or desirable to heavily invest in rigorous designs. The most important thing for you to keep in mind is that the main purpose of monitoring and evaluation is to understand if your conservation efforts are effective (and why or why not) so that you can learn and improve over time, as needed (i.e., practice adaptive management).

TIP!

Most conservation projects have limited resources and need to choose M&E designs that match those resources and that help them make good management decisions.

The topic of M&E design could take up an entire course. In this guide, we do not intend to provide a complete description of everything you need to know and do. Instead, we aim to provide a basic overview of the concepts in order to clarify some common areas of confusion and misuse of terminology and to distill the basic components of M&E design into a series of simple concepts. This guide should help you understand key decisions you need to make and how those decisions may influence your ability to draw conclusions from your M&E efforts.

BOX 1. DEFINING KEY MONITORING AND EVALUATION TERMS

Monitoring: The periodic collection and analysis of data related to goals, objectives, and/or key variables that may influence expected results. ***Monitoring*** enables you to generate the data necessary to ***evaluate*** the impact of your project. Some also refer to this process as ***Monitoring and Evaluation (M&E).***

Monitoring and Evaluation Design: The approach taken to structure monitoring and/or evaluation. It includes sampling methods, use (or not) of controls and comparisons, timing of interventions, and timing of observations (Margoluis, Stem, Salafsky, & Brown, 2009)

Sampling: The selection of a subset of individuals or entities from a population in order to estimate characteristics of the whole population.

Box 4 provides further definitions related to categories of M&E (process and impact).

Defining Terminology

Keeping in mind that this guide is designed to help teams use the *Open Standards* to practice adaptive management, our focus is on monitoring to evaluate, learn from, and improve our actions over time. We define "monitoring" as the periodic collection and analysis of data related to goals, objectives, and/or key variables that may influence expected results (Box 1). *Monitoring* allows teams to generate the data that facilitate *evaluation*. This distinction is consistent with the way the terms are used in the evaluation field. We primarily use the term "monitoring and evaluation (M&E)" to broadly encompass any effort to measure progress and factors that may affect progress.

In the conservation community, however, different actors use these terms differently, and you may run into inconsistencies. For example, some people consider "evaluation" as a formal process (typically carried out by a third party) to assess the progress and impact of a project, program, or strategy. Some people also use terms such as "effectiveness" and "impact" to distinguish the types of data they are collecting. We will discuss this in more detail in a later section. The main thing to keep in mind is that, if you want to understand how effective your conservation efforts are and if you want to learn and improve over time (information needs C-E described in Box 2), then your team should be measuring results along your stated theory of change – from beginning to end – regardless of whether you call that "effectiveness monitoring," "impact evaluation," or some other term.

Along the same lines, the specific indicators your team uses for testing progress along a results chain typically will be the same regardless of how you intend to use the data generated (e.g.., whether you use the indicators for measuring short-term impact or long-term impact or whether you use them for project team learning or external assessment). For this reason, it is important that you develop indicators closely tied to your results chain (theory of change) during the strategic planning phase of your project.

Preview of Key Decisions

The most basic decisions your team will have to make are defining your audiences and their information needs and the purpose of your M&E. For example, you may be conducting M&E to report project results to donors, your own institution, or a key stakeholder. These audiences will want to see evidence that you are achieving what you said you would. But, if you wish to improve your project or future efforts, you should design your M&E to understand what works and what does not work (and, ideally, why). You could also be more formal with your M&E and seek to test assumptions and share your learning beyond your team.

More likely, your team will orient M&E efforts to achieve a combination of all the above – but, this combination could be different for each strategy and even within a single strategy. For example, imagine your team is implementing a strategy with a key assumption upon which not all team members or stakeholders agree. In this case, you might want to take a rigorous approach to test that assumption and answer a key question (e.g., Under which conditions do greater yields from agroforestry lead to small-scale farmers decreasing deforestation for agricultural expansion?). Your M&E results would provide important learning opportunities for your team but also for a broader audience. For another strategy, you might want to focus your M&E on helping you improve daily management decisions. For example, if you are implementing a law enforcement strategy you may not need to determine if law enforcement decreases illegal activities (because existing evidence indicates it generally does). But you may want to focus your M&E on assessing which law enforcement activities are more effective and cost-efficient.

BOX 2. DEFINING INFORMATION NEEDS

Your team may have different types of information needs or questions and different indicators, all of which may require differing M&E designs. These information needs include:

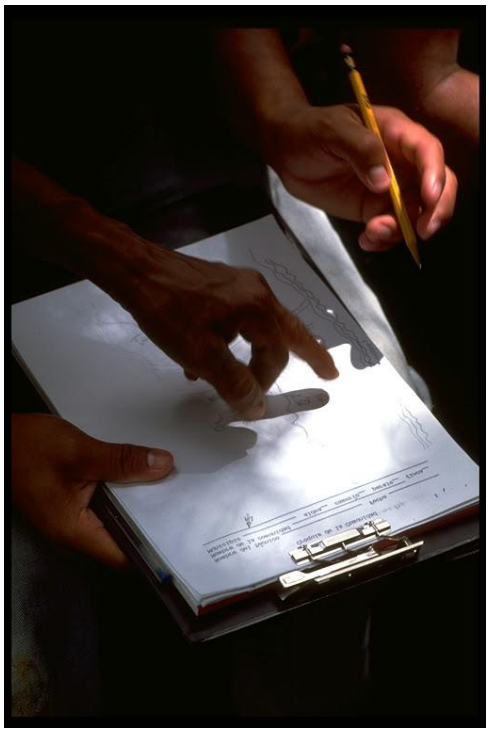
A. Understanding if a factor is present in your project context (conceptual model)
B. Understanding if one factor causes or is associated with another factor in your project context (conceptual model)
C. Understanding if a result is achieved (results chain)
D. Understanding if one result and/or activity led to another result (results chain)
E. Understanding if certain factors are influencing your ability to achieve a specific result (results chain / conceptual model)

In this guide, we primarily focus on information needs C-E with the assumption that you are looking to understand whether the strategies you have chosen are effective and leading to the desired results. However, the M&E design concepts apply to any situation where you are collecting primary data to try to answer a key question.

Thus, clearly defining the purpose of M&E for each strategy (i.e., Why are you doing M&E? For whom are you doing it? and How are you expecting to use it?) will help you determine the level of precision needed. These decisions cut across several more specific decisions that we summarize here. The remainder of this guide provides more detail and guidance on each of these decisions and the implications for M&E design.

Defining Your Broad M&E Needs: When doing any monitoring, you need to:

1) Identify your key audiences and what they want to know
2) Define whether you want to evaluate
    a. Process
    b. Impact
3) Determine whether you will use your M&E information for
    a. Learning (formative) purposes
    b. Accountability (summative) purposes
4) Determine who will undertake the M&E (which may not always be the same as who is collecting data on specific indicators):
    a. Internal / first party
    b. External / third party



In general, you should answer these first four questions before you start thinking about which types of data you will collect and your M&E design. For the remaining questions, the order may vary somewhat, but they are all important questions to answer as you set up your design.

