The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH

conservation action planning handbook

TNC 2007

Developing strategies, taking actions and measuring success at any scale

The Nature Conservancy, Arlington, VA

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The CAP Handbook is intended as a guidance resource to support the implementation of The Nature Conservancy's Conservation Action Planning (CAP) Process - a powerful instrument for helping practitioners get to effective conservation results. The CAP process is a key analytical method that supports Conservation by Design, the Conservancy's strategic framework for mission success.

This document was prepared by the CAP Handbook Team and reviewed by field practitioners. The CAP Handbook Team is: Jeff Baumgartner, Rebecca Esselman, Dan Salzer, and Jora Young of TNC's Global Conservation Approach Team and Nick Salafsky of Foundations of Success. David Braun of TNC's Eastern New York Chapter co-authored Step 3: Assess Viability of Focal Conservation Targets. Much of this material was based on earlier work by Conservancy staff (including especially work by Greg Low) as well as materials developed by Foundations of Success, WWF, and the Conservation Measures Partnership.

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This is a living document that will adapt and change as new information becomes available and as we hear from you about how to improve it. The most recent version will always be available at: http://conserveonline.org/workspaces/cbdgateway/cap/practices

We welcome your feedback. Please address any comments to capfeedback@tnc.org.

For more information on Conservation Action Planning visit www.conservationgateway.org/cap.

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Introduction to the CAP Handbook

Conservation Action Planning (CAP) is a relatively simple, straightforward and proven approach for planning, implementing and measuring success for conservation projects. The methodology was developed by conservation practitioners working in real places. It has been tested and deployed successfully by hundreds of teams working to conserve species, sites, ecosystems, landscapes, watersheds and seascapes across the globe.[1]

CAP - An Adaptive Management Framework

Conservation of the Earth's rich natural diversity is a constantly evolving discipline. Our knowledge of species, natural communities, ecosystems and the processes that sustain them continue to improve. The human activities that threaten or are compatible with them are constantly changing. Conservation Action Planning is designed to recognize this shifting nature of our knowledge and the challenges conservationists face by encouraging practitioners to view the conservation planning process not as a once-a-decade exercise but as a regular, iterative process of "successive approximations." CAP encourages teams of practitioners to capture their best understanding of the conservation situation, build a set of actions based on that understanding, implement the actions, measure the outcomes of their actions, learn from these outcomes and refine actions over time.

Conservation Action Planning is one of three key analytical methods that support the application of The Nature Conservancy's strategic framework for mission success, called Conservation by Design (The Nature Conservancy 2006). Conservation by Design is a collaborative, science-based approach used to identify the biodiversity that needs to be conserved, to decide where and how to conserve it and to measure our effectiveness. The basic concepts of this conservation approach follow an adaptive management framework of setting goals and priorities, developing strategies, taking action and measuring results. These basic concepts are reflected in each of the three key analytical methods, which in addition to CAP include Major Habitat Assessment and Ecoregional Assessment. In general, Major Habitat and Ecoregional Assessments focus on setting goals and priorities, CAP focuses on developing and implementing strategies to address the priorities and achieve the goals, and all three methods incorporate aspects of measuring results. In addition to serving as the Conservancy's strategic framework for mission success, Conservation by Design also supports the protected area management goals of the Convention on Biological Diversity.[2]

At its core, CAP is a framework to help practitioners to focus their conservation strategies on clearly defined elements of biodiversity or conservation targets and fully articulated threats to these targets and to measure their success in a manner that will enable them to adapt and learn over time. The CAP process accomplishes this by prompting a conservation team to work through a series of diagnostic steps that culminate in the development of clearly defined objectives and strategic actions. Together these represent a testable hypothesis of conservation success that forms the basis of an "adaptive" approach to conservation management.

An overview of the CAP process is presented in the CAP Basic Practices document (see *Resources and Tools*). This Handbook is a more detailed "toolbox" designed to help you explore and apply this

1. While CAP was conceived and designed for planning for biological values, it has also been successfully adapted for use in planning for archeological, cultural and spiritual values. http://conserveonline.org/workspaces/cbdgateway/cap/resources/capresources_sm/4/2/CAP_Cultural_Summary_JRrev.pdf
2. Information on the Convention on Biological Diversity is available at http://www.biodiv.org/decisions/default.aspx?m=COP-07&id=7765&lg=0

process step-by-step. It contains 10 modules, which correspond to the 10 steps in the basic practice of CAP (Table 1). Each module provides a description of the individual step, its importance and expected outputs. In straightforward language, the following chapters detail a basic approach to implementing each step. For each of the steps, there is a discussion of some of the challenges that provide rich opportunities for user innovation. The toolbox also provides case studies that illustrate how different conservation teams have executed each step and a list of additional reading references and related tools. These resources provide more in-depth background on the step and/or ways a user might supplement or enrich both their understanding and application of that step.

The Summary of the Conservation Action Planning Process in Table 1 provides a short-hand list of the types of "products" one might expect from each step in the CAP process. This list can guide you as you navigate the handbook. While the Summary and Handbook present the steps in a linear fashion, the practice of CAP tends to be much less so. Many teams find that there are elements of the process that they will return to again to invest more deeply, with new information, or that they might apply a step in a slightly different sequence. Sometimes a project team will decide to use a limited number of the steps in conjunction with other things that are more familiar to them. This is ok. The practice of CAP is an evolving and open adaptive management framework that we hope will spark much innovation and adaptation.

Recognizing this iterative approach to conservation, the outputs of the CAP process can be captured in a simple, customized Excel tool--the CAP Workbook, which lends itself to easy entry of information and modification. Throughout this document the globe icon 🌍 will indicate references to the CAP Workbook. However, you can still use this guidance material even if you don't use the CAP Workbook.

Tips for First Time Users

Experience has shown that project teams can develop a credible Conservation Action Plan if they do the following:

Build on previous experience. CAP works best if you invest some time in modest preparation by compiling existing information and basic maps and reviewing existing plans and reports relevant to your area and biodiversity.

Work as a team. Although one person can develop a CAP plan on his or her own, it is better to assemble a CAP team composed of members with diverse skills and expertise. Conservation experience, knowledge of the area (both biological and sociological) and good strategic thinking skills are all important skills for the team to possess. It is also important to have a clear team leader who will be committed to ensure that the plan is implemented and a knowledgeable process facilitator, who is both competent with the CAP process and an experienced conservation professional. While CAP is relatively simple, like any new tool, it does help if someone shows you how to use it the first time you pick it up. This handbook will provide some guidance, but if you can engage a knowledgeable practitioner to help you through the process the first time, you may find it easier to avoid pitfalls.[3]

3. The Nature Conservancy trains and supports a network of conservation professionals who are committed to supporting teams by coaching them through the application of Conservation Action Planning to their conservation site. These individuals work for different conservation projects and organizations but share a common commitment to understand the CAP method and support at least one team every year in the successful application of CAP to their project. They are members of the Efroymson Coaches Network for Conservation Action Planning. For information on a coach near you visit http://conserveonline.org/workspaces/cbdgateway/cap/contact

Stick to the basics the first time around. At its essence the CAP process is simple. But like anything else, when you go somewhere the first time it always seems longer and more confusing. Your first time around with CAP may appear that way, too. To overcome this first impression, an experienced user will tell you, first and foremost, “don't expect to do everything completely or 'perfectly' the first time you go through each step in this process.” Remember, this is meant to be an iterative cycle -the idea is to deliberately and yet rapidly go through the steps, develop a credible draft of the outputs, capture your ideas and current knowledge and then step back and look at what you have done. You will revise your work over time as new information becomes available and the project changes and matures: CAP is a series of “successive approximations” built on a set of working hypotheses.

Adjust as necessary. The basic practices described in this document can be applied to almost any conservation project -regardless of scale or type. It is this flexibility that many practitioners really like about CAP, but it is up to you to adjust the method to meet your unique situation. If you are just starting out at a place or you are deeply invested and have been working there a long time or anything in between, the detail and investment in different steps will vary greatly. Your core project team should feel comfortable changing or adapting the basic practices as necessary. If you find success in modifying a step, share your innovations and modifications, as chances are there are other teams that would greatly value learning from your experience. Lessons learned can be shared by posting a case study through the CAP Toolbox using a standardized form.[4]

Learn to live with uncertainty. You will encounter gaps in available information and knowledge at many points along the way. There is no way around this in the business of conservation. The best advice a seasoned practitioner can give you is “don't allow this to stop you in your tracks - state your hypotheses and move forward with the best course of action determined by your best available information.” Just be sure to note what you don't know, record any assumptions you are making, and capture your reasons for going in the direction you chose. Capturing your rich discussions and the assumptions which led to your decisions will provide priceless reference points for your own learning as well as for future team members and practitioners in this and other projects. And by recording the gaps in your knowledge, you will be able to more readily fill in the gaps over time.

Please Share What You Learn

Conservation Action Planning is supported and freely distributed by The Nature Conservancy to any conservation practitioner in the hopes that it will result in more focused and effective conservation action taking place across the globe. Over the last fifteen years, many teams from many different organizations have adopted and are using CAP in one form or another. Their experiences and feedback have helped refine and shape the method. We welcome information on your experiences, your adaptations and your results. Sharing your knowledge will help improve the method and the practice of conservation across the globe. Visit www.conservationgateway.org for ways to share your knowledge.[5]

4. The CAP Case Study Template is available at
http://conserveonline.org/workspaces/cbdgateway/cap/practices/capcasestudyform.doc.
5. WWF and Foundations of Success have developed a useful device known as “Results Chain Modeling” to facilitate the articulation of assumptions that link proposed actions to outcomes.. Guidance available at
http://assets.panda.org/downloads/2_1_results_chains_11_01_05.pdf.

Resources and Tools

For comprehensive guidance on Conservation Action Planning:

In Spanish:
Granizo, Tarsicio et al. 2006. Manual de Planificación para la Conservación de Áreas, PCA. Quito: TNC y USAID.
http://conserveonline.org/workspaces/cbdgateway/cap/resources/2/2/Manual_PCA_Spanish.pdf

Online:
http://conserveonline.org/workspaces/cbdgateway/cap/resources

Supplementary reading providing overview and context for CAP:

TNC, 2005. Conservation Action Planning: Developing Strategies, Taking Action, and Measuring Success at Any Scale--Overview of Basic Practices. The Nature Conservancy. Available in English and Spanish.
http://conserveonline.org/workspaces/cbdgateway/cap/resources/1/TNC_CAP_Basic_Practices.pdf
http://conserveonline.org/workspaces/cbdgateway/cap/resources/1/TNC_CAP_Basic_Practices_Spanish.pdf

Low, G. 2003. Landscape-Scale Conservation: A Practitioners Guide. The Nature Conservancy.
http://conserveonline.org/workspaces/cbdgateway/cap/resources/4/2/Landscape_Practicitioners_Handbook_July03_PR.pdf

TNC, 2006. Conservation by Design, A Strategic Framework for Mission Success. The Nature Conservancy.
http://conserveonline.org/workspaces/cbdgateway/files/cbd_brochure.pdf

Summary of the Conservation Action Planning Process

A. Defining Your Project

1. Identify People Involved in Your Project

- ☐ Selection of core project team members and assignment of roles
- ☐ Identification of other planning team members and advisors as needed
- ☐ Identification of a process leader

2. Define Project Scope & Focal Conservation Targets *(5S = Systems)*

- ☐ A brief text description and basic map of your project area or scope
- ☐ A statement of the overall vision of your project
- ☐ Selection of no more than 8 focal conservation targets and explanation of why they were chosen

B. Developing Your Conservation Strategies and Measures

3. Assess Viability of Focal Conservation Targets *(5S = Systems)*

- ☐ Selection of at least one key ecological attribute and measurable indicator for each focal target
- ☐ Your assumption as to what constitutes an acceptable range of variation for each attribute
- ☐ Determination of current and desired status of each attribute
- ☐ Brief documentation of viability assessments and any potential research needs

4. Identify Critical Threats *(5S = Stresses & Sources)*

- ☐ Identification and rating of stresses affecting each focal target
- ☐ Identification and rating of sources of stress for each focal target
- ☐ Determination of critical threats

5. Develop Conservation Strategies *(5S = Strategies)*

- ☐ A situation analysis that includes indirect threats/opportunities and associated stakeholders behind all critical threats and degraded attributes
- ☐ A "picture" – either in narrative form or a simple diagram – of your hypothesized linkages between indirect threats and opportunities, critical threats, and focal targets
- ☐ At a minimum, good objectives for all critical threats and degraded key ecological attributes that your project is taking action to address and if useful, for other factors related to project success
- ☐ One or more strategic actions for each conservation objective

6. Establish Measures *(5S = Success)*

- ☐ A list of indicators and methods to track the effectiveness of each conservation action
- ☐ A list of indicators and methods to assess status of selected targets and threats you are not currently working on

C. Implementing Your Conservation Strategies and Measures

7. Develop Work Plans

- ☐ Lists of major action steps and monitoring tasks
- ☐ Assignments of steps and tasks to specific individual(s) and rough timeline
- ☐ Brief summary of project capacity and a rough project budget
- ☐ If necessary, objectives and strategic actions for obtaining sufficient project resources

8. Implement

- ☐ Action.
- ☐ Monitoring.

D. Using Your Results to Adapt and Improve

9. Analyze, Reflect & Adapt

- ☐ Appropriate and scheduled analyses of your data
- ☐ Updated viability and threat assessments
- ☐ Modifications to objectives, strategic actions, and work plans, as warranted
- ☐ Regular updates of project documents

10. Learn & Share

- ☐ Identification of key audiences and appropriate communication products for each

Conservation Action Planning
Step 1: Identify People Involved in Your Project

As summarized in TNC's CAP Overview of Basic Practices:

This step asks you to identify your most valuable resource -the people who will be involved in designing and implementing your project. Specific questions that this step answers include:

"Who will design our project?
"Who will be responsible for ensuring the plan goes forward?"
"Who can give us advice?"
"Who will help us through this process?"

Expected Outputs
- Selection of core project team members and assignment of roles.
- Identification of other planning team members and advisors as needed.
- Identification of a process leader.

The Importance of Identifying People in Your Project

Although conservation typically focuses on biodiversity, it is fundamentally a human endeavor. To this end, the most important resources for any conservation project are the people who will be involved in designing and implementing it. It is the commitment and skills that these people bring that will ultimately determine if your conservation planning process will result in the development of effective strategies that will truly be implemented and evaluated over time.

One of the key principles of adaptive management is that the *people who will ultimately be responsible for implementing a project must also be involved in designing and monitoring it*. If project managers don't intimately understand the assumptions that have gone into a project plan, chances are they will not be able to effectively implement the plan -or to successfully adapt it and change it over time. Another key principle is that *having project team members with different skills, knowledge, and experience will generally lead to a more creative and resilient project*. Project team members collectively need to have knowledge of the area (both its ecology and human context), ample conservation experience, and an ability to think strategically. A final principle is that although it is important to have continuity, *project teams also need to grow and change over time as conditions change,* the project matures, new or different expertise is needed, and as people's careers evolve.

Types of People Involved in Your Project

There are many ways to categorize the type of people that will be involved in your project by their role; the partners and perspectives they represent; and the knowledge, skills and characteristics that they have. The specific types of people that any given project will require are also influenced by the type of project you are undertaking and where the project is in its life cycle. If you are starting a small new project in a new place, you need one set of people to help you use the CAP process to get a quick sense of what your organization might undertake. If you are developing strategies in a large multi-stakeholder project, you may need another set of people. And if you are working to hand a project over to new partners, you may require still another group.

Roles

Whether they are formally or informally defined, basic project roles include:

- **Initiating Project Team** - The specific people who initially conceive of and launch the project. They may or may not go on to form the core project team, but if not, then the project should probably not go through a detailed CAP process until the Core Project Team has been identified. The initiating project team often includes a "sponsor" who is a person in a leadership or decision making position within the organization who validates the process, ensures that there are resources to implement it, and provides overall leadership for the project.
- **Core Project Team** - A small group of people (typically 3-8 people) who are ultimately responsible for designing and managing the project. This group includes the project leader(s).
- **Full Project Team** - The complete group of people collectively involved in designing, implementing, monitoring and learning from the project. This group can include managers, stakeholders, researchers, consultants, volunteers, and other key implementers. The composition of this group will typically change over time as the project goes through different stages and requires different skills and abilities.
- **Project Advisors** - People who are not on the project team, but to whom the team members can turn for advice and counsel.
- **Project Stakeholders** - Individuals, groups or institutions who have a vested interest in the natural resources of the project area and/or who potentially will be affected by project activities and have something to gain or lose if conditions change or stay the same. Just because someone is a stakeholder does not mean that you will want them on your project team. You cannot ignore key stakeholders in your analysis of the situation. Cultivation of key stakeholders can be a long process itself that may have to begin well before your CAP process gets under way.
- **Process Leader and Support Members** - A process leader is a person who can lead the project team through the CAP process. A process leader is typically part of the core team. A good leader understands the key elements of the process, has good facilitation skills and can keep your team from getting too bogged down in any one part of the process. This leader does not need to be a "professional" facilitator, but should be someone who is intimately familiar with applying the CAP process to "real-world" conservation problems. It is also often helpful to have one person serve as the workshop coordinator to arrange the logistics for the workshops in your CAP process.

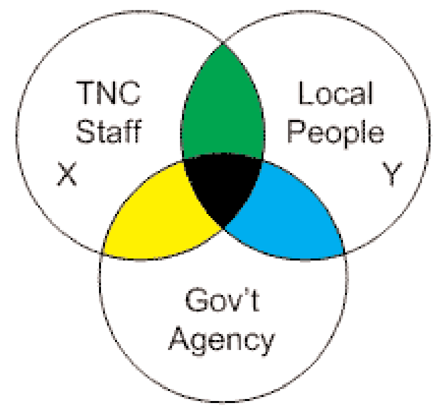
> Terms at a Glance
>
> Project Team - A specific group of practitioners who are responsible for designing, implementing and monitoring a project. This group can include managers, stakeholders, researchers, and other key implementers.
>
> Stakeholders - Individuals, groups, or institutions who have a vested interest in the natural resources of the project area and/or who potentially will be affected by project activities and have something to gain or lose if conditions change or stay the same.