Determining What You Will Monitor: Once you have answered the previous questions, you can then:

5) Identify what you will monitor – These are your indicators (or sometimes variables) – a topic that is covered in-depth in Section 2B (Week 10) of FOS's Manual on *Open Standards* Steps 1 and 2.
6) Consider which type of data you will collect
    a. Quantitative
    b. Qualitative

Determining How You Will Monitor: There are three key topics to consider. Your decisions related to these topics will collectively shape your M&E design.

7) Determine if you will try to compare individuals, entities, or elements affected by your intervention with those not affected
    a. No comparisons – non-experimental

   b. Comparison groups – quasi-experimental
   c. Control groups – experimental
8) Decide the timing of observations and how many you will you make
   a. Before implementation
   b. During implementation, and/or
   c. After implementation
9) Determine how you will choose your subjects (entities to be monitored)
   a. Census
   b. Sample

In the following sections, we provide more detail on each of these topics to help your team make M&E design decisions that best meet your needs. These decisions will inform your choice of data collection methods. At the same time, you will probably need to revisit many of these topics as you are choosing your data collection methods (see Step 2B in FOS's manual, Conceptualizing and Planning Conservation Projects and Programs) and make sure you are clear about the design you are using for each indicator, strategy, and/or project.

Defining Your Broad M&E Needs

The first four decisions to consider when structuring your monitoring and evaluation work are:

1) Identify your key audiences
2) Define whether you want to evaluate process or impact
3) Determine whether you will use your monitoring information for learning and/or accountability purposes
4) Determine who will undertake the overall monitoring

You will likely consider these four decisions simultaneously, and your decisions for each will probably influence the others.

1) Identify your key audiences

This is a critical step that you may have already done when you developed a first iteration of your monitoring plan under Step 2B of the *Open Standards* (see also FOS's manual, Conceptualizing and Planning Conservation Projects and Programs).

TIP!

Don't forget to include your own team as a key audience. Good adaptive management involves systematic M&E to test assumptions, adapt, and learn – so your team is a primary audience.

At this point, it is helpful to revisit your identified audiences and be clear about what information they want to know and what they need in order to do their job better. Giving thought to the final product you will share with these audiences will help you determine which monitoring design and methods are most appropriate for your situation. For example, if it is really important for your team to publish data on a specific project approach in a peer-reviewed academic journal, you will want to have as strong of a design as feasible, and you will want to

use well-known and validated methods. Or if you are in charge of a large, well-funded project where you need to demonstrate with a high level of certainty the degree to which your project is having an impact, you should use a more rigorous design (Box 3 provides some examples of when a team may want to invest more heavily in M&E design). If, however, your project is tight on resources and your main audience is your project team and managers, you may choose a less rigorous design that will give you solid data that are sufficient for management decisions. For now, you can fill out the rest of your audiences table, which will help you make decisions related to selecting your monitoring design and methods.

BOX 3. CONDITIONS FOR HIGH INVESTMENT IN M&E DESIGN

A rigorous M&E design may make sense if:

- Project investment is high;
- An important audience needs strong inference of causality;
- Little is known about a strategy's potential effectiveness;
- Project is a pilot that might be scaled up; and/or
- The team plans to publish project results in a peer-reviewed publication

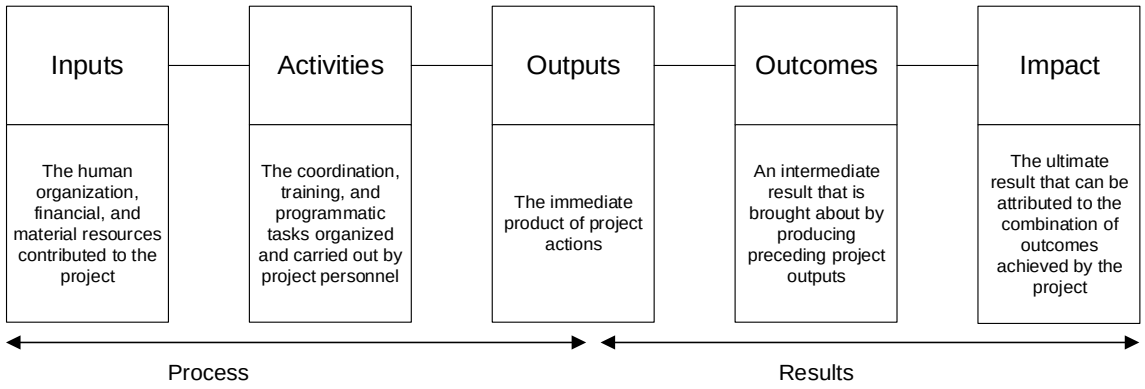
TABLE 1. TABLE OF KEY AUDIENCES AND INFORMATION NEEDS FOR A MARINE SITE

Audience	Broad Info Needs (Box 2)	Indicators of Interest	Media Type/ Length	Desired Action
Project team	A. Presence of factors B. Association among factors C. Achievement of results D. Causality among results & activities E. Influencing factors	All indicators along results chain & those related to critical assumptions/ enabling conditions; Indicators related to major uncertainties in project context	Matrix of indicators & measurements, accompanying analysis by indicator	Learn, improve, adapt; Ensure strategy selection is based on good understanding of context
Project partners Save the Hammerheads	A. Presence of factors B. Association among factors C. Achievement of results D. Causality among results & activities E. Influencing factors	All indicators along results chain & those related to critical assumptions/ enabling conditions Presence/absence of hammerhead sharks in key sites	Report with main results & conclusions by indicator, result(s), &/or strategy, 20-50 pages (text heavy OK)	Learn, improve, adapt; Support project & any proposed changes based on data
Senior managers	C. Achievement of results D. Causality among results & activities E. Influencing factors	Key indicators along results chain (e.g., threat reduction, target status, & a few select indicators along the chain)	Dashboard of key indicators & associated analyses; Anecdotes &/or hard data illustrating key achievements & challenges	Support project & any proposed changes based on data
Funders	C. Achievement of results D. Causality among results & activities	Key indicators along results chain (e.g., threat reduction, target status, & a few select indicators along the chain)	Dashboard of key indicators & associated analyses; Anecdotes &/or hard data illustrating key achievements & challenges	Support project & any proposed changes based on data; Provide ongoing funding in the future
General public	C. Achievement of results D. Causality among results & activities	Key indicators along results chain (e.g., threat reduction, target status, & possibly a few select indicators along the chain)	2-page glossy brochure; 5-10 minute professionally produced video with key project highlights – including lessons learned	Support project & any proposed changes based on data

2) Define whether you want to monitor and evaluate process or impact

As shown in Figure 1, to understand project effectiveness, there are two main elements that a team may choose to monitor and evaluate: process and impact (or, more generically, results).

FIGURE 1. MAIN COMPONENTS TO CONSIDER IN AN EVALUATION



Note: Some process evaluations might include outputs, as these are closely tied to activities. Some impact evaluations may also include some limited outputs, especially if their achievement represents important progress. If an impact evaluation strives to demonstrate return on investment, it will also assess inputs.

Process M&E answers the question: Is the project doing what it said it would do – and is it doing these things well? Process M&E examines the implementation of project activities, procedures, and/or administrative and management functions. For example, a process evaluation could examine whether the marine project team followed its work plan, met key deadlines for products, and did a good job of involving stakeholders in its activities.

Impact (or Effectiveness)[2] M&E answers the question: To what extent are the project's actions effective? Impact M&E examines whether results have been achieved over the short term (outputs, to a limited degree, and intermediate outcomes) and the longer term (impacts). In the context of the work your team has done, this means measuring impact at key points along your results chain (or theory of change). It may also mean looking at your context (conceptual model) to ensure that it is accurate, since that analysis helped inform your strategy selection. An impact evaluation of the marine project might examine whether the team was

TIP!

When measuring impact, your team may also want to look at your conceptual model to understand if your assumptions about key threats and contributing factors were correct. This will help you assess if you chose the right strategies – in addition to assessing whether those strategies achieved the desired impact.

[2] See Box 4 for varying definitions and interpretations of the term "impact M&E."

effective at achieving key results like getting local tourism operators to hook up to municipal wastewater systems, influencing policy makers to strengthen fisheries regulations, and restoring beach and shoreline habitat affected by an oil spill near a fragile beach. As part of impact M&E, the team may want to look not just at whether the results were achieved, but also whether there is a plausible case for one result causing another result (i.e., looking at the relationship between two or more results). Moreover, the team may want to collect data to understand how big of a threat municipal wastewater systems are and whether it makes sense to continue investing in strategies to reduce this threat. A real-world example of impact M&E can be found in Rare's approach to its Pride Campaigns, where they use the same theory of change across their social marketing efforts to collect data and test whether they are seeing the social and biological shifts needed for sustained conservation results.

Not all people use the term "impact" the same. Indeed, there are many definitions and interpretations of several terms. To measure project impact, it is most important for your team to focus on measuring change and relationships along your results chain. However, you should also be aware of these terms and how they are sometimes used. Box 4 shares some common (and sometimes conflicting) interpretations.

BOX 4. COMMON INTERPRETATIONS OF TERMS TO DESCRIBE IMPACT M&E

Different people, organizations, and fields use terms differently. To assess if your strategies are effective, we strongly suggest you and your team do not worry about terminology, but rather focus on the concept of monitoring key results and relationships along your results chains and other potential variables that can influence your effectiveness. However, it is good for you to know about the different interpretations that exist.

Impact Monitoring / Evaluation:
Interpretation 1: Examines whether desired results along a results chain are being achieved – from intermediate results to threat reduction results to target results (interpretation used in this manual; synonymous with Interpretation 1 of performance M&E and effectiveness M&E)
Interpretation 2: Focuses on the ultimate impact (usually on a conservation target but sometimes on a threat reduction result; synonymous with Interpretation 1 of status M&E)
Interpretation 3: An evaluation with a rigorous design (experimental or quasi-experimental) and an aim to establish causality

Performance Monitoring /Evaluation:
Interpretation 1: Examines whether desired results along a results chain are being achieved – from intermediate results to threat reduction results to target results (synonymous with Interpretation 1 of impact M&E and effectiveness M&E)
Interpretation 2: Same as Interpretation 1 but focuses on intermediate results only
Interpretation 3: Focuses on whether activities and tasks were carried out effectively and as planned (synonymous with "process evaluation," as described in this manual).

Effectiveness Monitoring / Evaluation:
Used synonymously with Interpretations 1, 2, and 3 of performance monitoring / evaluation.

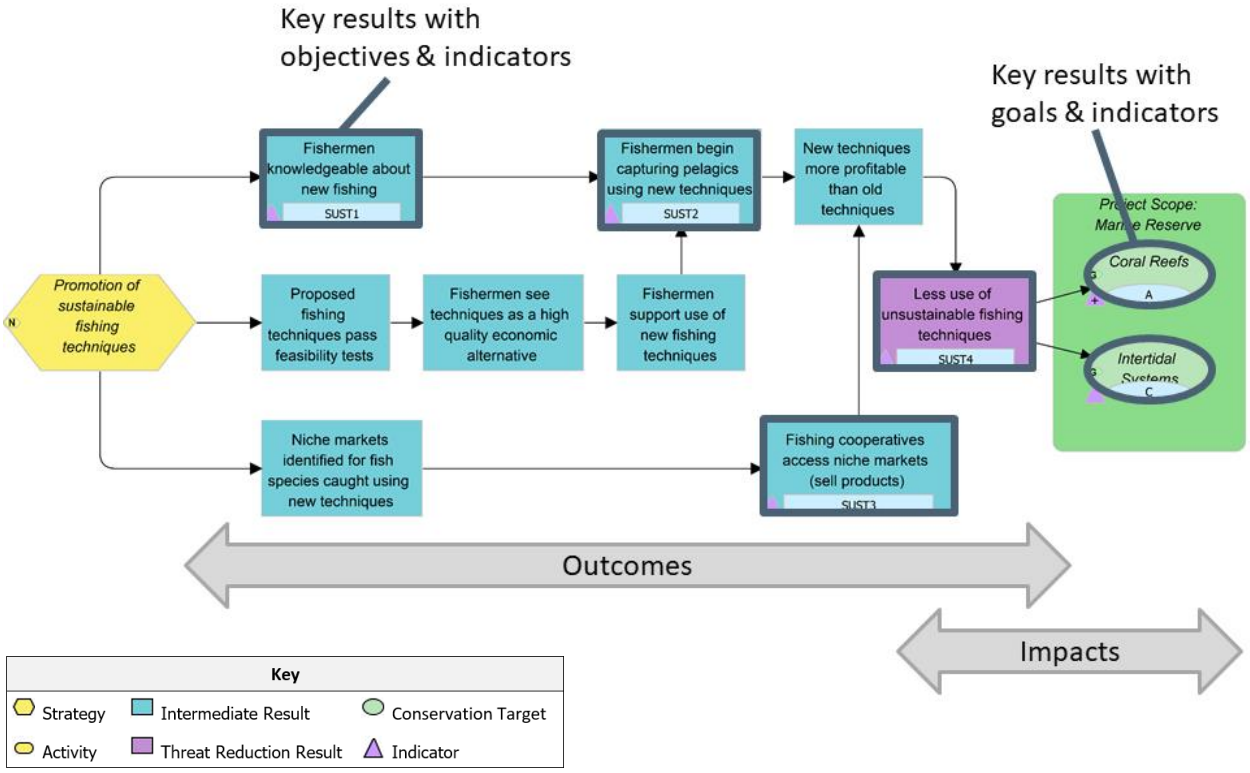
Status Monitoring / Evaluation
Interpretation 1: Focuses on the ultimate impact (usually on a conservation target but sometimes on a threat reduction result; synonymous with Interpretation 2 of impact M&E)
Interpretation 2: Focuses on conditions of various factors (e.g., conservation targets, threats, and drivers) as they currently are, without intervention

Monitoring vs. Evaluation
In addition to these distinctions, some people consider "monitoring" to be less rigorous and for internal purposes, while they see "evaluations" as more rigorous and used for accountability purposes. We see this distinction as somewhat artificial and not very informative – again, the key is to use your results chain to measure effects and influences along that chain and use that information to adapt and learn – regardless of what term you use to describe the process.