Representation of Partners and Perspectives

In addition to the roles that they play, project team members and advisors also often represent different partners and perspectives. Most conservation projects are partnerships between people representing different organizations and groups. As such, it is usually important to have individuals from each of the major partners involved in the project team. Partnership development is an entire process in and of itself that often requires substantial advance planning and hard work to carry out.

For example, Figure 1 shows a relatively simple partnership. In this case, although the three groups have slightly different missions, they still can agree to come together and work on areas of joint interest shown by the shaded overlap areas. (Actually, they can even take on work related to the unshaded areas, as long as it is a negotiated trade -"We will help you do X, if you help us do Y"). Here, it would be useful to have at least one key representative from each partner group on the core project team.

Figure 1. A Simple Partnership



In more complex projects there are more potential stakeholders, such as a development Non-Government Organization (NGO) or a logging company. In this case, it may or may not make sense to include representatives of the logging company and the development NGO on the project -it depends in large part on how their mission relates to the goals of the proposed project. Note, however, that even if they are not on the core project team, they are still key stakeholders who need to be considered and consulted during the project process. Also, in some cases you may choose to include a "difficult" organization in your team as a way of trying to draw them into your project.

Box 1. Characteristics of Good Conservation Project Team Members

Greg Low (2003) lists the following characteristics for a good project leader - although most if not all probably apply to all project team members, or at least should be present across the team.

- **Alignment With Core Values**. Integrity beyond reproach; innovation and excellence; commitment to people; commitment to the future.
- **Composure.** Cool under pressure; can handle stress; is not knocked off balance by the unexpected; doesn't show frustration when resisted or blocked.
- **Dealing With Ambiguity.** Can effectively cope with change; shifts gears; can decide and act without having the total picture; can comfortably handle risk and uncertainty.
- **Drive for Results.** Bottom-line oriented; steadfastly pushes self and others for results; takes initiative to make concrete results happen - a dealmaker.
- **Interpersonal Savvy.** Relates well to all kinds of people; builds constructive and effective relationships; uses diplomacy and tact.
- **Learning on the Fly.** Learns quickly when facing new problems; open to change; analyzes successes and failures for clues to improvement; tries to find solutions.
- **Partnering.** Understands how to build a partnership for clearly defined results; active listener; collaborative; recognizes value of distinct strengths; shares credit.
- **Patience.** Tolerant with people; tries to understand the people and the data before making judgments and acting; sensitive to due process and proper pacing.
- **Perseverance.** Pursues everything with energy, drive, and a need to finish; seldom gives up before finishing, especially in the face of resistance or setbacks.
- **Political Savvy.** Can maneuver through complex political situations; anticipates where the land mines are and plans approach accordingly; is a "maze-bright" person.
- **Sizing up People.** Good judge of talent; can articulate people's strengths and limitations and project what they're likely to do in various situations.
- **Strategic Thinking.** Can craft competitive and breakthrough strategies; can hold on to a vision; puts the trivial aside and focuses on the critical.

Knowledge, Skills, and Characteristics

Since conservation is an interdisciplinary endeavor, it is important to have people with different knowledge and skills on your team or as your key advisors. For example, depending on your ecosystem and species of concern, you might need to have a marine biologist, a botanist or a hydrologist. Likewise, depending on your threats and likely strategies, it may also be useful to have an anthropologist, a lawyer or an enterprise development specialist. As a general rule, most people tend to gravitate towards strategies that they are familiar with. To this end, it can be helpful to have multiple perspectives to ensure that you consider a diversity of options. In addition to disciplinary knowledge, it is also helpful to have people who know the local natural history and the project's socio-economic setting. Finally, it is also important to have a range of different types of people on your project team who bring different types of energy and characteristics (Box 1).

Commonly Used Methods

There is no hard and fast method for identifying the people involved in your project. Some basic steps that you may wish to consider include:

1. Bring together your initiating project team

To get a sense of the kinds of skills and partner organizations that you might want to involve in the planning process, it is useful to take a little time at the beginning to sketch out in very broad terms your current understanding of the project. To do this, just very quickly (in an hour or two at most) ask yourself the following questions: What is the general area you are planning for? What are the things that attracted you to this area in the first place? What do you suspect are the big issues that you will likely need to address in your plan? And who are the key partners or stakeholders in the area? As you go along in the process you will address all of these things with more precision. At this point you are using this broad brush discussion to help you to pinpoint the people you want to invite to join and/advise the process.

2. Consider broader team

Based on this initial analysis, think about who would be good to have on your core project team and involved in the CAP process, who might be good as an advisor, and who you should avoid having directly involved in your project. You may wish to develop a table to help you through this step (Table 1). Or if you want to be formal about your analysis, you could even rank different candidates on different criteria.

Table 1. Example of breakdown of potential team members.

Person	Organization	Skills/Knowledge	Roles	Comment
Core Team				
Ingrid	TNC	Business development	Team leader	Good leader
Jose	TNC	Marine biologist	Assembles info. on targets, works with science advisors	Good team player; may be leaving in 6 months
Martha	Green Island (local NGO)	Local politics	Building local consensus	
Raj	National Fisheries Agency	Fishing policy		Useful link to senior agency officials
Advisors				
Hubert	TNC	CAP process Coach	Process leader	
Mei-Lee	World Bank	Economics	Economic analysis	Good links to donor community

3. If appropriate, draw up a team charter and/or rough "terms of reference"

Team charters are useful for defining the responsibilities of the team, sub-teams and individuals. Charters typically articulate the purpose, organization, constraints and interdependences of the team. Terms of reference can be developed for each person that spells out what they are expected to contribute to the team and what they can expect to get in return. For example, will it be a paid position? Will they get credit in any scientific publications? If multiple organizations are involved in the project, it may also be useful to develop an informal or even formal memorandum of understanding among the partners. View examples of a team charter in the *Resources and Tools* section.

4. Gauge interest among possible team members

Approach your initial round of candidates and see if they are interested in joining the project, either as a core team member or advisor. You will also want to make sure you have a good process leader.

5. Re-evaluate your list

Once you receive responses to your invitation you can evaluate the list of accepted invitations for potential gaps in expertise or skills and fill additional spots accordingly.

The CAP Workbook allows you to enter information about your project team using the Project Identification Wizard.

6. Regularly revisit your project team composition

As you continue through the CAP process it is a good idea to revisit your team composition to see if you have the right people on your core team and as advisors, especially as you go through different stages of your project and require different skills and linkages with different partners.

7. Consider key stakeholders

Make sure you carefully consider the key stakeholders who are not part of your project team when you get to *Step 5. Complete Situation Analysis* and *Step 6. Develop Strategies*.

Opportunities for Innovation

- **Developing Good Terms of Reference, Charters and Partnership Agreements** - Traditionally, most Nature Conservancy projects have not developed formal terms of reference for their members, team charters, or partnership agreements. It might be good to experiment with this and see if they are helpful, and if so, provide templates and models that can be adapted by new projects. As noted above, this work may have to take place well before the CAP process itself.

- **Dealing With Difficult Team Members** - Many project teams have to deal with members who are polarized in their positions and/or have a negative history with other team members. Suggestions of how to manage these situations would be most useful such as bringing team members onboard for a trial basis or by setting term limits.

- **Figuring Out Who to Include in Your Team as Project Grows and Matures** - A common challenge in many project teams is that the person or people who start the project are not always the people who are best suited to manage the project over the long-term. It is thus important to change and adapt team composition over time. Suggestions of how to manage this issue of growth and change would be welcome—as would a discussion of the more general "life-history" of a conservation project, particularly in respect to team composition at different stages.

Resources and Tools

Basic guidance and examples for selecting a project team can be found in the following sources:

Caldwell, R. 2002. Project Design Handbook. CARE.
www.aprscp.org/new%20materials/CARE%20Project%20Design%20Handbook.pdf

Margoluis, R. and N. Salafsky. 1998. Measures of Success: Designing, Managing, and Monitoring Conservation and Development Projects.
www.IslandPress.org (English in hardcopy only)
www.FOSonline.org (Spanish online)

Examples of team charters:

Great Lakes Basin for alignment of strategic actions.
http://conserveonline.org/workspaces/cbdgateway/cap/practices/supportmaterials/bp1sm/GLteamcharter

Chico Basin Charter for developing Measures of Success.
http://conserveonline.org/workspaces/cbdgateway/cap/practices/supportmaterials/bp1sm/chicoteamcharter

Turner L. and R. Turner, 1998. Creating a Team Charter in How to Grow Effective Teams. The Ends of the Earth Learning Group.
www.endsoftheearth.com/HTMLTeams/Chap2.htm

Conservation Action Planning

Step 2: Define Project Scope & Focal Conservation Targets

As summarized in TNC's CAP Overview of Basic Practices:

With this step you define the extent of your project and select the specific species and natural systems that your project will focus on as being representative of the overall biodiversity of the project area. This step helps your project team come to consensus on the overall goal and scale of the project and your ultimate measures of success. Specific questions that this step answers include:

"Where is our project?"
"What are we trying to conserve or restore?"

Expected Outputs

- A brief text description of your project area or scope.
- A basic map of your project area(s) using a computer-based GIS program, existing base map or hand sketch.
- A statement of the overall vision of your project.
- Up to eight ecological systems, ecological communities and/or species that you assume represent the biodiversity of the area for which you are planning.
- An explanation of why these conservation targets were chosen by the team and, if applicable, the nested targets they represent.

The Importance of Scope and Focal Targets

A project's scope and focal conservation targets define the broad parameters of the project and provide the foundation for all subsequent steps in the CAP process. Defining the scope enables the core project team members to discuss and agree on what the geographic or ecological extent of their project will be. This is especially important when conservation efforts might extend beyond the limits of a designated management area or when the investments transcend single site boundaries.

Focal target selection is perhaps the most critical step to the CAP process. One of the important benefits that a CAP brings to a project is the establishment of a clear biodiversity focus - a focus upon which other planning and monitoring steps are concentrated to ensure that consideration of threats, strategies and monitoring plans, and the prioritization therein, all link directly back to the biodiversity in question. Further, engaging partners in the planning process ensures the interests of those partners are considered and appropriately represented going forward in the process. Then, as planning moves forward, all key stakeholders are beginning with a common vision for the focus of the project.

The value of such a common vision statement can not be overemphasized. The vision should be a source of inspiration and unification among individuals. A vision is a summary statement in general terms that describes the desired state or ultimate condition that you are working to achieve.

Defining Scope and Selecting Focal Conservation Targets

The project scope is determined based on the biodiversity of interest and can be thought of as the geographic or ecological "frame." The scope of the project usually is depicted by a basic map illustrating the applicable project area and a general text description. In some cases we may be acting outside of a defined geographic scope such as in the case of some wide-ranging species or the implementation of broad-scale strategies. But, for most teams, an initial estimate of the geographic context is a useful step to help define the scope of the planning "unit" for their project. This is particularly important in multi-stakeholder efforts in which the different partners may have different ideas of what they would like to accomplish.

Ultimately the selection of our focal conservation targets will focus and further refine our understanding of the project scope because in fact, the ecological characteristics of the targets are critical to the final project boundary. For example, if you initially define your project area as a watershed, but then identify a forest ecosystem on the ridgetops as a target, you may have to expand your project area to encompass the forest not only in your original watershed, but also over the ridgeline in adjacent watersheds.

Focal conservation targets are a limited suite of species, ecological communities and ecological systems that are chosen to represent and encompass the biodiversity found in your project area. Most projects can be reasonably well-defined by eight or fewer well-chosen focal targets. Experience has shown that eight well-chosen targets can adequately account for the biodiversity at a location. The process gets unnecessarily complex and time consuming when more than eight targets are used.

There are three basic types of focal conservation targets:

- **Ecological Systems (or "ecosystems")** - Ecological systems are assemblages of ecological communities that occur together on the landscape and share common ecological processes (e.g., flooding), environmental features (e.g., soils and geology) or environmental gradients (e.g., precipitation). Ecological systems can be terrestrial, freshwater, marine or some combination of these. Examples include Bottomland Hardwood Forest, Glacial Plain Streams, and S outh Shore Fringing Reef.

- **Ecological Communities** - Ecological communities are groupings of co-occurring species, including natural vegetation associations and alliances. Examples include Atlantic White Cedar Swamp, Native Mussel Assemblages, and Tidal Flat Community. (Note: This level of resolution will not always be available in existing maps or classifications.)

Terms at a Glance

Scope or Project Area - The place where the biodiversity of interest to the project is located. It can include one or more "conservation areas" or "areas of biodiversity significance" as identified through ecoregional assessments. Note that in some cases, project actions may take place outside of the defined project area. In a few cases, a conservation project may not focus on biodiversity in a specific area but instead will have a project scope that focuses on a population of wide-ranging animals, such as migratory birds.

Focal Conservation Targets - A limited suite of species, communities and ecological systems that are chosen to represent and encompass the full array of biodiversity found in a project area. They are the basis for setting goals, carrying out conservation actions, and measuring conservation effectiveness. In theory, conservation of the focal targets will ensure the conservation of all native biodiversity within functional landscapes. Often referred to as "focal targets", "biodiversity features" or "focal biodiversity."

Nested Targets - Species, ecological communities, or ecological system targets whose conservation needs are subsumed in one or more focal conservation targets. Often includes targets identified as ecoregional targets.

Vision - A general summary of the desired state or ultimate condition of the project area or scope that a project is working to achieve. A good vision statement meets the criteria of being relatively general, visionary and brief. For most biodiversity conservation projects, the vision will describe the desired state of the biodiversity of the project area.

• **Species** - Specific types of species could include:
  - Species of special concern - due to vulnerability, declining trends, disjunct distributions or endemism within the ecoregion
  - Globally imperiled and endangered native species - (e.g., IUCN Red List species, both global and national red lists, or species ranked G1 to G3 by Natural Heritage Programs)
  - Globally significant examples of species aggregations - such as a migratory shorebird stopover area aggregation
  - Major groupings of species - share common natural processes or have similar conservation requirements (e.g., freshwater mussels, forest-interior birds)
  - Other key species - including keystone species, wide-ranging regional species, umbrella species and flagship species

The coarse filter/fine filter approach is a useful framework for selecting focal conservation targets. Coarse filter targets are those ecological systems or community types or occasionally species that, when conserved, also conserve a larger suite of species within the project area. The species and natural communities that would be conserved by protecting a coarse filter target can be described as nested targets. The fine filter is composed of species and communities that are not well captured by coarse filter targets and require individual attention. These targets may be rare, face unique threats or require unique strategies.

There are situations in which teams find it beneficial to address the needs of a non-biodiversity target in their planning process for the project. This may occur because the project area is also very important for the protection of archeological features or cultural values. The CAP process works well for these types of targets as well. For more guidance on this subject see the *Opportunities for Innovation* and the *Resources and Tools* sections below.

Commonly Used Methods

The following sections provide basic guidance for defining your project's scope and selecting focal conservation targets. Although these two sub-steps in the CAP process are presented in a linear sequence and follow Step 1. Identify People Involved, in most project situations these steps will be highly iterative - after selecting your conservation targets, you may want to revisit your project scope and even the membership of your project team.

Defining Project Scope and Vision

Defining your project's scope involves agreeing as a team on the basic parameters of your project:

1. Discuss with team the basic scope of your project
Most project teams will come together with at least a broad idea of what they are supposed to focus on - for example, conservation of biodiversity in a national park or in a specific watershed. In many cases, ecoregional planning or other prioritization exercises will have provided a general description of priority areas. However, the precise “edges” of the project -what is in and what isn't - are requires consideration and refinement. When partners are involved, have participants clearly articulate why they are involved in the planning process. This will provide a place to begin refining the project scope. Further the basic ecological needs of targets can help define the scope of a project. The scope definition and target selection processes will inform each other.

2. Outline your project area on the best available map

Most conservation projects will typically focus on biodiversity in a defined project area. In these cases, you should describe this area in a GIS, on a base map, or even by a rough hand-drawn sketch. As shown in Box 1, it is not always obvious where the team should draw the project boundaries - but the choice that the project team makes will have profound consequences for the ongoing structure and functioning of the project - indeed you define your project by the project area you select, rather than vice versa. Note that in many cases, project actions may take place outside of the defined project area - for example political action in a national capital designed to affect a protected area in a remote province. Focal conservation targets, once determined, will help further define the more general project area you may be able to describe at this point.

3. Develop and refine a vision statement for your project

A vision is a general summary of the desired state or ultimate condition you are hoping to achieve within the project area. The following characteristics describe a typical vision statement:

- Relatively General - Broadly defined to encompass all possible project activities
- Visionary - Inspirational in outlining the desired change in the state of the targets toward which the project is working
- Brief - Simple and succinct so that that all project participants can describe the vision

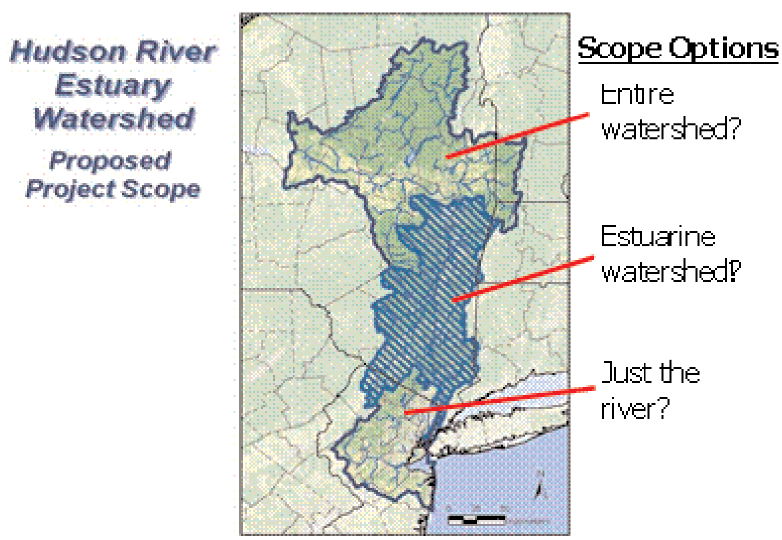
Example from Mashomak Preserve: *Maintain and restore high quality coastal ecosystems and keystone species governed by natural ecological processes unencumbered by invasive species and deer in a healthy and viable state for the foreseeable future.*

Example from Serria la Laguna: *To conserve the biodiversity and the cultural patrimony of the Reserve of the Biosphere Mountain range the Lagoon, by means of the planning, programming and execution of actions coordinated between institutions, key actors and local users*

Example from The Gulf Coastal Plain Ecosystem Partnership: *To develop a voluntary and cooperative stewardship strategy to sustain the long term viability of native plants and animals, the integrity of ecosystems, the production of commodities and ecosystem services, and the human communities that depend upon them.*

Box 1. Defining Your Project Area

In this case, the project team had a range of options for defining the project area. There is no one right choice, but each choice would mean a very different focus for the project.