In monitoring for adaptive management purposes, the focus is typically on the results section of Figure 1, as well as any other key variables that might influence the achievement of those results. In a results chain and as shown in Figure 2, this means measuring impact at both key intermediate results (and associated objectives) and longer-term impacts on conservation

targets (expressed as goals under the *Open Standards*). It also could mean examining the status of other variables (e.g., enabling conditions) that could influence the degree to which different results occur.

FIGURE 2. MAIN COMPONENTS OF IMPACT M&E



3) Determine whether you will use your M&E for learning and/or accountability purposes

There are two main purposes that M&E may serve – learning or accountability (known as "formative" and "summative," respectively, in evaluation terminology).

Evaluation for learning purposes is done with the intent of gathering data solely or primarily to help improve projects and programs. This type of evaluation tends to be ongoing.

Evaluation for accountability purposes is done to judge whether a project or program is performing as expected. This type of evaluation usually happens at key periods in a project's life (e.g., midway through the project or at the end).

These purposes are not mutually exclusive, and the distinctions can be blurry. The main difference lies in the intent behind the evaluation and how the data are used. Because adaptive

management involves learning and improving, M&E for adaptive management is done regularly throughout the life of a project for formative (learning) purposes. Nevertheless, good data can often serve both accountability and learning purposes. If your team has done a good job laying out its theory of change and developing indicators tied to it, then the data you collect could serve both purposes. Likewise, if your team has access to data collected for accountability purposes, you could use that data for learning as well.

4) Determine who will undertake the monitoring / evaluation

Depending on data needs and resources, M&E might be conducted by an internal team, external team, or some combination of the two. The composition you choose will depend on how important it is for your results to be seen as objective or unbiased.

TIP!

Not all project staff have the skills do to do M&E. You may have to contract outside support. However, all or most team members should be involved in setting the goals and objectives which will be monitored and orienting the external evaluator to your team's theory of change and the context that may influence that theory. Ideally, all or most staff should also help frame key questions the evaluation should explore.

Internal (or "First Party") M&E is conducted and managed by the same project staff that designed and/or implemented the project.

External (or "Third Party") M&E is performed by an outside evaluator who is independent of the project team and, therefore, viewed as objective.

An evaluation could also include both internal and external representatives. In such cases, the internal members bring a rich understanding of the project, context, and history, while the external members help provide a more objective, removed perspective. A mixed team can be particularly useful in cases where project team members lack some key skills or resources needed to carry out M&E.

Which Type of Evaluation is Most Appropriate for Adaptive Management?

As you can imagine, there are a number of ways that a team could structure its monitoring and evaluation work. For example, they could choose any one of the following combinations:

- Internal, formative, process evaluation;
- External, summative, impact evaluation;
- Internal, formative, impact evaluation
- External, summative, process evaluation
- Internal, summative, impact evaluation

This list is not exhaustive; any permutation is possible. However, it is most common that a summative evaluation would be conducted externally. In contrast, adaptive management tends to promote learning within a team to improve a project over time. As such, it is more typical that monitoring for adaptive management (as promoted by the *Open Standards*) would focus on internal, formative, impact evaluation. With this in mind, this how-to guide also focuses more on this type of evaluation and does not emphasize the strict standards often associated with external, summative evaluations (e.g., determining causality regardless of cost).

Determining What You Will Monitor

Once you know your broad M&E needs, you can turn to the substance of the monitoring itself. In particular, you will need to think about the following decisions:

5) Identify what you will monitor
6) Consider which type of data you will collect (quantitative, qualitative, or both)

These decisions, as well as the decision about how you will monitor, will be heavily influenced by your M&E aims and resources.

5) Identify <u>what</u> you will monitor (indicators or variables)

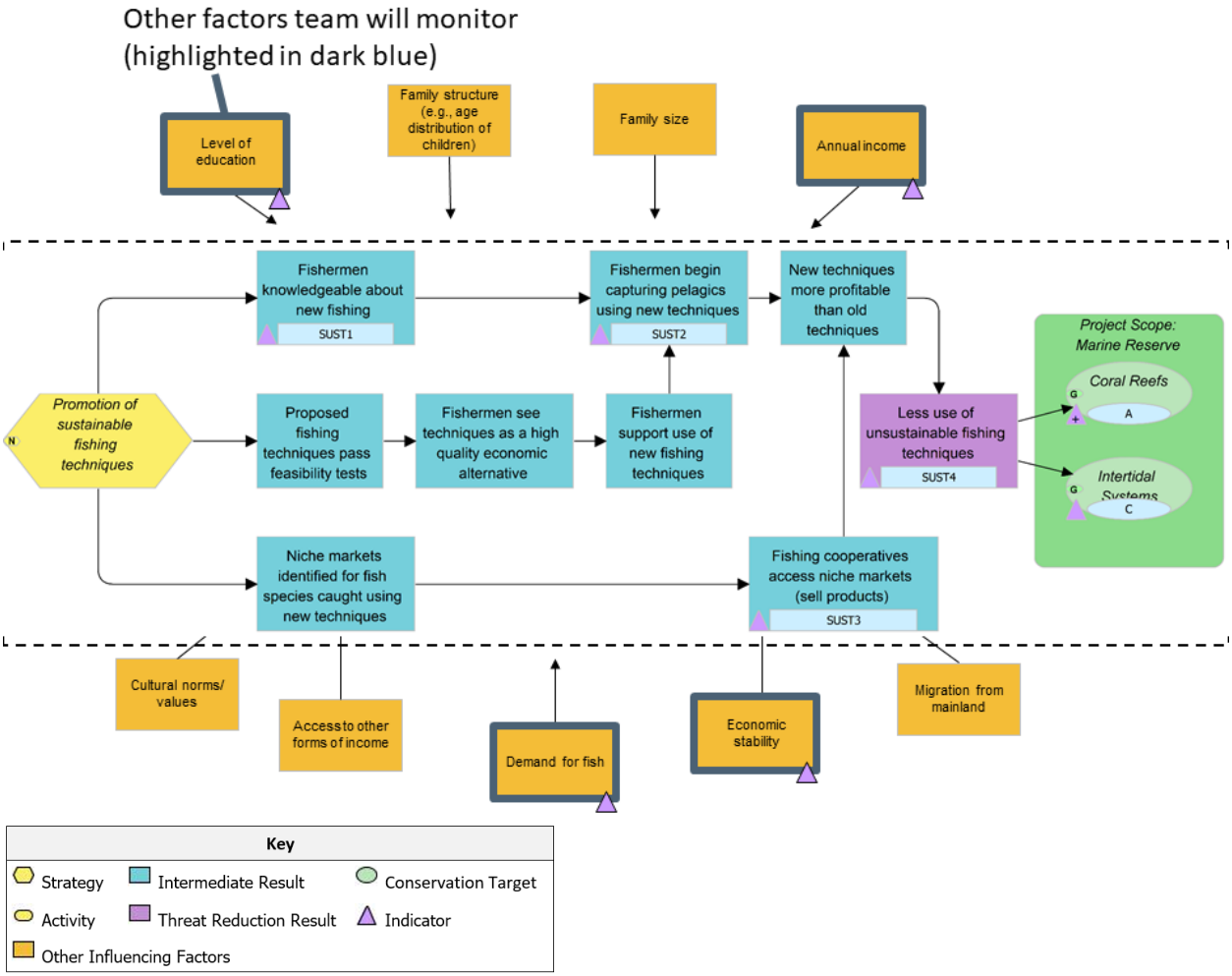
If you have been following *Open Standards* guidance on results chains, objectives, and indicators (e.g., see FOS Manual), your team should have identified and be prepared to measure key results (and associated objectives and goals) along your results chain (refer back to Figure 2 for an example). In addition to these, you also may want to monitor other factors or issues not expressed in your results chain but that may affect your ability to achieve your goals and objectives. Doing so will help increase your ability to demonstrate potential causality. A good starting place to do this is the conceptual model you developed in Step 1 of the *Open Standards*. You may want to consider contributing factors that you did not bring over to your results chain but that were causally linked in your conceptual model (e.g., migration from mainland or demand for a particular resource). In addition, there may be some broad issues (e.g., political stability, economic trends) or characteristics of target audience (e.g., education and income) that you may want to monitor because

TIP!

If you monitor other factors outside of your results chain, try to limit those factors to ones with a strong likelihood to influence (positively or negatively) your ability to achieve your results. While it is important to try to establish causality, you also need to keep your overall monitoring to a reasonable level for your budget.

they could influence your ability to achieve your results (Figure 3). Your challenge will be finding the right balance between what you need to monitor and what might be nice or interesting to monitor.

FIGURE 3. OTHER FACTORS TO CONSIDER WHEN EVALUATING PROJECT IMPACT



6) Consider which type of data you will collect

There are two main types of data: quantitative and qualitative.

Quantitative data are data that can be measured in numbers or percentages and that can be put into categories or in rank order. This type of data is often presented in graph or tabular form.

Qualitative data are in-depth descriptive data that are typically observed but not measured in numbers or percentages. Examples include feelings, opinions, stories, and observations.

The following table summarizes the main advantages and disadvantages of each type of data. In general, the strongest monitoring efforts include a mix of quantitative and qualitative data (and methods).

TABLE 2. QUANTITATIVE AND QUALITATIVE DATA – MAIN ADVANTAGES AND DISADVANTAGES

	Advantages	Disadvantages
Quantitative Data	Easy to analyze Allow for broad generalizations across the sample	Do not provide contextual background helpful for analyzing responses
Qualitative Data	Provide in-depth description, detail, and/or richness High validity	Difficult to analyze Difficult to generalize

Keep in mind that here we are discussing quantitative and qualitative *data.* Some people associate quantitative data with quantitative methods and qualitative data with qualitative methods. There is much, but not complete, overlap (see Box 6 in a later section). For instance, questionnaires (typically considered a quantitative method) can produce both quantitative and qualitative data. More specifically, a survey might collect close-ended responses which could be put in categories (e.g., "yes" or "no" answers, or 1 to 5 ratings). However, it might also include open-ended questions that would generate qualitative descriptive data. Likewise, key informant interviews (a qualitative method) could include questions seeking quantitative data (e.g., budget figures or number of projects exhibiting certain characteristics).

Determining How You Will Monitor

At this point, there are three key topics to consider. Your decisions related to these topics will collectively shape your M&E design.[3]

7) Determine if you will try to compare individuals, entities, or elements affected by your intervention with those not affected

[3] We define "M&E design" as including use (or not) of controls and comparisons, timing of interventions, timing of observations, and sampling methods (Margoluis, Stem, Salafsky, & Brown, 2009). Many use the term more narrowly to characterize the use (or not) of controls or comparison groups.

8) Decide the timing of observations and how many you will you make
9) Determine how you will choose your subjects (entities to be monitored)

These decisions will be heavily influenced by your M&E aims, your context, and your resources (Box 5). Keep in mind that these steps can be iterative, so you may move through Steps 7-9 and then go back to refining what you will monitor (Steps 5-6).

7) Determine if you will try to compare those affected by your intervention with those not affected

Specifying your "comparison model" is about determining whether you will use comparison or control groups or whether you will examine only the subject(s) you are trying to influence. This step may be influenced by earlier or later steps.

There are three options your team should consider (listed in the order that is more common for on-the-ground conservation teams):

a) No comparisons or controls – known in the research and evaluation world as a non-experimental design;
b) Comparison groups – known as quasi-experimental design; and
c) Control groups – known as experimental design.

Your team will probably specify a general comparison model for your M&E efforts. However, you may also decide to use a different comparison model for a particular strategy or even individual results and indicators. For example, you may decide to not compare your site or project to another site or project, but you may decide to use comparisons for a specific indicator perhaps because you can easily obtain data for that indicator across various sites (e.g., forest cover in your project area as compared to forest cover at multiple non-intervention sites). In general, most small- or medium-sized conservation projects will not have the resources to use comparisons or controls. Box 5 provides some general considerations that may influence the type of

BOX 5. GENERAL CONDITIONS FOR DETERMINING LEVEL OF RIGOR

Your monitoring audience and information needs ultimately should inform which M&E design is most appropriate for your situation. However, some general principles include:

Consider a **less rigorous approach** (no comparisons, fewer observations) when:

- Your strategy has a good evidence base to demonstrate its effectiveness
- Investments are relatively small
- Risks to conservation and/or society are low if the strategy is not effective

Consider a **more rigorous approach** (comparisons or controls, multiple observations) when:

- This is a new strategy and/or the evidence base demonstrating its effectiveness is weak
- Project or strategy is a pilot that might be scaled up
- Investments are high
- Risks to conservation and/or society are high if the strategy is not effective
- You have an obligation to one of your audiences to demonstrate causality

comparison model that is most appropriate for your team.

a) **No comparisons or controls (non-experimental design):** This comparison model does not involve control or comparison groups and, as such, it is the least expensive approach. It is also the most common approach used for on-the-ground conservation projects. This approach requires less time and resources to implement, but it also has limited ability to detect causal relationships. Non-experimental designs may rely on quantitative approaches and/or qualitative approaches (Box 6).

TIP!

Any of the approaches laid out here can be strengthened by taking multiple observations over time.

BOX 6. QUALITATIVE APPROACHES

Many people use the terms "qualitative methods" and "qualitative design" loosely (and even interchangeably). While some people categorize qualitative design as another type of design, it is really a type of non-experimental design. Qualitative approaches may involve one or more of the following elements:

Qualitative Sampling: Focuses on the sampling framework and not statistical power. Individual cases are weighted more heavily because the evaluator is not looking for population-based trends. Some qualitative sampling examples include stratified purposeful sampling and theory-based sampling.