As the work of conservation increasingly involves many partners and evolves beyond single site-based management, the plan needs to embrace a diversity of values, including but not exclusively, biodiversity conservation. While this situation is obviously not as straightforward as planning for biodiversity outcomes alone, the synergy of diverse partners finding shared ways to realize their diverse interests can be powerful, especially in politically charged and complex landscapes. Articulating these different values in a shared vision statement can be a particularly valuable exercise so that all parties understand that their interests are acknowledged and that the members of the team are working to find the best ways to realize this expanded vision of success.

Selecting Focal Conservation Targets

The basic task in focal target selection is to take the list of hundreds or even thousands of potential targets in your project area and select a limited number (typically eight or less) that adequately represent and encompass the biodiversity at your project area. The following instructions apply for a project team working on their own or in a workshop setting. Throughout this process, remember to consider targets across levels of biological organization; spatial scale; and terrestrial, freshwater and marine systems that may occur within your project area. In doing this work, it is also important to remember that there is no one "right" answer -for most projects, there are many sets of focal targets that can potentially do a good job of representing the biodiversity of the project area. Box 2 shows the results of this process for a few different projects. Box 3 contains a decision tree that summarizes the following procedure.

The CAP Workbook allows your team to record your selected focal conservation targets and nested targets.

1. Determine ecological systems and species groupings in project area
Pay special attention to coarse-scale systems and systems that have other nested targets. Ecological systems, and some species such as umbrella or keystone species, can provide the "coarse filter" for conserving the representative array of species and natural communities. Species groupings provide a way of aggregating the target species at an area that share common natural processes and have similar conservation requirements (e.g., freshwater mussels).

Example: The Laguna Madre landscape in Texas and Mexico was divided into five major ecological systems – coastal sandplain matrix, Tamaulipan thornscrub, hypersaline lagoon system, barrier island complex and nearshore marine system.

2. Identify priority ecological communities or species not yet captured
These priority communities and species should have ecological attributes or conservation requirements not adequately captured within the previously defined ecological systems. These are your "fine filter" targets. Potential community or species targets to consider include:

- Individual species or groups that have special conservation or management requirements due to distinct locations, ecological process or threats.
- "Keystone species" that drive ecological processes.
- Specific species or groups that disperse or use resources across different ecological systems. These species help ensure attention to linkages, connectivity, ecotones and environmental gradients.
- Regional-scale species or groups that have attributes that need to be conserved within the bounds of your project area. Individual conservation areas make important and often unique contributions to the functional network of areas that supports a population of a regional-scale species or grouping of species.

The particular life stage(s) of the regional-scale species that is fulfilled at the landscape may be considered a focal conservation target (e.g., nesting, stopover or wintering grounds for migratory birds; spawning aggregation sites for fish).

Example: At Laguna Madre, seagrass bed community that play a critical role in supporting the entire estuarine food web, the ocelot which utilizes a full gradient of terrestrial-estuarine-barrier island-marine ecosystems, and the globally significant concentration of piping plovers were all added as species targets.

3. Review initial list of targets and "lump" or "split" targets as necessary
As a general rule, you will want to lump several targets into one if they:

- co-occur on the landscape,
- share common ecological processes,
- share similar critical threats, and
- therefore require similar conservation strategies.

On the other hand, if an aggregate target contains species or communities that do not meet the above criteria, you may want to think about splitting it. Target lumping and splitting may be refined later in the CAP process as you conduct your viability and threats analyses and/or develop strategies. See Box 3 for a decision tree useful when considering the lumping and splitting of targets.

4. Identify the eight or fewer conservation targets
Use list of targets identified through the above steps to select eight or fewer targets, that best meet the criteria below.

- **Represent the biodiversity at the site.** The focal targets should represent or capture the array of ecological systems, communities and species at the project area and the multiple spatial scales at which they occur. A target that complements other focal targets in this respect is more desirable.
- **Reflect ecoregion or other existing conservation goals**. Focal targets should reflect efforts at the regional, national or state level where they exist such as Ecoregional Assessments, State Comprehensive Wildlife Conservation Plans, a protected area gap assessment or a national biodiversity action plan. Focal targets that are grounded in the reasons for the project area's inclusion in existing plans are desirable.
- **Are viable or at least feasibly restorable**. Viability (or integrity) indicates the ability of a conservation target to persist for many generations. If a target is on the threshold of collapse, or conserving a proposed target requires extraordinary human intervention, it may not represent the best use of limited conservation resources.
- **Are highly threatened**. All else being equal, focusing on highly threatened targets will help ensure that critical threats are identified and addressed through conservation actions

An additional criterion for focal target selection that may be considered is the strategic value of a target. Will the target leverage other conservation actions? Will it generate synergies among partner organizations?

Once targets have been selected, consider mapping the distribution of these targets. It will help inform later steps in the CAP process such as threat assessment and may also help refine your project area.

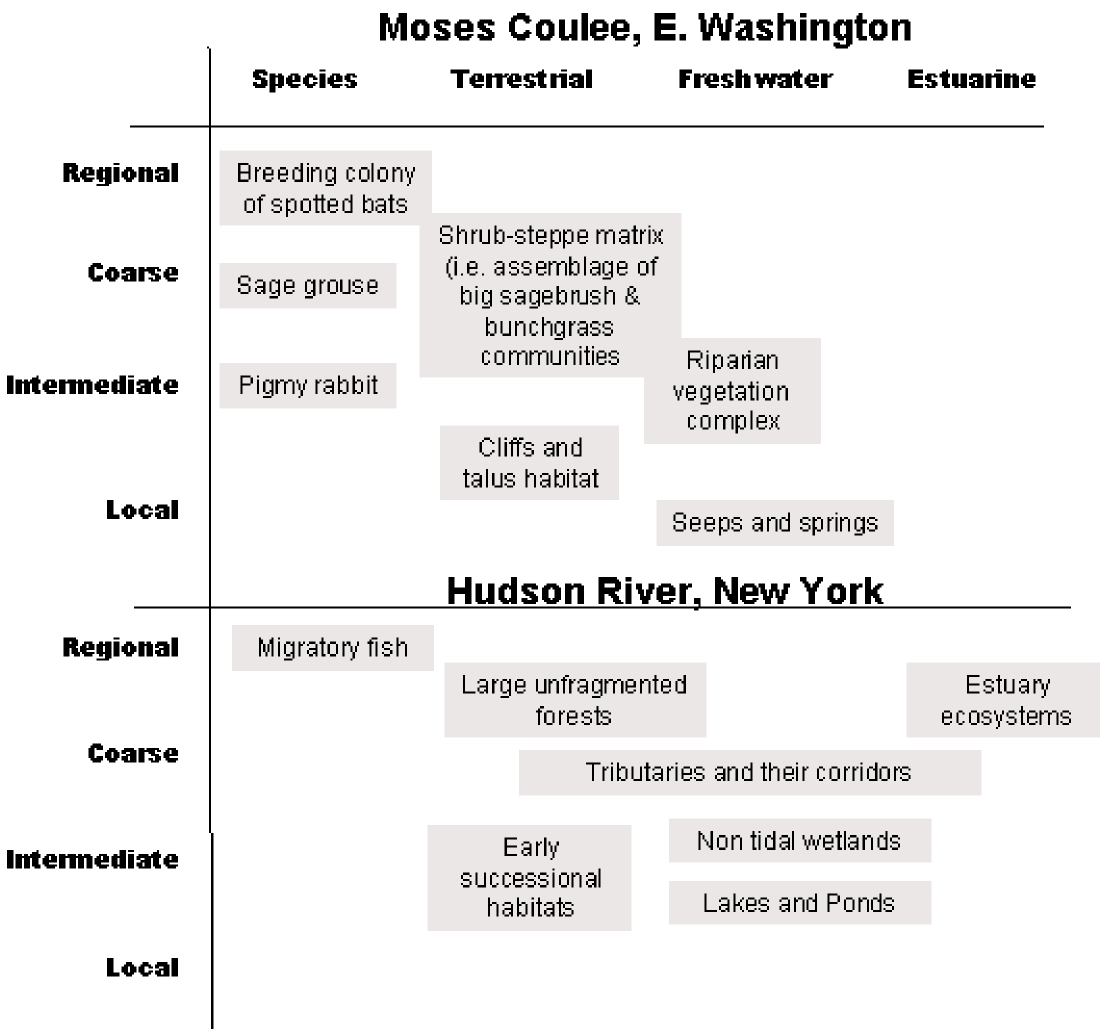
5. Capture "nested targets"
Capture important biodiversity targets not identified as focal conservation targets as "nested targets" linked to one or more focal conservation targets. The focal conservation targets were selected to "adequately represent and encompass the biodiversity at your project area." It is important to describe how other important biodiversity targets known to occur within the project area are captured by the focal conservation targets. If an ecoregional assessment has been completed, identify ecoregional targets occurring within the project area as focal conservation targets or as nested targets under one or more of the focal conservation targets. The CAP Workbook includes a worksheet to explicitly capture nested targets and link them to the focal conservation targets.

> *Example: The Lake Wales Ridge Conservation Project in Florida includes 55 ecoregional conservation target occurrences. The project team identified six focal conservation targets and captured all 55 ecoregional targets within their nested targets table.*

6. Revisit project team composition, project scope and definition of project area
In many cases, your choice of targets will compel you to revisit your project area/scope. For example, you may want to alter the scope to ensure that the project area contains a viable occurrence of a matrix forest target or to ensure you have captured the critical watershed of a lake that may extend beyond the original boundary you had first drafted. In general, a project's targets define the project area as least as much as the project area defines the targets. Also the choice of targets may require a team to alter the team composition, invite others to participate in the planning process, and/or reach out to others for advice on topics where the team may lack expertise.

Box 2. Examples of Targets Selected By Various Projects

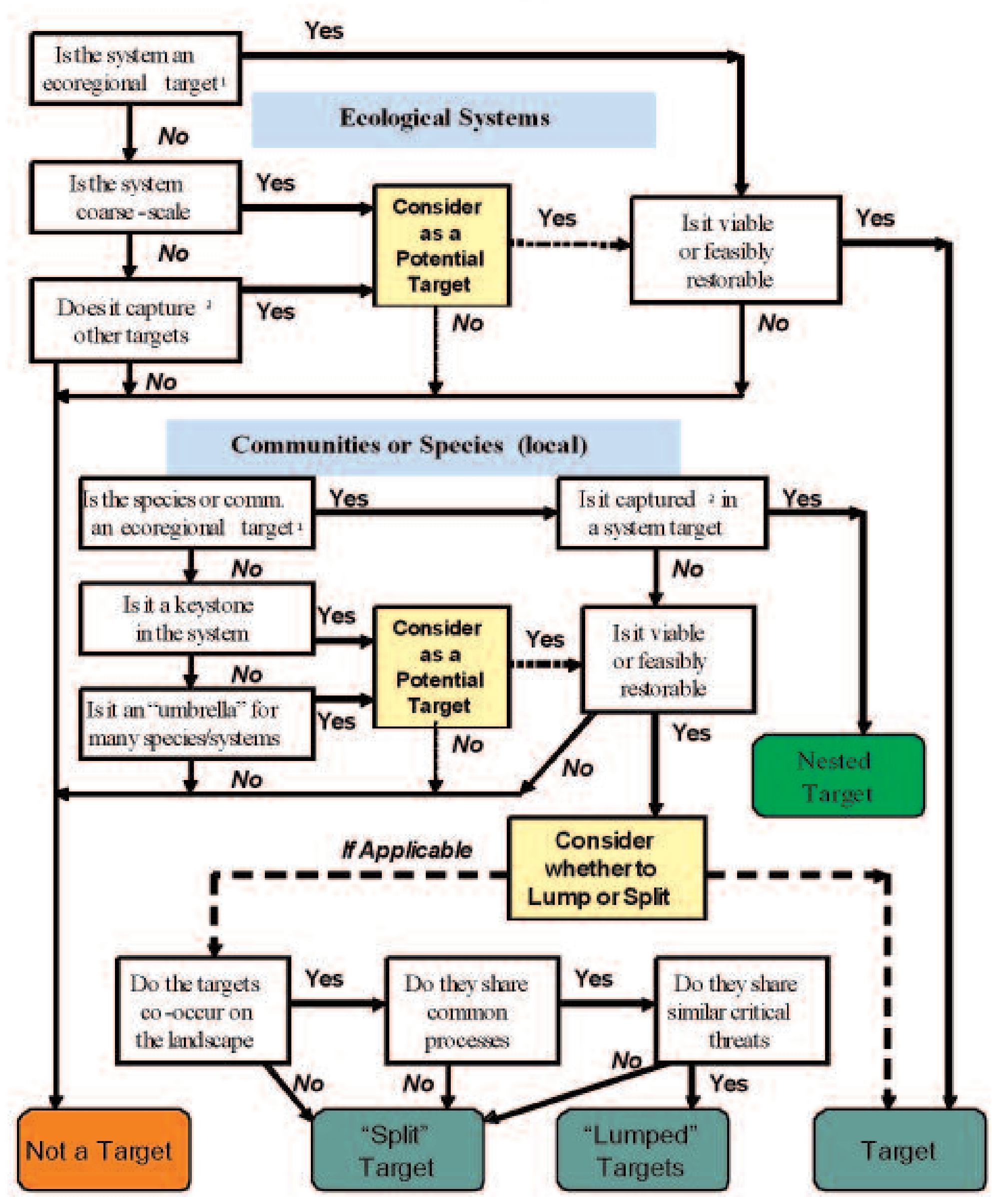
The targets in these examples are stratified by spatial scale as well as whether they are species or various kinds of ecosystem targets.



Box 3: Focal Conservation Target Selection Tool

A common challenge among planning teams is identifying a limited number of targets. When considering a large number of possible targets, teams need to determine when a number of targets can be aggregated because of similarities in their location in the landscape, the ecological processes that define them and the threats impacting them. This decision tree can be used for determining: (1) if a system, community or species should be a focal target or not and (2) if targets should be lumped or split.

Focal Conservation Target Selection Tool



Notes: [1] Or is the system, community, or species likely to be a target in a new or revised ecoregional plan?

Opportunities for Innovation

- **Representing All Biodiversity in Extremely Biodiversity Rich and/or Complex Project Areas** - Although most conservation projects can be represented with eight or fewer focal conservation targets, in some extremely complex situations more targets may be required. One way to deal with this issue might be to divide the overall complex project into more manageable sub-projects. For example, for the Greater Yellowstone Ecosystem, the project team developed seven CAP sub-projects (workbooks): one each for six traditional landscape areas and one for the wide-ranging mammals that transcended the individual landscapes. When is this appropriate? What are the more common circumstances under which sub-projects/workbooks are a reasonable solution? When complex projects have developed multiple CAP Workbooks, they can summarize that information within TNC's Conservation Project Database (ConPro, http://conpro.tnc.org). Answers to such questions would be useful to the CAP community.

- **Determining the Relationship Between Projects, Sub-Projects, Targets, Nested Targets, and Key Ecological Attributes** - Members of a given project team have a great deal of latitude as to how they choose to define their project. For example, in the Greater Yellowstone Ecosystem example described in the previous paragraph, a wide ranging mammal, such as the grizzly bear, could be the scope of an entire project or sub-project, a target within a project, a nested target within a given ecosystem, or even a key ecological attribute (a critical defining characteristic) for an ecosystem target. The "right" answer clearly depends on how the project team chooses to define the problem on which they want to focus their efforts. That said, it would be good to explore ways teams are configuring complex projects to determine if any "rules-of-thumb" can be discerned through application. Then develop some more specific guidance on how to configure more complex projects.

- **Applying CAP to Non-Biodiversity Targets and Projects** - In many places around the world, cultural and archeological relicts have been a strong if not the strongest impetus for protecting a given site. In these cases, often it is the cultural and archeological values that inspire partners to want to undertake a conservation planning process. Where these values occur in tandem with significant biodiversity values, teams may want to consider applying a parallel and compatible planning process that uses the basic "thinking" of CAP that was pioneered for this purpose. By cooperatively planning in this manner, teams are finding ways to benefit both cultural and biodiversity targets and, in effect, inclusion of both becomes a strategy to promote conservation of each. For more information please see Conservation Area Planning for Tangible Cultural Resources (http://conserveonline.org/docs/2004/03/CAP_Cultural_Summary_JRrev.pdf) for a report summarizing the application of CAP for cultural conservation targets. The Motagua Guatemala CAP provides an example of a completed CAP Workbook, in English and Spanish addressing the conservation of cultural targets (http://conserveonline.org/workspaces/cbdgateway/cap/resources/additional).

Resources and Tools

Basic guidance and examples for selecting focal conservation targets can be found in the following sources:

Comer, P., D. Faber-Langendoen, R. Evans, S. Gawler, C. Josse, G. Kittel, S. Menard, M. Pyne, M. Reid, K. Schulz, K. Snow, and J. Teague. 2003. Ecological Systems of the United States: A Working Classification of U.S. Terrestrial Systems. NatureServe, Arlington, Virginia.
http://conserveonline.org/docs/2003/05/US_Ecological_Systems.PDF

Groves, C. (2003). Drafting a conservation blueprint: A practitioner's guide to planning for biodiversity. Washington, The Nature Conservancy. Island Press.