Qualitative Methods: Focus on extracting a limited amount of rich data that provide contextual information to understand observed patterns and relationships. Examples include key informant interviews, focus groups, direct observation, and participatory mapping.

Qualitative Data: Describe qualities of what is being studied but are not numerical in nature. Examples include informant transcriptions or recordings, videos, oral histories, and field notes. Within these, the evaluator might try to identify more specific data, such as perceptions about wildlife abundance (e.g., there are many fewer elephants), opinions about the environmental regulations (e.g., regulations are strict), and descriptions about water quality (e.g., the water is murky).

Qualitative Analyses: Examining (usually qualitative) data to understand and explain the reason behind behaviors or conditions. While there is generally no formula for doing qualitative analyses, the evaluator is often looking for patterns and commonalities or differences that can help explain those patterns. Examples include discourse analysis, coding data (based on themes), and iterative or grounded analysis.

In general, qualitative approaches are used to understand the context from the perspective of the informant(s). They provide a richness that complements quantitative approaches, often aiding understanding the "why" behind observed trends.

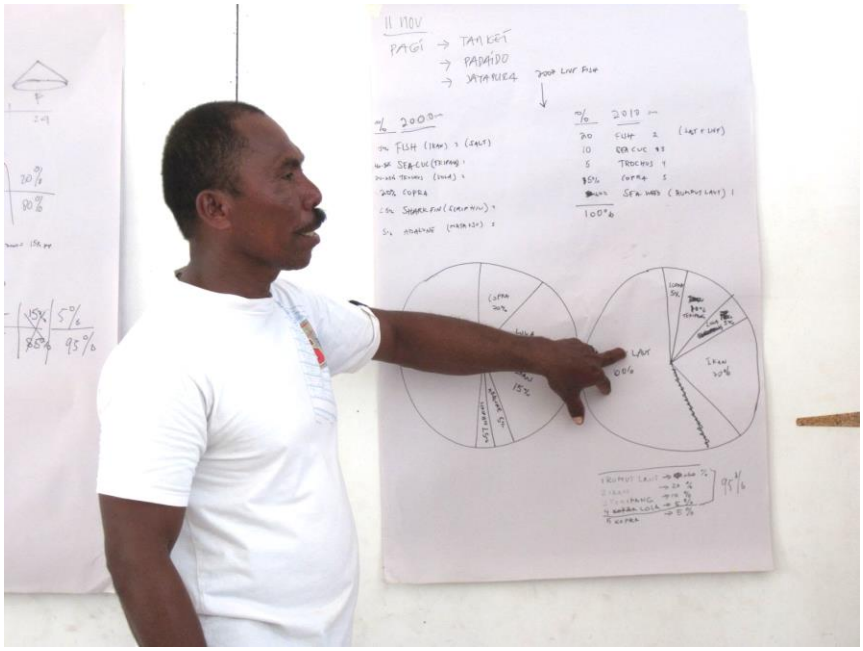
b) **Comparison groups (quasi-experimental design):** This approach involves identifying comparison groups which will not participate in or benefit from a project or strategy. The project team tries to find comparison groups that are as similar as possible to the group

"exposed" to the project or strategy. This allows the team to develop a counterfactual situation – what would have happened in the exposed group if they had not been exposed to the project or strategy. It is similar to experimental designs (described below) but lacks the random assignment of subjects to the comparison group. A common example of a quasi-experimental design is matching, where an exposed group is matched with a non-exposed group selected by the team. For instance, suppose you are working to promote sustainable fishing practices, and you want to understand whether fishers' use of these practices is greater in communities in which you have worked. You should measure fishers' use of the practices in those communities. You could then also identify other similar communities in which fishers have not participated in your strategy, and you could measure those non-exposed fishers' use of the practices.

TIP!

Any evaluation design (including experimental design) will be strongest when it includes a mixture of quantitative and qualitative methods.

Another example of a quasi-experimental design which can be quite powerful is a cross-site comparison. Imagine now you are working in three different sites where you are promoting sustainable fishing practices – all fishers have been exposed to the strategy. However, some variables that differ across those sites include geographic region, community organization, and income levels. Your team could try to assess whether there are differences in adoption of sustainable fishing practices across the three sites and whether geography, community organization, and/or income levels might influence adoption. In this way, you are not formally testing the effectiveness of your efforts to promote sustainable fishing practices (because you are controlling for this variable by ensuring all are exposed). Rather, you are testing the degree to which other key variables (differences among communities) may affect adoption rates.



The main advantage of using comparison groups is that doing so can be more feasible to set up than a true experimental design, yet it yields strong evidence for causality. Quasi-experimental designs, however, tend to be moderately to highly expensive and, as such, are often not practical for many conservation teams.

c) **Controls (experimental design):** This approach involves the random assignment of subjects to those "exposed" to the strategy or project (treatment group) and those "not exposed" (control group). For example, for the sustainable fishing practices strategy mentioned earlier, the team may decide from the start to work with two randomly selected groups of fishers, one of which participates in the sustainable fishing strategy and the other of which does not. The team could then follow both groups over time to measure key variables that will help them determine whether exposure to the sustainable fishing strategy had a statistically significant impact on fishers' adoption of practices, as compared to fishers who were not exposed. The main advantage of an experimental design is that it provides strong evidence for causality. However, it is also very expensive and typically not practical for most conservation teams.

TIP!

Teams can often feel pressure to provide strong evidence of causality and, therefore, to use more rigorous approaches. While it is ideal to provide reasonable evidence of causality, it is important to remember that conservation happens in a dynamic, messy, resource-limited context. See Box 5 for more tips.

8) Decide the timing of observations and how many you will make

A second key element of how you will monitor (your M&E design) is determining when and how often you will monitor. There are three options:

a. Before implementation
b. During implementation, and/or
c. After implementation

In the evaluation literature, these are also referred to as: pre-test (before implementation), post-test (after implementation), and time-series (a number of observations over time that may span before, during, and/or after implementation). Determining the timing of measurements and how many you take is largely influenced by your resources and the level of certainty you need to know that any changes you witness are likely due to your conservation actions. The same considerations outlined in Box 5 apply to this step, while Box 7 provides additional tips to consider for determining when to collect data.