Groves, et al. 2000. Geography of Hope, Second Edition. Volume 1 (.pdf, 2.3 MB). The Nature Conservancy.
http://conserveonline.org/docs/2000/11/GOH2-v1.pdf

Groves, et. al. 2000. Geography of Hope, Second Edition. Volume 2 (.pdf, 5.4 MB). The Nature Conservancy.
http://conserveonline.org/docs/2000/11/GOH2-v2.pdf

Poiani, K and B. Richter. 2000. Functional Landscapes and the Conservation of Biodiversity. Working Papers in Conservation Science #1. The Nature Conservancy.
http://conserveonline.org/docs/2000/11/WP1.pdf

Poiani, K., B. Richter, M. Anderson, and H. Richter. 2000. Biodiversity conservation at multiple scales. BioScience. 50(2).133-146.

Solano, Clara, et al. 2006. Estrategia de Desarrollo Sostenible, Corredor de Conservación, Guantiva-La Rusia-Iguaque, Boyaca Santander, Colombia. Fundación Natura y TNC.
http://www.natura.org.co/

The Nature Conservancy. 2003. Conservation Area Planning for Tangible Cultural Resources. Guatemala. Working document.
http://conserveonline.org/docs/2004/03/CAP_Cultural_Summary_JRrev.pdf

The Nature Conservancy ENY. 2005. Conservation of Biodiversity in the Hudson River Estuary - The Process. A Report on a Multi-Stakeholder Workshop Series Using a Modified Version of TNC's CAP process.
http://conserveonline.org/workspaces/hrew.conserve/HREW%20workshops%20%20process%20report.pdf

Conservation Action Planning

Step 3: Assess Viability of Focal Conservation Targets[6]

As summarized in TNC's CAP Overview of Basic Practices:

This step asks you to look at each of your focal targets carefully to determine how to measure its "health" over time. And then to identify how the target is doing today and what a "healthy state" might look like. This step is the key to knowing which of your targets are most in need of immediate attention, and for measuring success over time. Specific questions that this step answers include:

> *"How do we define 'health' (viability) for each of our targets?"*
> *"What is the current status of each of our targets?"*
> *"What is our desired status for each of our targets?"*

Expected Outputs:
The bottom line output is a rough assessment of the overall viability rank for each target based on key ecological attributes. The components of this overall assessment include:

- At least one key ecological attribute for each focal target.
- A measurable indicator for each key ecological attribute (in some cases, the indicator may be the same as the attribute itself).
- Your assumption - to the best of your current knowledge - as to what constitutes an acceptable range of variation for each attribute.
- Current and desired future status of each attribute.
- Brief documentation of how you arrived at your viability assessments including references, experts consulted, assumptions, and suggested research needs.

The Importance of Assessing Target Viability

A key step in managing any system is to develop a good understanding of what you are trying to accomplish. In particular, you need to be able to define specific future goals, assess the current status of the system today, and measure your progress as you move towards these goals. For example, medical doctors define healthy individuals as having, among other things, a pulse rate and blood pressure within an appropriate range for their age and condition. If a patient is outside of the normal range, then the doctor can prescribe therapy and then monitor the patient's condition over time as they hopefully move towards a desired goal in the normal range.

This process of setting measurable goals is particularly challenging for the focal conservation targets used by biodiversity projects. Most focal conservation targets are themselves very complex systems that vary naturally over time. It is thus not easy to define or measure the "health" of a bear or migratory fish population, a forest, or a coral reef in a systematic and repeatable fashion. Target Viability Assessment is a flexible and yet powerful methodology that has been developed to help solve this problem, based on sound ecological principles. It provides a consistent framework for defining the current status, and desired future condition of focal conservation targets. In particular, the viability assessment methodology can provide the following benefits:

6. This chapter was authored by David Braun, Eastern New York Chapter and Nick Salafsky, Foundations of Success

- An objective, consistent means for determining changes in the status of each focal conservation target over time, the ultimate measure of the success of your conservation efforts;
- An objective and consistent way to compare the status of a specific focal target among different project that share concern for the same target;
- An objective means for comparing the status and effectiveness of different projects, even when they do not share the same focal targets;
- Guides the identification of current and potential threats to a target and identifies past damage to the target that must be undone;
- Serves as the basis of strategy design;
- Creates the foundation of a monitoring plan, and
- Helps summarize and document knowledge and assumptions about the biology and ecology of each target, and identify crucial information gaps and research questions.

Ultimately, viability assessment helps project teams to build a set of hypotheses to guide conservation and research - and then to continue to improve these hypotheses over time. Viability assessment relies on established principles of ecology and conservation science. It uses the best available information on the target's biology and ecology in an explicit, objective, consistent, and credible manner. Viability assessment does not, however, require "perfect" information. Instead it provides a way for your project team to lay out - to the best of your knowledge - what you think healthy targets will look like

The guidance provided here provides an introductory overview of the Assessing Target Viability subject. You'll learn the basics that allow you to produce a credible first iteration of your target viability assessment that will inform your threats assessment and strategy selection. There may be times when you need to a more thorough assessment of target viability and could benefit from a more detailed set of guidance. For example, you may engage external scientists in your CAP to produce a more detailed viability assessment if the uncertainty associated with a target's viability status is serving as an obstacle to determining whether action is warranted. A link to a supplementary resource titled an *"Advanced Guidance for Step 3: Assessing the Viability of the Focal Conservation Targets"* is listed in the *Resources and Tools* section. This supplementary guidance offers an expanded guide to target viability assessment. It provides additional explanations of its core concepts and a more detailed presentation of best practices to help teams make the best use of the information and resources at their disposal.

Terms at a Glance

<u>Viability</u> - The status or "health" of a population of a specific plant or animal species. More generally, viability indicates the ability of a conservation target to withstand or recover from most natural or anthropogenic disturbances and thus to persist for many generations or over long time periods. Technically, the term "integrity" should be used for ecological communities and ecological systems with "viability" being reserved for populations and species. In the interest of simplicity, however, we use viability as the generic term for all targets.

<u>Key Ecological Attribute (KEAs)</u> - Aspects of a target's biology or ecology that, if missing or altered, would lead to the loss of that target over time. As such, KEAs define the target's viability or integrity. More technically, the most critical components of biological composition, structure, interactions and processes, environmental regimes, and landscape configuration that sustain a target's viability or ecological integrity over space and time. The word "attribute" is sometimes used as shorthand for KEA in this document.

<u>Indicator</u> - Measurable entities related to a specific information need (for example, the status of a key ecological attribute, change in a threat, or progress towards an objective). A good indicator meets the criteria of being: measurable, precise, consistent, and sensitive..

<u>Acceptable Range of Variation</u> - Key ecological attributes of focal targets naturally vary over time. The acceptable range defines the limits of this variation that constitute the minimum conditions for persistence of the target (note that persistence may still require human management interventions). This concept of an acceptable range of variation establishes the minimum criteria for identifying a conservation target as "conserved" or not. If the attribute lies outside this acceptable range, it is a degraded attribute.

<u>Current Status</u> - An assessment of the current "health" of a target as expressed through the most recent measurement or rating of an indicator for a key ecological attribute of the target.

<u>Desired Future Status</u> - A measurement or rating of an indicator for a key ecological attribute that describes the level of viability/integrity that the project intends to achieve. Generally equivalent to a project goal.

Defining Viability Assessment

Viability assessment begins by identifying key ecological attributes (KEAs) for each of your focal conservation targets. At its most basic, a key ecological attribute is an aspect of a target's biology or ecology that if present, defines a healthy target and if missing or altered, would lead to the outright loss or extreme degradation of that target over time. For example, a key attribute for a freshwater stream target might be some aspect of water chemistry. If the water chemistry becomes sufficiently degraded, then the stream target is no longer viable. Key ecological attributes can often be grouped into three classes:

- **Size** is a measure of the area or abundance of the conservation target's occurrence.
- **Condition** is a measure of the biological composition, structure and biotic interactions that characterize the occurrence.
- **Landscape** context is an assessment of the target's environment including ecological processes and regimes that maintain the target occurrence such as flooding, fire regimes and many other kinds of natural disturbance, and connectivity such as species targets having access to habitats and resources or the ability to respond to environmental change through dispersal or migration.

Box 1. One Example of Viability Assessment

A project has selected a grassland habitat and a population of migratory fish as two of its focal conservation targets. The team decides that a key attribute of the grassland is the frequency of fires. The indicator here is merely the years between fires (basically the attribute itself). After consulting local experts, the team makes an assumption that a healthy frequency is to have fires every 5-10 years. If fires happen more or less often then that, then the grassland will lose integrity over time, leading to serious system degradation.

Likewise, the team decides that a key attribute of the migratory fish is population size. An indicator here is a sample of adults observed going over a fish ladder during the peak of the spring spawning season. The team currently has incomplete knowledge of what constitutes a viable population, but based on a review of some past monitoring information makes an initial assumption that at least 10 adults per hour are required. They hope to refine this estimate over time and add in specific ranges for each rating category.

			Indicator Ratings						
Target	Key Attribute	Indicator	Poor	Fair	Good	Very Good	Current Status	Current Rating	Desired Rating
Grassland	Fire regime(fre-quency)	Years between fires		>10 or <5	5-10		8	Good	Good
Mirgratory Fish species	Population size	Spawning adults observed per hour		<10	>10		<2	Poor?	Good

However, not all classes necessarily apply to all focal targets.

Although key ecological attributes are specific descriptions of an aspect of a target, they are generally still too broad to measure or assess in a cost-effective manner over time. To this end, it is important to develop indicators that can be used to assess the attribute over time. An indicator, in simplest terms, is what you measure to keep track of the status of a key ecological attribute.

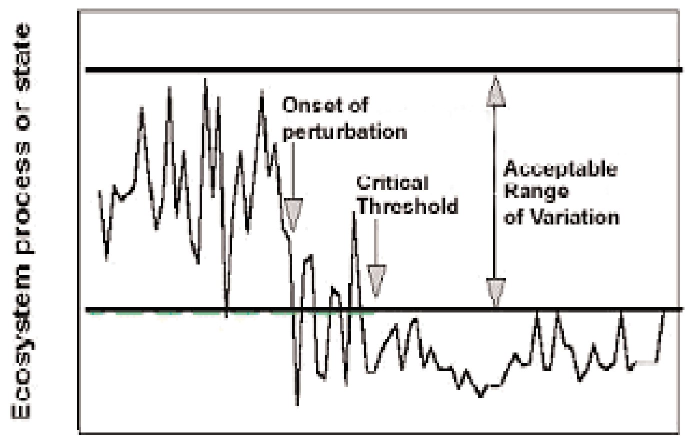
For example, as shown in Box 2, an indicator of fire regime for a grassland target might be years between fires, while an indicator of population size for a migratory fish target might be the number of spawning adults observed per hour during the breeding season. Generally speaking, an indicator may be either:

- A specific, measurable characteristic of the attribute such as the total number of adults in a population, or
- A collection of such characteristics combined into an index such as a multi-species index of forest canopy composition.

Key ecological attributes and their associated indicators provide a way to assess the status of a target over time. But by themselves, they are not sufficient to determine the health of a given target. Instead, they need to be placed in an appropriate context or frame of reference. Just as a healthy person's pulse rate or blood pressure changes over the course of a day and over a lifetime, most key ecological attributes will vary over time. For example, the size of migratory fish population might go up and down on a year-to-year basis. As shown in Figure 1, however, there is a difference between a population size that is within the acceptable range of variation (ARV) and one that is outside this acceptable range. For some attributes, this acceptable range is one-sided (for example, it may be possible to have too little, but not too much of a particular kind of forest within a project area). For other attributes, the acceptable range is two-sided (for example, there can be too many or too few deer per hectare in the forest). In some cases, we may be able to precisely determine thresholds that clearly mark the boundary of this acceptable range, whereas in other cases we can only approximate where these thresholds might be. These thresholds, however, establish what you determine as the acceptable range of variation for your target.

Figure 1. Acceptable range of variation.

Any given key ecological attribute will vary naturally over time; it is "acceptable" when it is in the range as determined by critical thresholds, or your estimate of what constitutes an acceptable range.



Estimating the acceptable range of variation for each key attribute helps answer two crucial questions: *how much alteration of a key attribute is too much?* And, *how much restoration is enough?* Managing conservation targets within their acceptable range of variation in turn does not mean managing for all the variation that the target might experience under undisturbed conditions. Instead, it means managing only for an envelope of conditions that together are "enough" for target persistence and function.[7]

7. This is why we use the term "acceptable range of variation" rather than "natural range of variation" which corresponds to the variation of the attribute in a world independent of human influence. We use the term "acceptable" because it allows us to sidestep the thorny issue of what is "natural" and instead focus on what our best available science tells us is sufficient to achieve our goal - the long term persistence of the target.

Once you have estimated the acceptable range of variation for an attribute, you can then go on to specify the viability rating scale. This scale involves establishing the following boundaries for an indicator based on your thresholds:

- **Very Good** - Ecologically desirable status; requires little intervention for maintenance.
- **Good** - Indicator within acceptable range of variation; some intervention required for maintenance.
- **Fair** - Outside acceptable range of variation; requires human intervention.
- **Poor** - Restoration increasingly difficult; may result in extirpation of target.

In effect, by establishing this rating scale, you are specifying your assumption as to what constitutes a "conserved" target versus one that is in need of management intervention. This rating scale is directly analogous with the established pulse rate and blood pressure ranges that a doctor uses to determine whether a patient's circulatory system - and thus by extension the entire patient - is healthy. Although ideally you would define all four boxes of the rating scale, in many projects, you may find that you can only define one or two key boxes - for example the threshold between Fair and Good - especially in early stages of your work.

The final step in the viability assessment is to use the rating scale that you have constructed and available evidence and/or expert opinion to determine the current status of your conservation target (where your target is today) and the desired status of your target (where you would like it to be at some point in the future). This desired status becomes a goal for your project.

Although the viability assessment process can seem complex and overwhelming, at its core, it is merely a way to use your best available knowledge to provide a consistent framework for defining and then measuring the health of your focal conservation targets. In effect, you are constructing a model in which your indicators will tell you about the status of your attributes which in turn will tell you about the status of your focal targets which in turn will tell you about the status of the overall biodiversity of the project site. If you can say that your indicators are in their acceptable range, then you say that your key attributes are okay, which in turn means your targets are okay, which in turn means the overall biodiversity is healthy. If your indicators are not in the acceptable range or are headed out of that acceptable range, then you have problems that you need to address.

Commonly Used Methods

A complete viability assessment involves:

1. Identifying the key ecological attributes for a given target;
2. Selecting indicators for each attribute;
3. Building a rating scale for each indicator based on your hypothesis about its acceptable range of variation;
4. Determining the current status and the desired future status of each attribute using the rating scale and data on all available indicators,
5. Recording any issues, gaps in knowledge, or assumptions,
6. Repeating this process for all your targets, and
7. Reviewing and adjusting your assessments as necessary.

As you go through this process, keep in mind:

- **Your Work Does Not Have to be Perfect** - All too often, project teams seem to get stuck on this step in the CAP process because they feel they do not have sufficient information to develop scientifically credible indicators or ratings. The key here is to make the best use of the information you have, document your key assumptions and uncertainties, get started, and move forward. As your knowledge and resources expand and the project progresses, you will be able to refine, expand, and improve your work. DO NOT GET BOGGED DOWN! Do the best you can and keep moving through the process.
- **Make Use of Existing Work** - Your team is probably not the first group to develop a viability assessment for any given type of target. Before you spend a lot of time and energy developing your analysis, see if you can find existing assessments from other groups that you can adapt to your project's situation. The Conservation Project Database (http://conpro.tnc.org) is a good starting point to find these assessments; the references at the end of this chapter provide other places to look.
- **This is a Highly Iterative Process** - Although viability assessment is presented as a linear series of steps, in reality you will have to go back and forth through these steps, for example revising your indicators and even your key ecological attributes as you start to develop your ratings.

The CAP Workbook contains spreadsheets in which to record KEA, indicators, rankings and rationale determined during the viability assessment process. The Viability Wizard can assist you in entering relevant information.

1. Select a target and identify a limited set of key ecological attributes

Select one of your conservation targets to assess. If this is your first time doing a viability assessment, you may wish to select a relatively simple and straightforward target. With your team, identify a small set of ecological attributes that are critical to this target's long-term viability. There is an almost infinite number of attributes that could describe some characteristic of a target. The challenge here is to identify a small selection of critical attributes that if degraded, would seriously jeopardize the target's ability to persist for more than a few decades. If necessary, brainstorm a list of attributes of the target and then try to winnow them down to the most essential ones. It may also be helpful to develop an ecological model of the target. The broad categories of size, condition, and landscape context can be used to inform the selection of specific key ecological attributes. Box 2 provides a flowchart that can help you in the selection of key ecological attributes.

In identifying your key ecological attributes, it is important to ensure that your final selections are - as the name implies - attributes of the target, rather than descriptions of threats to the target. For example, “compatible land use” is not a key ecological attribute for a forest target. Instead, the threat of incompatible land use presumably affects actual key attributes such as connectivity, soil stability, or the hydrologic regime.

The key ecological attributes that you identify for a target actually define the essence of that target. Often, the process of considering and identifying key ecological attributes will cause you to rethink the target and what it represents. There may even be occasions where you may decide to rename your target to more accurately reflect the key ecological attributes that define it.

For example, the Chico Basin project team in Colorado has identified the following key ecological attributes for one of their focal conservation targets.

Attributes for One Target

Adapted from the Chico Basin Project, Colorado, USA

			Indicator Attributes			
Target	Key Attribute	Indicator	Poor	Fair	Good	Very Good
Black-tailed prairie dog complex	Size of complex					
Black-tailed prairie dog complex	Associated species abundance					
Black-tailed prairie dog complex	Connectivity					

2. Select indicators for each key ecological attribute

For each of your key ecological attributes, determine an indicator that can be used to assess the attribute over time. In many cases an indicator can be the same as the attribute itself. For example, if your attribute is population size, the indicator may be the number of individuals in the population if you can count this number directly. If you cannot count this number directly, then your indicator will specify how you will measure this number - for example, for a fish population, as catch per unit effort using a specific technique at a given time of the year. In other cases, however, developing a good indicator will require a bit more thinking to find a way of measuring the attribute over time. For example, if your attribute is the water quality of a stream, it is not possible to measure every physical and chemical parameter. Instead, you would select a few representative parameters - for example water temperature and oxygen levels - that you feel can represent the overall water quality. You can also combine several measurable properties into a composite indicator or index. Indicators frequently involve some type of quantitative assessment - such as number of acres, recruitment rate, age class sizes, percent of cover, or frequency of fire of a given intensity. Other indicators may involve measurable elements that are not numerical, such as the seasonality of fire or flooding. Box 3 provides some tips for selecting good indicators.

In many cases, you may be able to measure a key attribute using just a single indicator. However, sometimes there may be no single best indicator so you may need to track several indicators to get a better picture of what is going on. For example, field surveys and analyses of aerial photographs together may provide complementary information on forest tree composition, more accurate and reliable than either one could provide on its own.

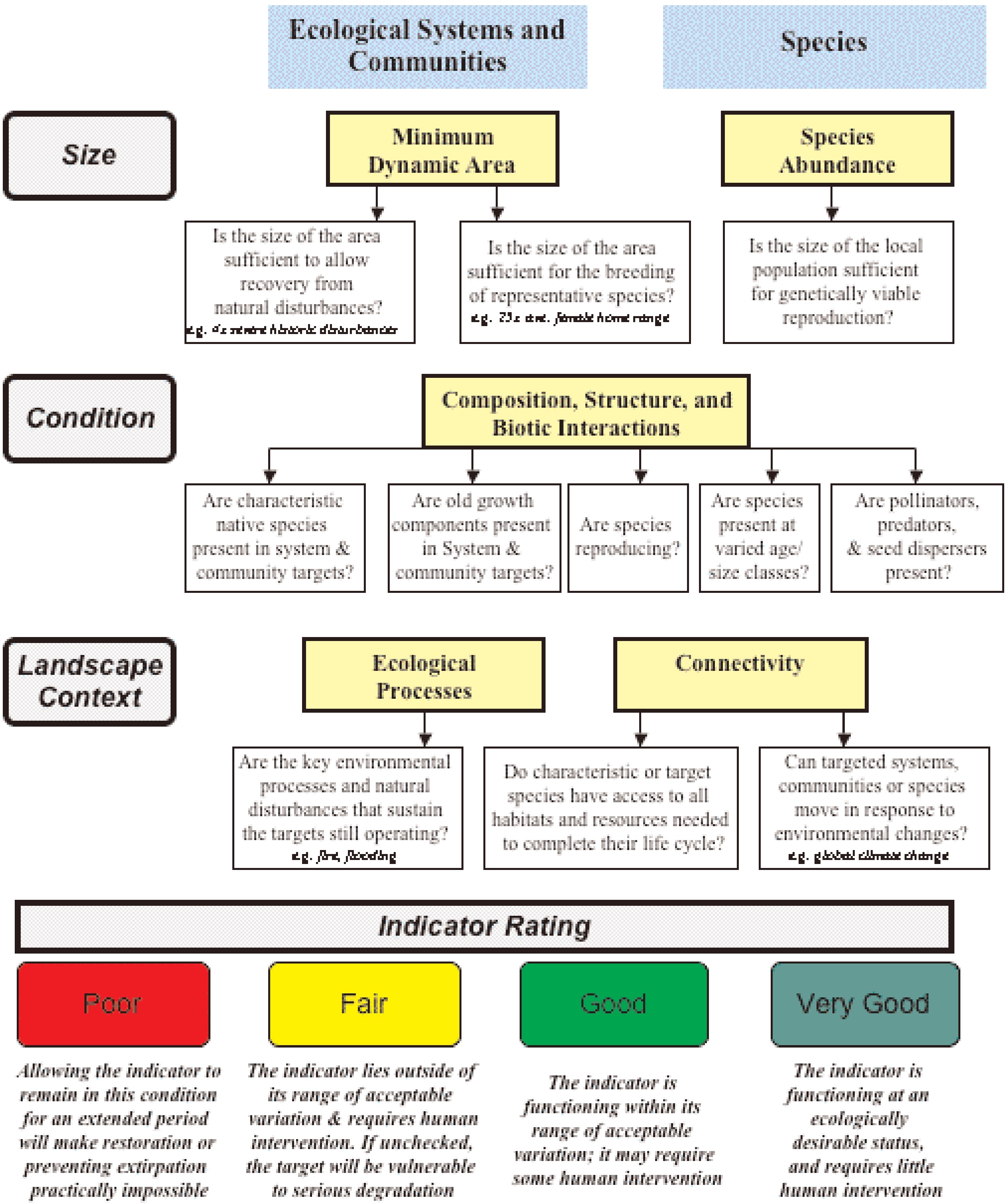
In our example, the Chico Basin project might add the following indicators for their targets:

Indicators for the Attributes
Adapted from the Chico Basin Project, Colorado, USA

			Indicator Attributes			
Target	Key Attribute	Indicator	Poor	Fair	Good	Very Good
Black-tailed prairie dog complex	Size of complex	Acres of occupied prairie dog town				
Black-tailed prairie dog complex	Associated species abundance	Presence of key species (e.g. swift fox, ferruginous hawk, burrowing owls, etc.)				
Black-tailed prairie dog complex	Connectivity	Average distance in km between colonies				

Box 2. Guide to Selecting Key Ecological Attributes

Adapted from Low 2002. Sample questions below are illustrative only - they do not represent an exhaustive list.



Box 3. Criteria for a Good Indicator

Selecting good indicators for your key ecological attributes is as much of an art as it is a science. However, the following criteria can help you in this process.

Scientifically, the most effective and credible indicators are:

1. **Measurable:** The indicator can be assessed in quantitative or discreet qualitative terms by some procedure that produces reliable, repeatable, accurate information.
2. **Precise & Consistent:** The indicator means the same thing to all people and does not change over time.
3. **Specific:** The indicator is unambiguously associated with the key attribute of concern and is not significantly affected by other factors.
4. **Sensitive:** The indicator shows detectible and proportional changes in response to changes in threats or conservation actions.
5. **Timely:** The indicator detects change in the key attribute quickly enough that you can make timely decisions on conservation actions.
6. **Technically Feasible:** The indicator is one that could be implemented with existing technologies, not one that must await some great conceptual or technological innovation.

Institutionally, the most effective and credible indicators will also be:

7. **Cost-effective:** The indicator should provide more or better information per unit cost than the alternatives.
8. **Partner-based:** The indicator should be one that works well for key partner institutions in the conservation effort and/or rests on measurements they can or already do collect.
9. **Publicly Relevant:** The indicator should be useful for publicly communicating conservation values and progress to the community.

Box 4. Viability Ratings

For each focal target, you need to determine key attributes, indicators, indicator ratings, and current and desired status of the indicator. If you are working with a group, you can copy the following table on a flip chart and fill it in for each target. Or you can enter the ratings directly into the appropriate cells of the CAP Workbook. Make sure you also capture any key discussion points that emerge.

Simple Viability Rating Form for Flip Charts

				Indicator Ratings **Bold=Current** *Italics=Desired*			
Focal Target	**Category**	**Key Attribute**	**Indicator**	**Poor**	**Fair**	**Good**	**Very Good**
Target A	- Size - Condition - Landscape Context	KEA 1	Indicator				
Target A	- Size - Condition - Landscape Context	KEA 2	Indicator				

Standard Definitions of Viability Ratings

- Very Good - Ecologically desirable status; requires little intervention for maintenance.
- Good - Indicator within acceptable range of variation; some intervention required for maintenance.
- Fair - Outside acceptable range of variation; requires human intervention.
- Poor - Restoration increasingly difficult; may result in extirpation of target.

3. Determine acceptable range of variation and rating scale for each attribute

Most attributes vary naturally over time, but we can define an acceptable range of variation. This is the range of variation for each key ecological attribute (or technically for its indicators) that would allow the target to persist over time - a range in which we would say the attribute has Very Good or Good status (see Box 4 for a sample data form and definitions of these criteria). If the attribute drops below or rises above this acceptable range, it is a degraded attribute that has Fair or Poor status. Your challenge is to specify - to the best of your current knowledge - your assumption as to what would constitute an acceptable range of variation.

			Indicator Attributes			
Target	Key Attribute	Indicator	Poor	Fair	Good	Very Good
Grassland	**Fire regime**	**Fire frequency**		**fire not frequent enough**	**fire frequent enough**	

Ideally, and over time, you will identify a set of thresholds or boundaries for the four rating increments for each key ecological attribute: Very Good, Good, Fair, and Poor. These thresholds should state clearly where the indicator being measured would fall within each level of the rating scale. For example, is a "good" size for a grassland a minimum area of 50,000 or 100,000 acres?

			Indicator Attributes			
Target	Key Attribute	Indicator	Poor	Fair	Good	Very Good
Grassland	**Fire regime**	**Fire frequency**		**> 10 years**	**5-10 years**	

The scientific information needed to establish these benchmarks is often lacking or inadequate. In these cases, project teams can rely on general ecological concepts, comparisons to other similar systems, well-informed expert opinion - or failing that, the team members' best estimate - to determine a "credible first iteration" of the benchmarks and assessment of the current rating. For

			Indicator Attributes			
Target	Key Attribute	Indicator	Poor	Fair	Good	Very Good
Grassland	**Fire regime**	**% area with 5-10 year fire retun**	**< 25%**	**25-50%**	**51-75%**	**> 75%**

the initial planning, it is often sufficient to describe the benchmarks for Good and Fair, since this distinction is the most important for determining the need for management actions. As shown in the following example, if you treat this as the first step in an iterative process, **you can almost always put some initial thinking down**. Identifying gaps and weaknesses in existing knowledge is also crucial to help you spur investigations to improve the state of knowledge about your focal targets.

For example, suppose a project team is working on a project with a grassland target. They decide that one of the key ecological attributes is fire regime and the indicator of the fire regime is fire frequency. They know that the grassland that they are responsible for managing is full of woody species and the grasses and forbs are not flowering well and they haven't seen some grassland nesting bird species in a few years. As a result, they are pretty certain that the grassland needs to burn, but they don't know how frequently the grassland would burn in a natural state. So in their first pass, the team fills out the viability rating scale as follows:

This team has defined Fair as being "fire not frequent enough" and Good as being "fire frequent enough." This is perfectly acceptable for their first attempt. Later, the team locates a local grassland expert. She tells them that fire should occur every 5-10 years to maintain the structure of this type of grassland. This additional information enables them to fill out the table as:

Reviewing the literature and consulting with experts, the team comes to realize, however, that it is not just the presence of fire anywhere on the site that matters, but that a sufficient portion of the site should burn on a regular interval. To this end, over a few years, the team does some more research about the frequency of fires and they redefine their indicator and ratings as follows:

Any of the above outcomes is acceptable for a first iteration CAP depending on the level of information available.

4. Determine current and desired future status of each attribute

Once you have determined a limited set of attributes and indicators for each focal conservation target and determined the rating scale, the next task is to assess the current status rating and set the desired status rating of the attributes relative to your rating scale. The current status rating describes the indicator rating category where your key ecological attribute is today; the desired status rating describes where you want to be in the future. You should consider the appropriate spatial extent and time frame for achieving the desired status; some changes may require long time periods (50-100 years). If you know the actual specific current indicator status information, record it as well as the desired indicator rating category (e.g., if a Very Good size indicator rating is > 30,000 acres, and you know the current extent is 55,000 acres, record the specific acreage as well as assigning the indicator to the Very Good rating category).

The four-category framework for categorizing the viability status for each KEA and target provides little opportunity to describe and keep track of incremental changes. The CAP workbook provides data fields in which you can record information on *incremental change* in indicators.

5. Record any assumptions

As you go through this work, make sure you write down any relevant issues or comments that emerge. In particular, you should note how you arrived at your viability assessments including references and experts consulted, data analyzed, assumptions you made, your level of confidence in your assessments, and suggested research needs. If you are using the CAP Workbook, capture the issues or comments using the comment feature available for many of the key decisions.

6. Repeat for your other targets

Go through Steps 1-5 for your remaining targets.

7. Review your viability assessments and adjust as necessary

Review the results of the viability assessments for all of your targets (if you are using the CAP Workbook, the summary page is useful) and discuss with your team. If necessary, you may have to revisit some of your attributes or even your choice of targets. The end product should be a completed viability table as shown in the following example.

Complete Viability Summary for Three Targets
Adapted from the Chico Basin Project, Colorado, USA

			Indicator Ratings			
Target	Key Attribute	Indicator	Poor	Fair	Good	Very Good
Mid grass priairie	**Size of ecosystem**	**Acres of prairie**	**< 10,000**	**10,000-20,000**	**20,000-30,000**	**> 30,000**
Mid grass priairie	**Species composition**	**% of system in weed patches and number of patches > 5 acres**	**> 5% of system; some patches much > 5 acres**	**3-5% of system; few patches > 5 acres**	**1-3 % of system; no patches > 5 acres**	***< 1% of system; no patches > 5 acres***
Mid grass priairie	**Compatible land uses**	**% natural surrounding vegetation developed or tilled**	**> 50%**	**25-50%**	**< 25%**	**< 5%**
Black-tailed prairie dog complex	**Size of complex**	**Acres of occupied prairie dog town**	**< 5000**	**5000-10,000**	**10,001-25,000**	**> 25,000**
Black-tailed prairie dog complex	**Associated species abundance**	**Presence of key species (eg swift fox, ferruginous hawk, burrowing owls, etc.)**	**None**	**Some presence of a few species**	**Large presence of a few species**	**Large presence of many species**
Black-tailed prairie dog complex	**Connectivity**	**Average distance in km between colonies**	**> 10 km**	**7-10 km**	**< 7 km**	**< 7 km**
Landscape mosaic	**Intactness of landscape**	**Size of pronghorn population**	**< 2000**	**2000-5000**	**2500-3000**	**> 3000**
Landscape mosaic	**Connected-ness of native vegetation**	**Fragmentation index?**	**?**	**?**	**?**	**?**

Opportunities for Innovation

Although the viability assessment process has been developed and tested over several years and many workshops, there are still many aspects of the framework that could benefit from further innovation. We offer the following suggestions and encourage you to innovate and communicate additional suggestions:

- **Developing general-purpose KEA lists for broad target types**. Certain broad types of conservation targets may lend themselves to the development of generic lists or diagrams of KEAs that can serve as templates for use by other projects. For example, river ecological systems invariably call for the recognition of KEAs related to the hydrologic regime, water quality, channel and bank morphology, up-downstream connectivity, and usually river-floodplain connectivity as well. When you develop lists of KEAs for particular target types, you should bear in mind that your work may provide examples for others; and teams working on similar types of targets may benefit from cooperating to develop generic lists or templates. If you develop such a list, consider making that information available to others.

- Working with target function versus viability. It is important to recall the reasons why targets are selected. They matter not only for their own sake, but also to represent various parts of the biological spectrum so that their conservation will provide a safety net for these many other parts as well. We therefore note that there may be a difference between ensuring that a target merely persists, and ensuring that it provides the ecological functions for which it was selected. For example, the population of a keystone predator may be sufficient to allow the population to persist at some minimally viable level, but not sufficient for its predation to significantly affect prey populations. There is much room for innovation to ensure that our "viability assessments" address the ecological function of our targets rather than their mere persistence alone.

- Improving criteria for the Poor/Fair boundary. When we categorize the status of a KEA or a target as Poor, we are saying that the target is in immediate danger of disappearing from the project area within perhaps 15-25 years. A Poor rating is a call to action rather than a failing grade. It should not take into account estimates of whether restoration is feasible - that should come in the assessment of threats and strategies. However, even though intended to be objective, the Fair-Poor distinction nevertheless can involve some subjective decisions based on estimates of the consequences of current conditions and trends. There is a need for more examples of methods for establishing and objectively documenting this distinction.

Resources and Tools

The following documents provide additional information about the viability assessment process:

Parrish, J.D., D.P. Braun, and R.S. Unnasch. 2003. Are we conserving what we say we are? Measuring ecological integrity within protected areas. Bioscience 53: 851-860.

Braun, D.P. 2007. Advanced Guidance for Step 3: Assessing the Viability of the Focal Conservation Targets. The Nature Conservancy.

In addition, there are many different resources to help you develop your lists of KEAs, identify indicators, and develop estimates for their acceptable range of variation. These specific resources will obviously vary depending on your project location and targets, but some good general suggestions include:

- Examples developed by or for other CAP teams. Hundreds of CAP teams across the world have captured their viability analyses within the CAP Workbook and this information can now be accessed through the Conservation Project Database (http://conpro.tnc.org). These workbooks provide examples of how other CAP teams have grappled with the same or similar targets to those under consideration in your project. Not all of these examples will have received scientific review, but all will be instructive. Additionally, several groups have compiled templates or basic versions of KEA models for a range of target types that you can consult for further examples. Many of these include information on ways to estimate the acceptable range of variation, as well.

- General ecology. The general ecological literature provides numerous discussions of the ecology of broad types of ecological systems, the types of KEAs that affect them, and the ranges of variation for the KEA that distinguish these types. The same may be said of the literature on species that fulfill specific roles in ecosystems, such as top predators, dominant herbivores, or members of freshwater feeding guilds. This information establishes general-purpose models for many kinds of targets, with which to guide the search for more detailed information on each specific target.

- The information used to justify the selection of a focal conservation target. Often this will include invaluable information on the role(s) played by species in their larger communities or ecological systems, the sensitivity of each target to particular kinds of alterations, the major driving processes and critical environmental constraints for each target, and nested targets.

- Scientific and natural historical studies specific to the target or project area. When they exist, there is no substitute for actual scientific and natural historical studies or species recovery plans on which to base your ideas about the KEAs and their ARV. Such studies will never be free from weaknesses in their data and differences in assumptions and methods, but they will capture all that past and present experts have seen fit to record. Where information is lacking for your specific target, you may find useful information on related taxa or similar types of species, communities, or ecological systems in the same or similar ecoregions.

- Expert advice. Often a crucial source of information will be individuals who have studied the project area and/or the specific target the most and know the scientific literature on it as well. Not only can experts help identify KEAs and help estimate their ARV, they can also guide you in identifying crucial publications to review for your own understanding. Of course, you should be careful to not ask too much of your experts. It will often be best to prepare yourself for a full consultation by reviewing important publications beforehand and preparing specific questions and ideas to discuss.