The least rigorous option is to take a single measurement after implementing your conservation action (post-test). You can significantly increase your ability to demonstrate possible causality by taking measurements before and after implementation (pre-test / post-test). You can often improve that ability even further by taking several measurements over time because doing so could allow you to determine whether the variable of concern is sensitive to a particular time (e.g., seasonal changes or political cycles – see Box 7 for timing considerations). Your team will need to weigh its available resources against the need or desire to demonstrate causality before deciding the timing and number of measurements. Box 5 can help you think through this

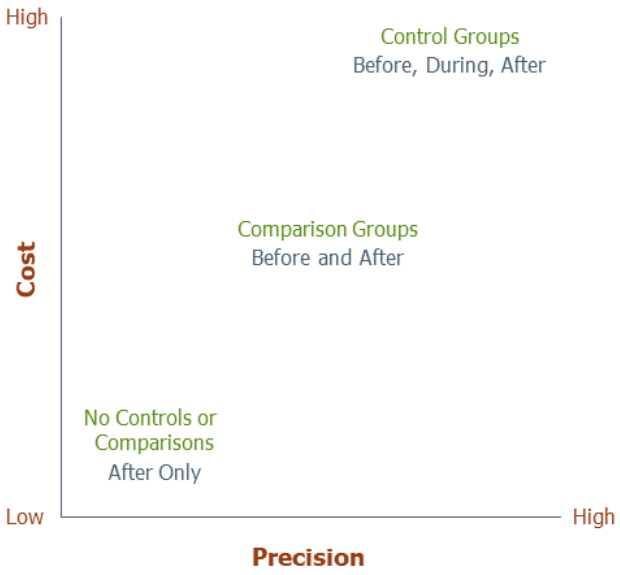
decision. Likewise, Figure 4 summarizes the main trade-offs your team should consider when determining the timing of observations and your comparison model.

BOX 7. CONSIDERATIONS FOR WHEN TO COLLECT DATA

It is important to define the timing of baseline and final data collection for each indicator. In many cases, you will want to collect data more frequently. To decide when and how often you should collect data, consider the following factors:

- **Time period to effect change:** If you realistically cannot expect to see a change in a factor for five years after the start of the project, then your next measurement after the baseline measurement should probably be no earlier than five years (unless you need to monitor it for the influence of other variables).
- **Seasonality:** You may need to always monitor at the same time of year or at various points of the year to be able to factor in seasonal changes. For example, if you are monitoring water levels, they will vary widely depending upon whether you take them at the beginning of the wet season versus during or at the end of the wet season. In most cases, it would not make sense to compare water levels taken at the end of the dry season one year with those taken at the end of the wet season the following year.
- **Natural variability:** If what you are monitoring varies naturally, you should have enough data points from appropriate timeframes to account for natural variations that have nothing to do with project impacts. For example, if you are collecting data influenced by climatic changes, you should clearly note if the measurement time coincides with an El Niño year and how that might affect your results. You may also want to vary the number of collection times around the El Niño event to compensate for this effect.
- **Project life cycle:** This is a more practical concern. You should keep in mind key project reviews, planning, reports, or other project-related events and adjust your monitoring times to meet those needs if doing so will not substantially affect the outcome of your monitoring.

FIGURE 4. COST AND PRECISION TRADE-OFFS OF COMPARING TREATMENT GROUPS AND TIMING OF OBSERVATIONS



9) Determine how will you choose your subjects or entities to be monitored

You also need to think about the individuals, units, or entities within a population about which you will collect data. There are two options:

Census monitoring involves measuring all the individuals, units, or entities in a population. Using a census has the inherent advantage that you know your monitoring data will adequately represent the entire population since you have collected data for all individuals! In some projects, you can easily monitor all the individuals in a population. For instance, if you are interested in monitoring change in environmental knowledge and attitudes among students in an urban classroom participating in an environmental education course, it would be fairly easy to administer a survey to all the students. Likewise, if you are interested in measuring the number of fruit trees in a small agroforestry plot, you can count all the trees in the plot. Or, if you want to know the number of governments that have signed on to a treaty, you could easily collect that data. In addition, there may be automated ways of gathering data from an entire population. For example, you may be interested in how many visitors to a website download a certain publication. Even if the population of visitors is quite large, you could use Google Analytics or other tracking software to generate the desired data with a few mouse clicks.

Sampling involves measuring a representative subset of individuals, units, or entities in the population. Suppose in the previous examples that the populations you want to monitor are much larger – for example, you want to monitor students' environmental knowledge and attitudes across 50 school districts. Or, perhaps you need to know how many trees of a certain

species are in a 500,000 hectare forest. For either case, it is technically possible to survey all students or count all trees, but it would not be a very good use of project resources. By identifying a representative sample, you can monitor the desired indicator and then extrapolate the results to the broader population.

TIP!

Your ability to generalize your conclusions to the broader population is dependent upon the degree to which your sample is representative of that broader population. If you wish to make well-founded attribution or causality claims, you should consider working with an experienced statistician to identify the best sampling method.

The main advantages of sampling over a census lie in the reduced cost and greater speed of measurement because you are collecting data on a subset of individuals or entities rather than on an entire population. At a marine site, it would be impractical to count every fish in the coral reef habitat. More likely, you will only be able to monitor selected samples. The disadvantage of sampling is it can be quite complicated to do it well, and it requires using statistics to determine to what extent your sample data represent the population. When selecting your sample, you will want to take care to minimize selection bias which can affect your ability to generalize conclusions.

There are different approaches to sampling, with different benefits and drawbacks. It is beyond the scope of this guide to discuss all the different approaches and how to best employ them. Instead, we highlight, in very general terms, a few concepts. If you decide to sample, your team may wish to bring in the expertise of a statistician.

One common approach to sampling is a simple random sample – a sampling technique that minimizes bias and simplifies analysis of results. However, because of the random nature of selection, it does not allow you to easily examine a subset of the population that may be of interest. In this case, stratified sampling would be helpful because it allows you to stratify your sampling frame by key characteristics of interest (e.g., education or income level). Each strata then becomes your population from which you sample. Stratified sampling can be more costly and require a larger sample overall. In addition, it tends to work only where sub-groups are fairly homogenous.

If you are taking a qualitative approach, you might use sampling techniques such as purposeful sampling, where you seek out individuals or entities that will provide a lot of information about

the topic of interest. For example, you might select individuals based on a set of criteria, such as female heads of household from fisher families. Maybe you wish to purposefully sample this group because they are the ones who will be able to give you the most accurate information about annual household income. Another example is snowball sampling, where you might interview key individuals and then ask them whom else you should interview, based on your topic of interest. For more information on quantitative and qualitative approaches to sampling, your team could consult academic textbooks and/or work closely with experienced professionals.

Table 3 summarizes some potential methods, samples, and comparison models that a team implementing a sustainable fishing strategy could use to collect data on its indicator. As you can see in the table, the comparison model might vary by indicator. In many real-world situations, if the team were collecting indicator data for its own ongoing monitoring purposes, it may not use comparison groups, and it almost definitely would not use control groups. Likewise, the team would likely use post-test or possibly pre-test/ post-test observations. For data that are easier to collect, the team might do time-series observations.

TABLE 3. POTENTIAL M&E DESIGNS FOR INTERNAL MONITORING OF SUSTAINABLE FISHING STRATEGY

Qs & Information Needs (Box 2)	Indicator or Variable	Method	Sample/ Comparison Model
Is unsustainable fishing a high threat to coral reefs? *B. Association among factors*	Greatest threats to coral reefs	Threat assessment	N/A
Do outreach efforts lead to fishers having greater knowledge of sustainable fishing practices? *D. Causality among results & activities* *E. Influencing factors*	% of fishers in identified terrestrial ecosystems and watersheds that can name and describe at least two new sustainable fishing practices	Survey fishers	Sample of fishers Comparison with fishers in areas not participating in intervention Observations before, during, and after intervention
Are fishers in project area using only sustainable fishing practices? *C. Achievement of results*	% of the fishers in identified terrestrial ecosystems and watersheds that are using only sustainable fishing practices	Review registry of fishing gear on boats before they leave on fishing expeditions Random periodic checks of fishing boats	Sample of boats No comparisons or controls Observations before and after intervention
Do fishers using sustainable techniques earn more income than the previously did? And how much more? *C. Achievement of results* *D. Causality among results & activities*	% of the fishers using the new practices that are earning at least 20% more income than under the unsustainable method	Survey fishers	Sample of fishers using the practices No comparisons or controls Observations before and after intervention
Has unsustainable fishing declined as a result of the use of sustainable fishing practices? *C. Achievement of results* *D. Causality among results & activities*	# of tons of key identified species caught	Review Fisheries agency's records of fish landings Review Fishing Cooperative's records of fish brought in for processing and sale	Census all records Comparison with fish caught outside intervention area before and after intervention

Concluding Remarks

This guide is designed to help you operationalize your monitoring efforts. You have invested a lot of time and effort into developing your strategic plan, and you want to make sure that you track whether what you expected to see happens in reality. To do that, you need to make some key decisions about your audience, their information needs, and the purpose of your M&E. These decisions will influence your M&E design and the level of rigor and attribution you will need to consider to meet your key audiences' information needs. You will also need to carefully choose your data collection methods.

To practice adaptive management, your team needs to have the right information available at the right level of detail to help you make good management decisions. This usually does not mean irrefutable proof your actions are working. Rather, it means having strong enough evidence for your context to inform management decisions with a reasonable degree of certainty. What is "reasonable" will vary by projects, contexts, and actions. Investing some time upfront in M&E design will help you ensure you have the framework and data necessary to be able to analyze, learn, and adapt – go "full cycle" with the *Open Standards*.

Some References

There are countless resources related to M&E design. The following are a few key, relevant resources that your team may find helpful. We encourage you to explore the evaluation literature (articles, textbooks, and guides) to find additional information tailored to your needs.

Bamberger, Michael, Rugh, Jim, and Mabry, Linda. 2006. RealWorld Evaluation: Working Under Budget, Time, Data and Political Constraints. Thousand Oaks, London, New Delhi: SAGE Publications. www.realworldevaluation.org/RealWorld_Evaluation_resour.html.

Margoluis, R., Stem, C., Salafsky, N., & Brown, M. (2009). Design alternatives for evaluating the impact of conservation projects. In M. Birnbaum & P. Mickwitz (Eds.), Environmental program and policy evaluation: Addressing methodological challenges. New Directions for Evaluation, 122, 85–96.

Patton, Michael Quinn. Qualitative Research & Evaluation Methods: Integrating Theory and Practice. Thousand Oaks, CA: SAGE Publications, 2015.

Rossi, Peter H., Mark W. Lipsey, and Howard E. Freeman. Evaluation: A Systematic Approach. Thousand Oaks, Calif.: Sage Publications, 2009.

Annex 1. *Open Standards* Steps and Outputs

(from Annex 3 of the *Open Standards*)
Numbers denote steps and sub-steps, and diamond bullets (♦) denote outputs. Not all standards or outputs are appropriate under all conditions or for all projects, so you should adapt as needed.

1. Conceptualize

1A. Define Planning Purpose & Project Team

- ♦ Identification of planning purpose & decisions.
- ♦ Identification of decisions already made & constraints or limits.
- ♦ Selection of initial project team.
- ♦ Identification of key skills.
- ♦ Identification of gaps in skills or knowledge.
- ♦ Designation of roles & responsibilities.

1B. Define Scope, Vision, & Conservation Targets

- ♦ Brief description of project scope.
- ♦ Map of project area.
- ♦ Vision statement for project.
- ♦ Selection of conservation targets.
- ♦ Description of the status of each priority conservation target.

1C. Identify Critical Threats

- ♦ Identification of direct threats.
- ♦ Rating or ranking of direct threats.

1D. Analyze the Conservation Situation

- ♦ Identification & analysis of indirect threats & opportunities.
- ♦ If relevant, selection of human wellbeing targets.
- ♦ Assessment of stakeholders & primary interests.
- ♦ Initial conceptual model.
- ♦ Ground-truthing & revision of model.

2. Plan Your Actions & Monitoring

2A. Develop a formal action plan

- ♦ Goals for each target.
- ♦ Identification of key intervention points & draft strategies.
- ♦ Prioritization of draft strategies.
- ♦ Results chains that specify assumptions for key strategies.
- ♦ Objectives for key intermediate results.
- ♦ Finalized strategies, results chains, & objectives.
- ♦ Finalized Action Plan.

2B. Develop a Formal Monitoring Plan

- ♦ Audiences & information needs defined.
- ♦ Indicators & methods defined.
- ♦ Finalized Monitoring Plan.

2C. Develop an Operational Plan

- ♦ Assessment of human, financial, & other resources.
- ♦ Risk assessment & mitigation.
- ♦ Estimate of lifespan & exit strategy.

3. Implement Actions & Monitoring

3A. Develop Detailed Short-Term Work Plan & Timeline

- ♦ Work plan detailing tasks, activities, & responsibilities.
- ♦ Project timeline or calendar.

3B. Develop & Refine Your Project Budget

- ♦ Project budget.
- ♦ Potential funding sources identified.
- ♦ Funding proposals developed & submitted.
- ♦ Financial resources obtained.

3C. Implement Your Plans

- ♦ Implementation of strategic plan.
- ♦ Implementation of work plan.

4. Analyze, Use, Adapt

4A. Prepare Your Data for Analysis

- ♦ Development & use of systems for recording, storing, processing & backing up project data

4B. Analyze Results

- ♦ Analyses of project results & assumptions.
- ♦ Analyses of operational & financial data.
- ♦ Documentation of discussions & decisions.

4C. Adapt Your Strategic Plan

- ♦ Revised project documents - action plan, monitoring plan, operational plan, work plan, & budget.
- ♦ Documentation of discussions & decisions.

5. Capture & Share Learning

5A. Document what you learn

- ♦ Documentation of key results & lessons.

5B. Share What You Learn

- ♦ Identification of key audiences.
- ♦ Development of a communications strategy.
- ♦ Regular reports to project team members & key stakeholders.
- ♦ Development & distribution of communication products.
- ♦ Use of other people's communication products.

5C. Create a Learning Environment

- ♦ Regular feedback shared formally or informally.
- ♦ Evaluations and/or audits at appropriate times during project cycle.
- ♦ Demonstrated commitment from leaders to learning & innovation.
- ♦ Safe environment for encouraging experimentation.
- ♦ Commitment to share success & failures with practitioners around the world.

Close the Loop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