- Natural heritage databases. Many databases exist that provide information on the biology and habitat requirements of thousands of species and ecological communities worldwide. IUCN-The World Conservation Union and NatureServeĺ provide major databases and links to other organizations and agencies with additional natural heritage data, often organized in ways that readily permit the identification of KEA and estimated ARV. Again, where information is less substantial for your specific target, there may exist useful comparative information on related taxa or similar types of species, communities, or ecological systems in the same or similar ecoregions.

- Evidence from the impacts of threats. Evidence and studies that show how different human activities or environmental changes affect the target may be as useful as studies of the target in less altered conditions. Any human activity or environmental change that results in stress to a target (e.g., reduced abundance, density, or range; reduced species diversity; etc.) clearly has affected and provides evidence of one or more KEA, and helps pinpoint critical thresholds of degradation on which to base estimates of the ARV.

- Ecological simulation models. Computer simulation provides a powerful means for evaluating assumptions about KEAs and their interactions, and for exploring the extent to which limits or thresholds in some KEAs may affect variation in others. Results from computer modeling and fresh modeling efforts can provide useful information on which to base hypotheses that can inform CAP efforts and help highlight needs for research.

- Governmental plans and reports. State and Federal agency species and habitat plans and other similar documents may provide viability and status information on species and systems. Some examples of these include: the US Fish and Wildlife Service's Endangered Species Act Species Recovery Plans; State Wildlife Plans.

Conservation Action Planning
Step 4: Identify Critical Threats

As summarized in TNC's CAP Overview of Basic Practices:

This step helps you to identify the various factors that immediately affect your project's focal targets and then rank them so that you can concentrate your conservation actions where they are most needed. Specific questions that this step answers include:

"What threats are affecting our targets?"
"Which threats are more of a problem?"

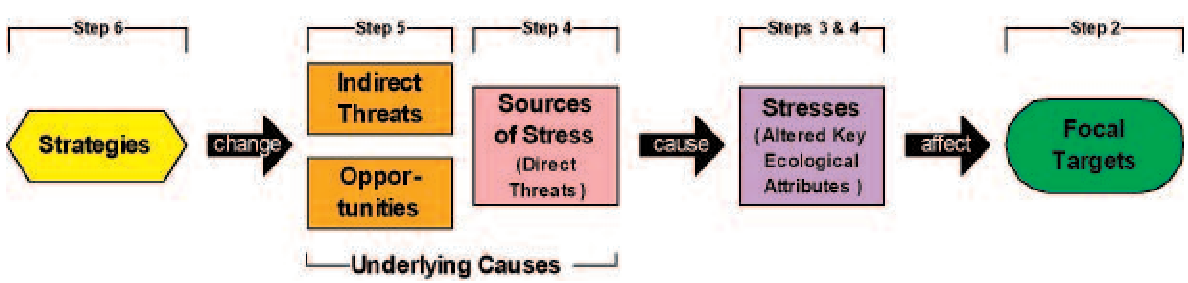
Expected Outputs
- A list of stresses for each focal conservation target.
- Ratings of the scope and severity of each stress.
- A list of sources of stress for each focal conservation target.
- Ratings of the contribution and reversibility for each source.
- A ranking of the sources of stress affecting each focal target and a determination of the critical threats affecting your overall project.

The Importance of Identifying Critical Threats

In many conservation situations, the biodiversity that we care about has either already been degraded, or is facing a series of threats that need to be countered by conservation actions. Threat ranking is a process wherein sources of stress, or direct threats, to your targets are first identified and then prioritized so that conservation actions can be directed where they are most needed. Threat ranking is important because in any given project area, there are always many activities that could be undertaken. The idea is to identify the most critical threats so that energy can be directed at them. Criteria-based ranking of threats provides an objective analysis of which threats are truly the critical threats. It also helps a team to lay out and document their assumptions so that they can be revisited at later dates.

Defining Critical Threats

As shown in the following diagram which follows the basic steps in the CAP process (step number corresponds to step in the CAP Basic Practices), the work of conservation ultimately involves having a project team uses strategies to achieve certain desired outcomes among factors (sources of stress, indirect threats and opportunities) that cause stresses to biodiversity targets.
Stresses are impaired aspects of conservation targets that result directly or indirectly from human sources (e.g., low population size, reduced extent of forest system). In essence stresses are



degraded key ecological attributes (Box 1). Sources of stress (also known as direct threats) are the proximate activities or processes that have caused, are causing or may cause the stresses (e.g., incompatible trawling or logging). For the most part, sources of stress are limited to human activities. Thus fires set by lighting or tropical storms that blow down large swaths of forest are not threats, but instead part of a natural (and often necessary) disturbance regime. There is a fine line, however, between a naturally occurring event, such as a fire set by lightning, and a human-caused threat, such as a fire set by a match or even increased intensity of fires due to forest management practices. In general, the latter two are sources of stress whereas the former is not. However, in special conservation situations -for example, when the last population of Javan rhinos is vulnerable to extinction from a "natural" tsunami -we would have to regard the tsunami as a threat to this species, even if it is not a threat to their forest habitat. Sources of stress can be currently active, likely to occur in the future (usually defined as within 10 years), or historical (Box 2).

Terms at a Glance

Stresses - Impaired aspects of conservation targets that result directly or indirectly from human activities (e.g., low population size, reduced extent of forest system; reduced river flows; increased sedimentation; lowered groundwater table level). Generally equivalent to degraded key ecological attributes (e.g., habitat loss).

Sources of Stress (Direct Threats) - The proximate activities or processes that directly have caused, are causing or may cause stresses and thus the destruction, degradation and/or impairment of focal conservation targets (e.g., logging).

Critical Threats - Sources of stress (direct threats) that are most problematic. Most often, Very High and High rated threats based on the Conservancy's threat rating criteria of their impact on the focal targets.

Critical threats are the sources of stress that are most problematic, as defined through the threat-rating process. Each stress is rated in terms of its likely scope and severity of impact on the target within the project planning horizon. Each source of stress is then rated in terms of its contribution and irreversibility and these ratings are combined to determine threat ratings.

When identifying and rating sources of stress, it is important to focus on direct threats - the proximate activities that directly cause the stresses to the conservation targets. The underlying causes (usually social, economic, political, institutional or cultural) that enable or otherwise contribute to the occurrence and/or persistence of direct threats (i.e., indirect threats) or that represent opportunities to reduce direct threats (i.e., opportunities) will be considered in *Step 5 Complete Situation Analysis* and *Step 6 Develop Strategies*.

Box 1. The Relationship Between Stresses and KEAs

A key feature of the CAP methodology is to distinguish between stresses and sources of stress. As Bill Weeks described in Beyond the Ark (Weeks 19971):

The Nature Conservancy originally called the second step in its [site conservation] planning discipline "threats analysis." Project teams understandably adopted "threat" as the unit of analysis. The Conservancy concluded after a time, however, that its project teams would be better positioned to develop good strategies if they considered threats in two more narrowly defined steps. Team members are now advised to ask first what the ecological stresses to a system are - independent of the source of those stresses - before separately tracing those stresses to their sources. If we do not consciously alter our natural mode of expression, we will, for example, call a proposed road a threat in an estuarine system. We are then immediately inclined to the conclusion that we must stop construction of the road. Threat: road. Solution: stop road. However, if we separate the threat into stress and source, the stress isn't the road. The stress is, for example, loss of tidal flow. That formulation of stress inclines us to think, instead, of ways to keep tidal waters flowing through the pathway that is the proposed location of the road. Culverts may be the answer.

In the old 5-S system (the precursor to CAP), identification of stresses was particularly important as a means of understanding the disturbances that are likely to destroy, degrade or impair your targets and that result directly or indirectly from human sources (e.g., low population size, reduced extent of forest system, reduced river flows, increased sedimentation, lowered groundwater table level). But identification of stresses in a consistent fashion also tended to be a particularly challenging part of the 5-S process.

The current iteration of the CAP process has expanded the analysis of targets, adding in particular an emphasis on developing and understanding key ecological attributes. This innovation has led to some confusion over the relationship between stresses and key ecological attributes. The simplest way to think about it is that a stress is a degraded key ecological attribute -one that is outside its acceptable range of variation. As shown in the following diagram, the stress (altered flow regime) is not a threat in and of itself, but rather a manifestation of the source of stress (agricultural water withdrawal) on the target.

Most of the stresses acting on your targets can thus be identified by looking at which key ecological attributes are currently degraded or have a high potential to become degraded within the planning horizon of your project (e.g., the next 10 years).

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1 Weeks, W.W. 1997. Beyond the ark: tools for an ecosystem approach to conservation. Island Press, Washington, D.C.

Box 2. Dealing With Historical Sources of Stress

An issue that often occurs in threat analyses is how to deal with cases in which a persistent stress exists, even though the original source of stress is no longer present - in other words, the stress comes from a "historical" source. Consider the following examples:

A. Levees are no longer constructed along a river but the remnant levees prevent the seasonal inundation of the floodplain - an important key attribute necessary for riparian forest recruitment. Levees need to be breeched to restore the flooding regime.
Stress: Altered flood regime
Source: Historical levee construction? Existing levees?

B. Illegal dumping of dirt has filled part of a wetland. A chain-link fence has been installed around the site that will prevent future dumping, but the fill needs to be removed to restore the wetland.
Stress: Reduced wetland extent
Source: Historical dumping? Fill dirt?

C. An accident at an industrial plant releases toxins into the downstream wetland resulting in the local extinction of many amphibian species. The plant has been permanently closed, but extensive clean-up and restoration work will be needed to restore the wetland.
Stress: Altered species composition/structure
Source: Historical industrial plant? Presence of toxins?

In each of these cases, the human-caused sources of stress have been abated, but persistent stresses are still affecting the targets. In each case, the degraded state of the conservation target will be reflected in reduced target viability ratings. As a result, traditional CAP guidance has held that these "restoration situations" should not be included in threats analyses, because the actual human-caused sources of stress have already been abated and their effects are adequately captured as altered key ecological attributes within the viability assessment. In the absence of other actual threats, traditional CAP guidance thus holds that these targets should be considered unthreatened (have dark green "low" threat ranks), even though the targets are clearly still stressed[2]. Practitioners then have to consult both the viability and threat summary tables during strategy development to make sure they are not missing any restoration situations.

There is, however, a grey area between "active" and "historical" sources of stress. In each of the above examples, one could make the case that the source of stress is the existing levees, the fill dirt or the presence of toxins and that these sources should be included in your threats analysis.

Ultimately, the point of assessing target status and doing threat ratings is to lead to good strategy selection. To this end, it's not worth spending a lot of time worrying about whether a source is "historical" or not. Your project team should define the stresses and sources that you feel are most important, make sure that restoration situations are expressed by altered key ecological attributes in the viability assessment, and then use your judgment to decide whether to also capture these persistent-stress situations within their threats analyses tables

2 Note that in the previous 5-S system, practitioners were instructed to mark these historical sources with a special tag that then was used to generate a separate summary table of "historical sources of stress" that could be consulted during strategy development. This practice caused confusion, however, so now current versions of the CAP Workbook do not support the historical source designation.

Commonly Used Methods

Since its inception, the CAP process has relied on a threat-rating methodology that involves identifying and rating stresses and then sources of stress on a target-by-target basis as described in this section. Recently, a “simplified” version of this methodology has been developed that focuses on directly rating the sources of stress (see *Opportunities for Innovation* below).

As you go through this methodology, you can enter your work directly into the appropriate sections of the CAP Workbook. Or alternatively, if you are working in a large group setting, you can use a sticky tarp and index cards to capture your thinking (see Box 2 in *Step 5. Complete Situation Analysis*) and then transcribe it into the workbook.

1. Select a target and review its key ecological attributes

Threat identification is typically done on a target-by-target basis. You should thus select one of your focal conservation targets as a starting point (if this is your first time doing threat rating, you may wish to select a relatively simple and straightforward target). You should then review the key ecological attributes and indicators for this target that you identified in *Step 3. Assess Viability*.

2. Identify stresses / altered key ecological attributes

Discuss each key ecological attribute and determine which of these are sufficiently altered (or predicted to be sufficiently altered within the next 10 years) so as to be causing stress to your target. Consider the key ecological attributes that were rated Fair or Poor in the viability analyses and determine if the stresses that led to the degradation of the target are still active. Also consider those key ecological attributes that have a current status rating of Good or Very Good but are likely to degrade to Fair or Poor within your planning horizon if no conservation action is taken.

Enter these altered key ecological attributes into the CAP Workbook, on a flip chart (Box 3), or put each one on an index card linked to your target. To more clearly describe the altered key ecological attribute as a stress to a target, considering adding a verb to your key ecological attribute name (e.g., reduced population size, altered species composition). If you identify stresses to a target that don't match any of the key ecological attributes, you may have missed a “key” attribute of that target in your initial viability assessment and you should consider updating your viability table with this new information.

3. Apply stress-rating criteria and calculate stress rank

Rate each stress according to the criteria of scope and severity as defined in Box 3. If you are using the CAP Workbook, it will automatically calculate the Stress Rank for you. Or you can use the manual threat calculation guidance.[8] You should also record any important comments or notes that emerge during your discussion.

4. Identify sources of stress

For each stress, brainstorm specific direct threats that are the source of the stress. Enter each source of stress in the CAP Workbook, flipchart, or if you are using index cards, put each source/direct threat on a card and then link the card to the appropriate stress(es). As you go through this process, you may find it useful to review the IUCN-CMP classification of direct threats (Annex A) to see if there are any threats you have not considered.

8. A guide for manual threat calculation is available at
http://conserveonline.org/workspaces/cbdgateway/cap/practices/supportmaterials/bp4sm/TNC_Threat_Scoring

5. Apply source of stress rating criteria and calculate threat rank
Rate each source of stress according to the criteria of irreversibility and contribution as defined in Box 4. The CAP Workbook will automatically calculate the Threat to System and Overall Threat Ranks for you. Or you can use the manual threat calculations guidance. You should also record any important comments or notes that emerge during your discussion.

6. Repeat for your other targets
Go through steps 1-5 for your remaining targets.

7. Discuss threat summary
Look at the results of your threat rankings in the summary table in the workbook (see Bering Sea example in Box 5). See if there are any outcomes that do not match up with your team's intuition. If so, go back and review your stress and source rankings for the questioned outcome. Perhaps your rankings need to be adjusted, or perhaps your intuition was off the mark. Then make any appropriate adjustments. This analysis identifies your critical threats (the Very High and High ranked threats overall as well as threats that are Very High or High ranked for one target). If it's useful and feasible, you may also want to map your critical threats as shown in Box 5.

Box 3. Stress Ratings

Each stress is rated in terms of its scope and severity of its impact on the target as defined below.
If you are working with a group, you can copy the following table on a flip chart and fill it in for each stress. Or you can enter the ratings directly into the appropriate cells of the CAP Workbook.

Simple Stress Rating Form for Flip Charts
Target X.

Stress	Severity	Scope	Stress Rank
Stress 1	High	Very High	High
Stress 2			
Stress 3			
Etc.			

Rating Criteria for Stresses

Severity - The level of damage to the conservation target that can reasonably be expected within 10 years under current circumstances (i.e., given the continuation of the existing situation).

- **Very High:** The threat is likely to destroy or eliminate the conservation target over some portion of the target's occurrence at the site.
- **High:** The threat is likely to seriously degrade the conservation target over some portion of the target's occurrence at the site.
- **Medium:** The threat is likely to moderately degrade the conservation target over some portion of the target's occurrence at the site.
- **Low:** The threat is likely to only slightly impair the conservation target over some portion of the target's occurrence at the site.

Scope - Most commonly defined spatially as the geographic scope of impact on the conservation target at the site that can reasonably be expected within 10 years under current circumstances (i.e., given the continuation of the existing situation).

- **Very High:** The threat is likely to be widespread or pervasive in its scope and affect the conservation target throughout the target's occurrences at the site.
- **High:** The threat is likely to be widespread in its scope and affect the conservation target at many of its locations at the site.
- **Medium:** The threat is likely to be localized in its scope and affect the conservation target at some of the target's locations at the site.
- **Low:** The threat is likely to be very localized in its scope and affect the conservation target at a limited portion of the target's location at the site.

Example of Stress Rating - Adapted from the TNC-WWF Bering Sea Project

4	Target: Sea Ice Ecosystem				
Stresses - Altered Key Ecological Attributes		Severity	Scope	Stress	User Override
1	Reduced population size (all sea ice spp)	High	Very High	High	
2	Loss of polar bear denning sites on land	Low	Medium	Low	
3	Reduced sea ice habitat integrity	Very High	Very High	Very High	
4	Degraded animal condition (all sea ice spp)	Medium	Medium	Medium	

Box 4. Source of Stress Ratings

Each source of stress is rated in terms of its irreversibility and contribution as defined below. If you are working with a group, you can copy the following table on a flip chart and fill it in for each source of stress. Or you can enter the ratings directly into the appropriate cells of the CAP Workbook.

Simple Source of Stress Rating Form for Flip Charts

Source	Stress 1	Stress 2	Stress 3	Etc.
Threat A				
Contribution	High	Very High		
Irreversability	Medium	Medium		
Threat B				
Contribution			High	
Irreversibility			Low	
Etc.				

Rating Criteria for Stresses

Contribution - The expected contribution of the source, acting alone, to the full expression of a stress (as determined in the stress assessment) under current circumstances (i.e., given the continuation of the existing management/conservation situation).

- **Very High**: The source is a very large contributor of the particular stress.
- **High**: The source is a large contributor of the particular stress.
- **Medium**: The source is a moderate contributor of the particular stress.
- **Low**: The source is a low contributor of the particular stress.

Irreversibility - The degree to which the effects of a source of stress can be restored.

- Very High: The source produces a stress that is not reversible (e.g., wetlands converted to a shopping center).
- High: The source produces a stress that is reversible, but not practically affordable (e.g., wetland converted to agriculture).
- Medium: The source produces a stress that is reversible with a reasonable commitment of resources (e.g., ditching and draining of wetland).
- Low: The source produces a stress that is easily reversible at relatively low cost (e.g., off-road vehicles trespassing in wetland).

Example of Source of Stress Ratings - Adapted from the TNC-WWF Bering Sea Project
Stress 1 = Reduced pop size, **Stress 2** = Loss of polar bear denning,
Stress 3 = Reduced sea ice integrity, **Stress 4** = Degraded animal condition

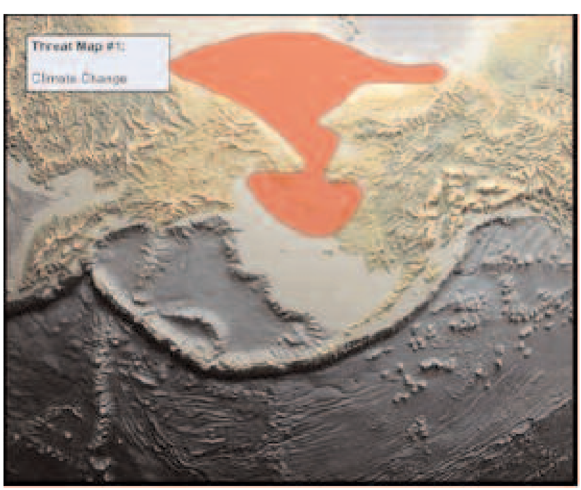
Threats - Sources of Stress **Threat to System Rank**

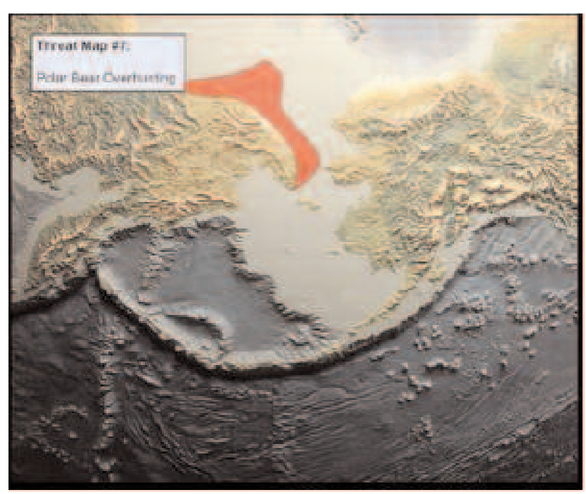
			Stress 1	Stress 2	Stress 3	Stress 4	
1	Climate Change	Contribution	Very High	Low	Very High	Very High	Very High
		Irreversibility	Very High	Very High	Very High	Very High	
		Source	Very High	Medium	Very High	Very High	
		Combined Rank	High	Low	Very High	Medium	
2	DLP killings (polar bears)	Contribution	Medium				Medium
		Irreversibility	Medium				
		Source	Medium	-	-	-	
		Combined Rank	Medium	-	-	-	
3	Overhunting	Contribution	High				Medium
		Irreversibility	Medium				
		Source	Medium	-	-	-	
		Combined Rank	Medium	-	-	-	

Box 5. Example of a Threat Rating Summary and Threat Maps

This example is adapted from the TNC-WWF Bering Sea Project. Note that threat maps are optional in the standard CAP process.

Summary of Threats to Targets **Project-specific threats**	Seabirds	Pinn-ipeds	Pelagic Fish	Sea Ice Eco-system	Sea Otter	Whales	Coral & Sponge Gardens	Bottom Dwelling Fish & Crab	Overall Threat Rank
Climate Change	High	High	High	V High	V High			High	V High
Excessive predation					V High				High
Oil spill	High	Medium	Medium	Medium					High
Competition with fisheries	High	High							High
Overfishing			Medium					High	Medium
Fisheries							High		Medium
Introduced predators	High								Medium
Whaling (historic)						High			Medium
Contaminants	Medium	Medium							Medium
Fishing bycatch, mortality	Medium		Medium						Medium
Fishing gear damage								Medium	
Aquaculture			Medium						
Roads & Infrastructure	Medium								
DLP killings (polar bears)				Medium					
Overhunting				Medium					
Threat Status for Targets and Site	High	High	Medium	High	V High	Medium	Medium	High	V High





Opportunities for Innovation

- **Adjusting the Time Frame for Threat Ratings** - As outlined in the methods section, practitioners are asked to rate scope and severity of threats "within 10 years under current circumstances (i.e., given the continuation of the existing situation)." This 10-year planning horizon was selected as a practical time frame from a management planning perspective. Certain threats, such as global climate change or invasive species, however, may not fully express themselves over a 10-year time frame. To this end, practitioners may wish to consider a longer time horizon for some threats if appropriate but should be sure to document their decisions. Over time, we may be able to arrive at consensus for the time frames for various threats.

- **Dealing with High Impact/Low Probability Threats Where "a Stitch in Time Saves Nine"** - The current threat ratings tend to prioritize existing threats that are obviously causing harm to biodiversity or threats that have a high likelihood of causing problems. However, some of the most cost-effective conservation actions are those aimed at stopping threats that are not obvious now and/or not likely to happen, but have the potential to cause huge problems down the road. Classic examples might be working to prevent catastrophic spills from oil tankers, or early detection and elimination of a potentially devastating invasive species or buying land while it is still relatively inexpensive and far ahead of the development frontier. We need to figure out a way to flag these threats where action today could lead to big savings in the future so they can be considered during the strategy development process.

- **Enhancing the Classification of Standard Threat Names** - The IUCN and the Conservation Measures Partnership have developed a standard classification of direct threats. This classification is in a hierarchical structure and is currently "comprehensive" at the highest levels. It is not complete, however, at lower levels. Over time, it would be useful to develop these lower levels so that conservation practitioners have a standard nomenclature.

- **Improving Spatial Representation of Threats** - Many threats are not evenly distributed on the landscape. As a result, it is important to create spatial maps of threats -especially for teams managing a large project area. Many practitioners have already developed map layers of threats such as roads, agricultural holdings or invasive plants. It would be good to develop ways of sharing these layers across projects. It would also be interesting to figure out how to map threats that have a less obvious spatial manifestation.

- **Developing a Simplified Threat-Rating Procedure** - Over the past few years, several groups have been experimenting with a simplified threat rating procedure that involves identifying and then rating the direct threats without dividing them into stresses and sources of stress. This method is now supported in the CAP Workbook. The basic procedure is:

    1. **Select a Target and Review its Key Ecological Attributes**. Threat identification is typically done on a target-by-target basis. You should thus select one of your focal conservation targets as a starting point (if this is your first time doing threat rating, you may wish to select a relatively simple and straightforward target). You should then review the key ecological attributes and indicators for this target that you identified in *Step 3. Assess Viability*.

2. **Identify Direct Threats (Sources of Stress)**. Brainstorm specific direct threats (also known as sources of stress) that are currently causing, or are likely to cause within your planning horizon, significant degradation of key ecological attributes to one or more of the conservation targets. As you go through this process, you may find it useful to review the IUCN-CMP classification of direct threats (http://conservationmeasures.org/CMP/Site_Docs/IUCN-CMP_Unified_Direct_Threats_Classification_2006_06_01.pdf) to see if there are any direct threats you have not considered and to make sure that you are not including any stresses in your list. Capture the anticipated impacts to the target by linking the direct threat to the key ecological attributes that will be altered by the threat. If you are using the CAP Workbook, a pop-up menu allows you to link the threat to the key ecological attribute(s) that the threat affects. If using a sticky board, you can put each threat on a card and then link it to the target(s), showing the appropriate key ecological attribute if it is helpful to show this detail.

3. **Apply Rating Criteria and Calculate Threat Rank**. Rate each direct threat according to the criteria of scope, severity, and irreversibility as defined in Boxes 6 and 7. The CAP Workbook will automatically calculate the Threat to System and Overall Threat Ranks for you. Or you can use the manual threat calculations guidance. You should also record any important comments or notes that emerge during your discussion.

4. **Repeat for Your Other Targets**. Go through steps 1-3 for your remaining targets.

5. **Discuss Threat Summary**. Look at the results of your threat rankings in the summary table in the workbook. (Whether you use the Stress/Source of Stress or Simple Threat Rating Method, you should end up with a summary table that looks like the one in Box 5.) See if there are any outcomes that do not match up with your team's intuition. If so, go back and review your rankings for the questioned outcome. Perhaps your rankings need to be adjusted, or perhaps your intuition was off the mark. Then make any appropriate adjustments. This analysis identifies your critical threats (the Very High and High ranked threats overall as well as threats that are Very High or High ranked for one target). If it's useful and feasible, you may also want to map your critical threats as shown in Box 5.

Box 6. Simplified Threat Ratings

Each direct threat (source of stress) is rated in terms of its scope, severity, and irreversibility of its impact on the target as defined below. If you are working with a group, you can copy the following table on a flip chart and fill it in for each source of stress. Or you can enter the ratings directly into the appropriate cells of the CAP Workbook.

Simple Threat Rating Form for Flip Charts
Target X.

Threat	Severity	Scope	Irreversibility
Threat 1	High	Very High	Low
Threat 2			
Threat 3			
etc.			

Rating Criteria for Sources of Stress / Direct Threats

Severity - The level of damage to the conservation target that can reasonably be expected within 10 years under current circumstances (i.e., given the continuation of the existing situation).

- **Very High:** The threat is likely to destroy or eliminate the conservation target over some portion of the target's occurrence at the site.
- **High:** The threat is likely to seriously degrade the conservation target over some portion of the target's occurrence at the site.
- **Medium:** The threat is likely to moderately degrade the conservation target over some portion of the target's occurrence at the site.
- **Low:** The threat is likely to only slightly impair the conservation target over some portion of the target's occurrence at the site.

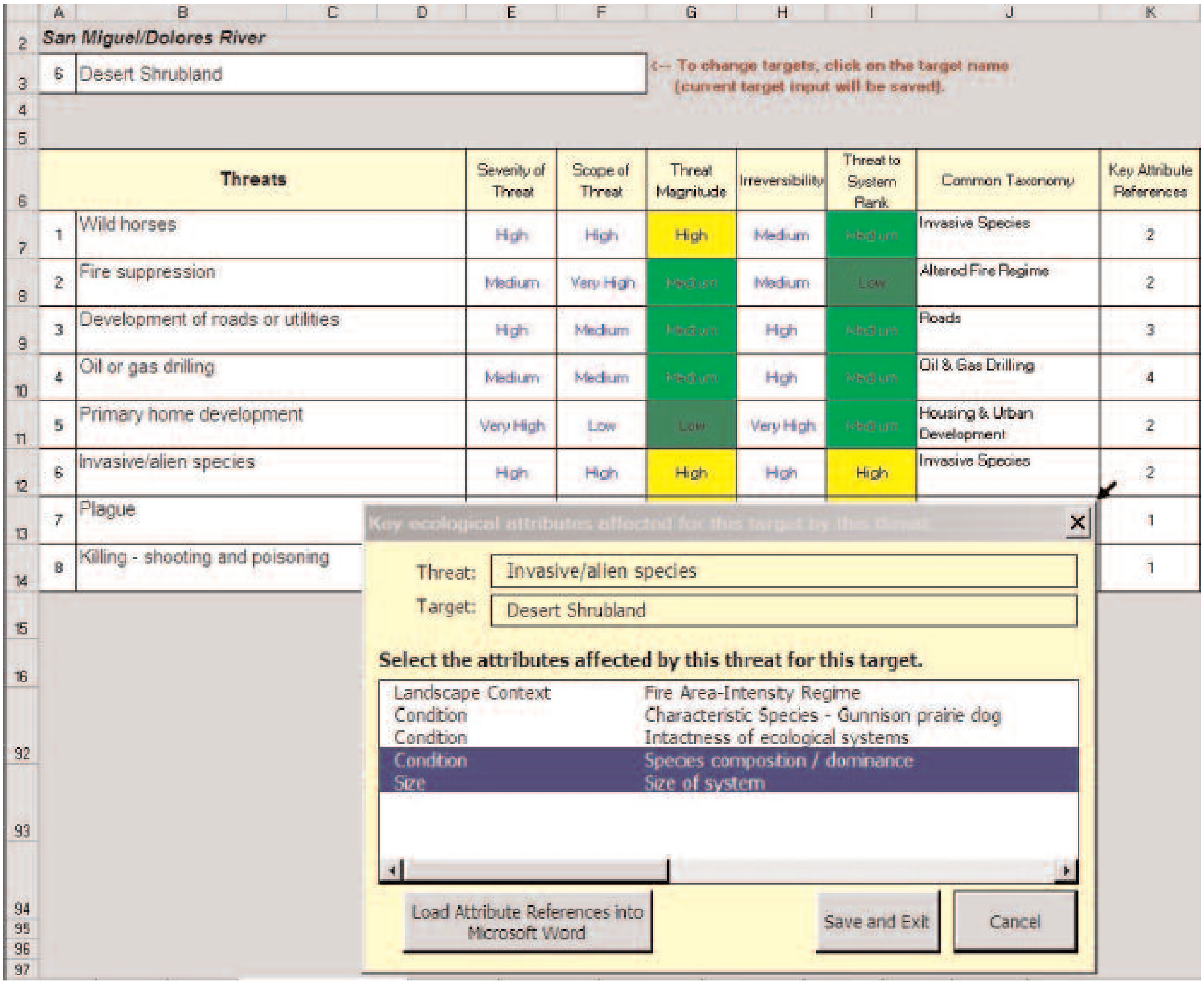
Scope - Most commonly defined spatially as the geographic scope of impact on the conservation target at the site that can reasonably be expected within 10 years under current circumstances (i.e., given the continuation of the existing situation).

- **Very High:** The threat is likely to be very widespread or pervasive in its scope, and affect the conservation target throughout the target's occurrences at the site.
- **High:** The threat is likely to be widespread in its scope and affect the conservation target at many of its locations at the site.
- **Medium:** The threat is likely to be localized in its scope and affect the conservation target at some of the target's locations at the site.
- **Low:** The threat is likely to be very localized in its scope and affect the conservation target at a limited portion of the target's location at the site.

Irreversibility - The degree to which the effects of a direct threat can be restored.

- **Very High:** The effects of the threat are not reversible (e.g., wetlands converted to a shopping center).
- **High:** The effects of the threat are reversible, but not practically affordable (e.g., wetland converted to agriculture).
- **Medium:** The effects of the threat are reversible with a reasonable commitment of resources (e.g., ditching and draining of wetland).
- **Low:** The effects of the threat are easily reversible at relatively low cost (e.g., off-road vehicles trespassing in wetland).

Box 7. Example of Simple Threat Rating



Resources and Tools

Basic guidance and examples for identifying critical threats can be found in the following sources:

IUCN and CMP. 2006. Unified Classification of Direct Threats, Version 1.0.
www.conservationmeasures.org

Salafsky, Nick, Dan Salzer, Jamison Ervin, Tim Boucher, and Wayne Ostlie. 2003. Conventions for Defining, Naming, Measuring, Combining, and Mapping Threats in Conservation: An Initial Proposal for a Standard System.
http://www.fosonline.org/images/Documents/Conventions_for_Threats_in_Conservation.pdf

Conservation Action Planning

Step 5: Complete Situation Analysis

As summarized in TNC's CAP Overview of Basic Practices:

This step asks you to describe your current understanding of your project situation - both the biological issues and the human context in which your project occurs. This step is not meant to be an unbounded analysis, but instead probes the root causes of your critical threats and degraded targets to bring explicit attention/consideration to contributing factors - the indirect threats, key actors, and opportunities for successful action. Specific questions that this step answers include:

"What factors positively & negatively affect our targets?"
"Who are the key stakeholders linked to each of these factors?"

Expected Outputs

- A situation analysis that includes indirect threats and opportunities behind all critical threats and degraded targets. In particular, a "picture" - either in narrative form or a simple diagram - of your hypothesized linkages between indirect threats and opportunities, critical threats, and targets, showing in particular where intervention would have the most impact.
- Identification of key stakeholders in the context of your situation analysis.

The Importance of Completing a Situation Analysis

Once you have evaluated the status of your conservation targets and identified critical threats you see the recurring and most serious threats at play across your system, it is time to drill further down into the "situation" at hand. It is through this process you gain a fuller understanding of what and who is really driving those critical threats, what would motivate these conditions to change, and who your allies might be in your efforts to change the trajectory you have defined so far.

A complete situation analysis involves assessing the key factors affecting your targets including direct threats, indirect threats and opportunities. Each factor can typically be linked to one or more stakeholders, those individuals, groups, or institutions that have an interest in or will be affected by your project's activities. Completing a situation analysis is a process that will help you and the other members of your project team work together to create a common understanding of your project's context - including the biological environment and the social, economic, political, and institutional systems that affect the biodiversity targets you want to conserve.

Terms at a Glance

Indirect Threats - Contributing factors identified in an analysis of the project situation that are drivers of direct threats. Often an entry point for conservation actions. For example, "logging policies" or "demand for fish."

Opportunities - Contributing factors identified in an analysis of the project situation that potentially have a positive effect on targets, either directly or indirectly. Often an entry point for conservation actions. For example, "demand for sustainably harvested timber."

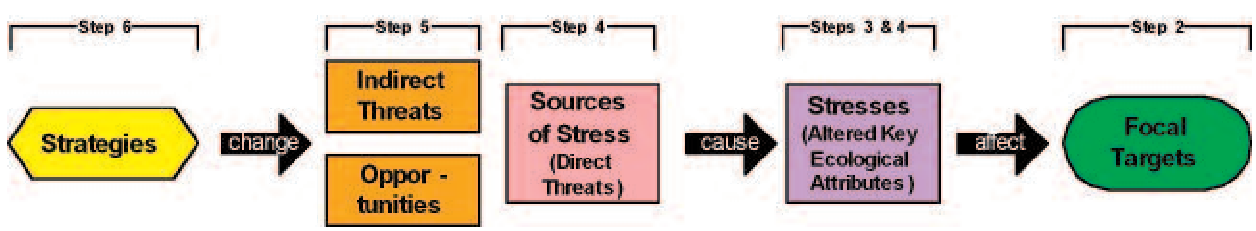
Stakeholders - Individuals, groups, or institutions who have a vested interest in the natural resources of the project area and/or who potentially will be affected by project activities and have something to gain or lose if conditions change or stay the same.

This practice is one that is sometimes overlooked - at least explicitly - in conservation projects, yet it is one of the most important steps to consider. By understanding the biological and human context, you will have a better chance of developing appropriate objectives and designing strategic activities that will help you achieve them. The challenge here is to make your logic explicit without spending too much time on trying to develop a perfect model of reality. In many ways, it is the process of discussing the situation with your project team that is more important than the product that results to capture this discussion.

Without a clear understanding of what is happening at your project area, it is nearly impossible to develop objectives and strategic activities that make sense for your project area's conditions. In addition, often project team members may think they have a shared understanding of their project's context and what the main threats and opportunities are. In going through a formal process to document underlying assumptions about the project's context, however, project teams often find they have somewhat different perceptions of the same situation. For example, biologists tend to focus on the biological aspects of the project area whereas development organizations tend to focus on the socioeconomic factors. Completing your situation analysis helps all project team members come to a common understanding of your project area's context, its critical threats and the underlying factors you should be considering in your project planning.

Elements of a Situation Analysis

The basic elements of a situation analysis are shown in the diagram below and defined as follows. As you can see, through identifying targets and critical threats in *Step 2: Define Scope & Targets, Step 3: Assess Viability* and *Step 4: Identify Critical Threats*, you already have a good start on your situation analysis.



To achieve conservation we ultimately have to abate critical threats and restore degraded targets. To do so effectively, we must understand the factors that drive these problems and also identify promising conditions that may lead to solutions. This means understanding the biological, political, economic, and socio-cultural context within which our targets exist -in particular, the indirect threats causing each critical threat or degraded target and the opportunities upon which to build. For example, for a direct threat of overfishing, an indirect threat might be community need for food and an opportunity might be community interest in setting up sustainable fisheries management. The intention is to make explicit your assumptions as to what specific factors are contributing to each critical threat and degraded target so as to provide insights and prompt discovery of effective points of entry and courses of action.

Box 1. What is the Relationship of a Situation Analysis to a Stakeholder Analysis?

Numerous publications and guides talk about the importance of doing situation and/or stakeholder analyses and offer methods and tools for doing them as distinct processes. But these terms are often used interchangeably with one another, causing a great deal of confusion. As outlined below, the two types of analyses are distinct and yet related to one another.

In this step we are undertaking both activities. The articulation of the underlying circumstances and the significant individuals and organizations who are critical to addressing these circumstances or taking advantage of promising opportunities is purposefully combined here in an effort to ensure this analysis is directly linked and outcome focused.

1) **Situation Analysis** - An analysis of the factors (direct and indirect threats and opportunities) affecting conservation targets at your project area. Each factor will typically have one or more stakeholders associated with them (for example, subsistence fishing by local residents vs. commercial fishing by foreign fishing vessels).
2) **Stakeholder Analysis** - An analysis of the people and organizations who will be influenced by, have an impact on, or will help implement conservation actions at your project area. This analysis can be subdivided into the following questions that are addressed during different parts of the overall CAP process:
    a) Who should participate in your project team? (This question is typically answered during Step 1: Identify People Involved of the CAP process.)
    b) Who are the key actors that potentially influence and/or have a stake in what happens to biodiversity at your project area and thus need to be considered in your situation analysis? (Typically answered during *Step 4: Identify Critical Threats and Step 5: Complete Situation Analysis*.)
    c) Who are the key actors that can potentially influence whether any strategy you plan to undertake will be effective? (Typically answered during *Step 6: Develop Strategies*.)
    d) Can stakeholder participation in the project design and monitoring serve as a conservation strategy in and of itself? (Typically answered during *Step 6: Develop Strategies*.)
    e) Who are the key audiences for the results of your project (this is also known as an “audience analysis”)? (Typically answered during *Step 10: Analyze, Learn, Adapt, & Share*.)

Commonly Used Methods

As part of your analysis of the situation, you should describe the relationships between targets, direct threats, indirect threats, opportunities, and associated stakeholders. This description can be a diagrammatic illustration of these relationships (sometimes called a “conceptual model” - Box 3) or in text form (Box 4). Either way, a good situation analysis clearly expresses the context in which your project will take place and illustrates the cause-and-effect relationships that you and your team assume exists within the project area. In other words, the analysis helps articulate the core assumptions inherent in your project, and to communicate the intentions and expected impacts of your actions to other people outside of your project. Key steps include:

1. Assemble your project team

Plan to spend at least a few hours together - ideally an entire day. If you are using a diagram, prepare a workspace (e.g., large flip chart sheets taped together, a white board, a chalk board, or a sticky tarp as shown in Box 2). If you are using text, then make sure you have some recording device to capture the conversation.

Box 2. How to Make a Sticky Tarp

One of the most useful tools for stakeholder workshops is a sticky tarp that you can use for threat and situation analyses. A sticky tarp is simply a large (2x3 meters is a good size) nylon tarp that has been liberally sprayed with a “retackable” artist's adhesive (e.g., 3M Spray Mount Artist Adhesive #6065 - make sure you use the white can!) on one surface and allowed to air-dry. This creates a tacky surface that does not dry out and allows any paper item to stick to it and yet be readily repositioned. Always remember to fold the sticky tarp onto itself (i.e., sticky surface to sticky surface) and to open it carefully not to dislodge the glue from the tarp. Over time you may need to reapply the adhesive to the tarp. Masking tape is useful to form the connecting lines.

2. Review the scope of your project and your focal conservation targets

If you are using a diagram, put the scope and targets on cards on the far right-hand side or the top center of your workspace. If you have species targets that are nested within habitat targets, you may wish to show this relationship (e.g., sharks nested in coral reefs). You may also want to show relationships between different targets (e.g., intertidal systems affecting seabirds).

3. Select one of the highest ranked direct threats to your targets

If you are using a diagram, put this threat on a card on your workspace and use arrows to connect it to the biodiversity targets that it directly affects. You may also show the altered KEAs (stresses) between a threat and biodiversity target if this additional detail is needed to show the logic connecting a threat to a biodiversity target.

4. Brainstorm factors behind this high ranked threat

For this direct threat, work with your team to brainstorm the various factors (indirect threats and/or opportunities) that lie behind it - in other words, to describe with greater precision what is causing the threat. For each factor, you may also want to list the relevant actor/stakeholder who is responsible for the factor and/or the motivation for their action (on the front or back of each card). If there are several drivers of one threat, you may also want to discuss the relative magnitude of impact of each of these drivers. It is also useful to identify opportunities and other promising trends that could reverse the situation. If you are using a diagram, put each factor on a card, put each card on your workspace, and then show the relationship to other cards.

5. As you work, you may rearrange, add, delete, or combine factors

In Box 3, for example, the team may have first written a direct threat of "fishing." As they went through the analysis, however, they realized that there were two kinds of fishing - fishing by local residents and fishing by boats from the mainland. As a result, they tore up the fishing card and substituted the two you see here. Overall, try not to get hung up in any one section of the analysis, but instead to create an overarching picture of the situation. As discussed in the *Opportunities for Innovation* section below, the key is to show enough detail, but not too much detail. If there are uncertainties, you can note these using question marks and try to reconcile them later through further inquiry.

6. Repeat for other identified critical threats

Repeat this process for the other previously identified critical threats at your project area. Unless you have a relatively simple project, you probably will not want to include the lower rated (e.g., low and possibly medium) threats.

7. Capture work with a sketch or computer program

At the end of the meeting, capture what you have done in a small sketch or using a computer flow-chart program (e.g. CMP's Miradi Adaptive Management Software, Microsoft Visio, or the drawing feature of MS Word). You may also want to develop brief text paragraphs describing each part of the analysis. These will provide detail that will be useful for describing your analysis to others who did not participate, as well as for formally documenting group discussions and decisions.

8. Determine confidence levels

Discuss with your group your confidence level in the different portions of your analysis and which stakeholders or other experts you might need to consult to vet different assumptions. Make assignments as necessary.

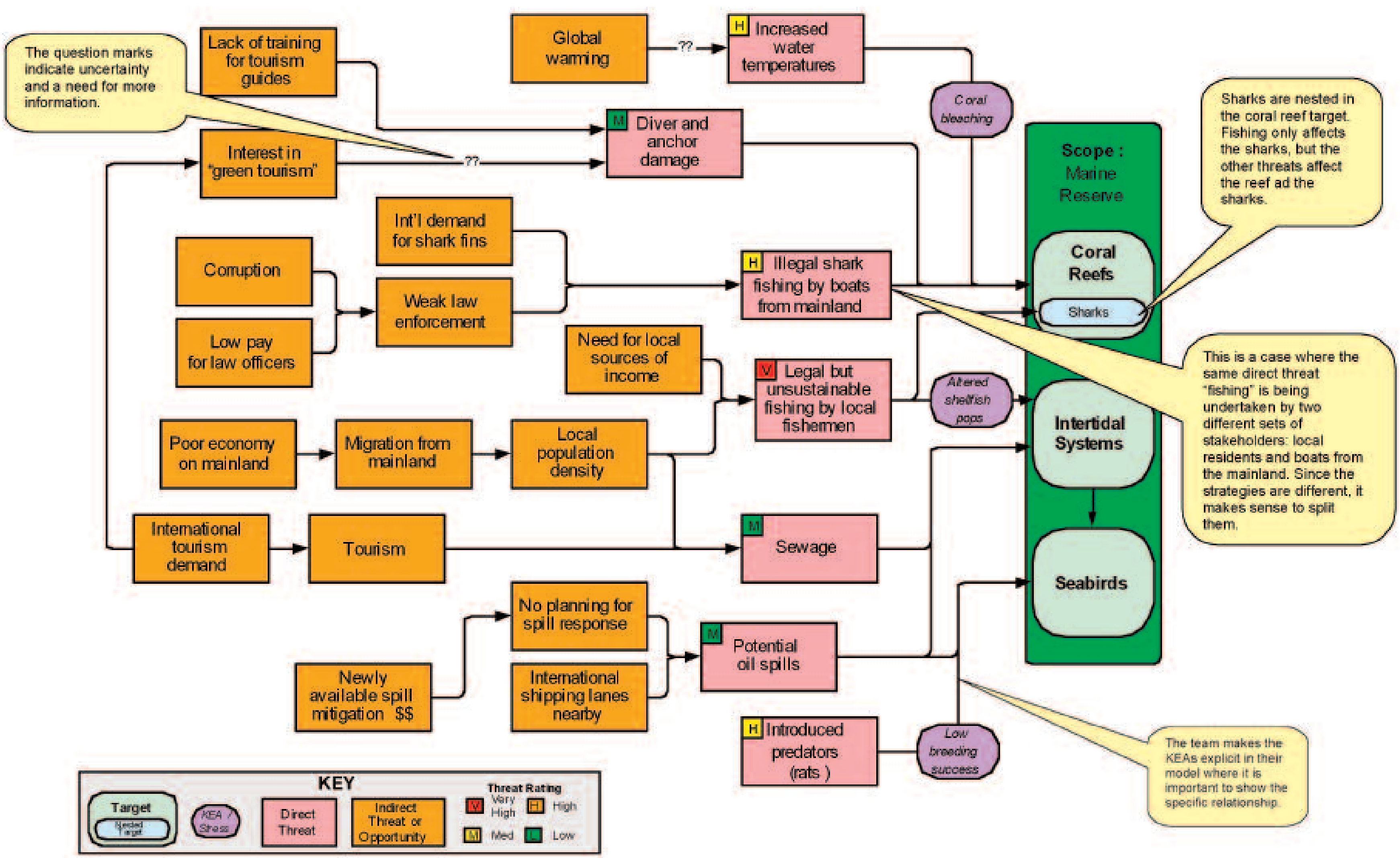
9. Consult with others as necessary

You might also want to consult with stakeholders and other experts and then reconvene with your team to discuss how you might change your analysis based on this input.

10. Use for strategy development

Once you have developed your conceptual model, you can use it as a basis for strategy development as outlined in the next chapter. In particular, you can select specific "chains" within the model and brainstorm strategies that you can use to intervene at various points along the chain to restore degraded targets and/or counter threats.

Box 3. Conceptual Model Diagram for Island Marine Reserve Project



Box 4. Excerpt of Text Description for a Tropical Forest Project

The following example is based on a tropical forest project. For simplicity's sake, we present only a portion of what the narrative text might look like. Your team should use a similar process for each direct threat. How detailed you make this exercise depends on how you want to use the information and to whom you will be presenting it. If the information provides sufficient detail for your project team to identify areas for your strategic activities, you may not need further detail. If you are presenting this to a donor or an external audience, you may choose to write this up as a more detailed narrative.

Direct threat: Illegal timber extraction (mahogany and cedar)

Biodiversity targets affected: Riparian forests; Primary forest; and Beaches (rivers and turtles)

Indirect threats and other factors influencing critical threat:

- International demand for wood has resulted in high prices for wood, directly leading to more illegal extraction.
- High price of wood has also caused people to migrate to the area. These migrants do not have their own resources and are exploiting timber (and other resources) without regard to how they should be managed to ensure they are available over the longer term.
- A need for income and a lack of economic alternatives has prompted people to extract timber illegally (either directly or through middlemen).
- Drug trafficking in the area has led to the planting of coca and the cutting of trees.
- Weak community organization and capacity means that indigenous peoples are not knowledgeable about their rights, and they lack the capacity for developing sound community norms for managing their resources. This has resulted in an inability to control the illegal extraction of timber in their communities.
- A deficient legal framework has resulted in governmental weakness in management and enforcement; this, combined with a lack of environmental awareness on the part of both governments and communities has led to an overall lack of vigilance and an inability to control illegal timber extraction.
- The governmental policy of national integration and commercial logging interests have resulted in discussions to build a road to Vallemedio. If this road is built, this will lead to colonization of the area and an expansion into forested areas through illegal clearing of these areas.
- The new forestry department officials have shown some willingness to enforce the laws.

Opportunities for Innovation

- **Finding Better Ways to Analyze Key Stakeholders** - As discussed above, each direct or indirect threat and opportunity factor typically has one or more stakeholders associated with it. Some situation analysis methodologies instruct the project team to do a detailed analysis of each stakeholder. For example, the Box 5 shows excerpts from the stakeholder analysis tools developed by CARE (Caldwell 2002).

  On one hand, this table can contain useful information. On the other hand, it is a lot of extra work to ask a project team to complete these tables. It would be useful to develop a simple and user friendly way of more formally integrating this type of analysis with the broader situation analysis.

  The Methodology to Rank Social and Institutional Stakeholders is another example of an existing tool. This tool was adapted by Nature Conservancy staff for a conservation planning exercise at the Chiapas Coastal Watersheds Platform Site in Southern Mexico. See the *Resources and Tools* section for a link to this tool.

Box 5: An excerpt from CARE's stakeholder analysis tool (Caldwell 2002).

Table 5: Stakeholder Anlaysis Profile Matrix

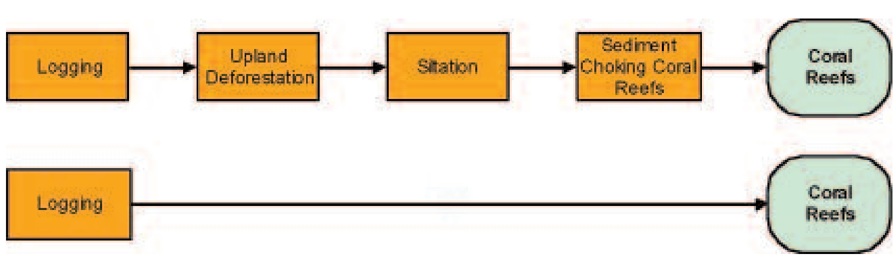
Stakeholder	Interests in the project	Effect of project on interest(s)	Capacity/motiviation to participate	Relationship with other stakeholders (partnership or conflict?)

Key stakeholders can significantly influence or are important to the success of a project. Influence refers to the degree to which a stakeholder has power over the project and can therefore facilitate or hinder project interventions. Importance refers to the degree to which achievement of project goals depends up on the involvement of a given sstakeholder. A simple matrix such as the one presented in Table 6 can be useful to assess the relative influence and importance of stakeholder groups. (Place the name of the stakeholder group in the appropriate cell, depending on its influence on and importance to the project.)

Table 6: Relative Influence and Importance of Key Stakeholders

Influence of Stakeholder	Importance of Stakeholder to Project Achievement				
	Unknown	Low	Moderate	Significant	Critical Importance
Unknown					
Low					
Moderate					
Significant					
Highly Influential					

- **Helping Practitioners Find the Right Level of Detail** - The key to any situation analysis is finding the right balance between presenting enough detail to make assumptions explicit and showing so much detail that the analysis becomes overwhelming. For example, the same relationship in a conceptual model might be expressed either as:



Obviously, the top chain shows more detail than the lower one. But it is not necessarily more correct. And if a model had 20 chains with the same detail as the upper one, it might become overwhelming. Effectively probing the situation to get to the real "heart of the matter" is as much an art as it is a science. And often it is a combination of having someone who knows how to ask the right questions, the people in the room who really understand the social, political and economic framework, and the presence of a person or persons in the process who has the ability to see connections that makes this process fruitful. The challenge to all of us to get better at articulating those questions that bring focus and content to bear, make the right amount of effort to assemble meaningful information and be certain those individuals with strong strategic thinking skills are part of the dialogue.

- **Building Links to Strategy Development Tools** - The Conservation Strategy Development Tool outlined in Low (2003) covers a good deal of ground that is also covered in this step. It essentially "works the problem from the other side" by starting with the strategy that you will employ and then using probing questions to determine the situation to which you will apply this strategy. It would be interesting to see if that tool can be explicitly extended to map out the situation before the project team takes action.

Resources and Tools

Basic guidance and examples of conducting a situation analysis can be found in the following sources:

Caldwell, R. 2002. Project Design Handbook. CARE.
www.aprscp.org/new%20materials/CARE%20Project%20Design%20Handbook.pdf

IUCN. 200x. Situation Analysis: IUCN's Situation Analysis Approach and method for Analyzing the Context of Projects and Programmes.
http://www.iucn.org/themes/eval/documents2/situation_analysis/approach_and_method.pdf

Margoluis, R. and N. Salafsky. 1998. Measures of Success: Designing, Managing, and Monitoring Conservation and Development Projects.
www.IslandPress.org (English in hardcopy only)
www.FOSonline.org (Spanish online)

WWF. 2000. WWF Assessing Root Causes Guide.
http://assets.panda.org/downloads/rcuser.pdf

Software that can be useful for doing conceptual models includes:

Miradi Adaptive Management Software. Forthcoming in the near future.
www.miradi.org

Microsoft Visio.
www.office.microsoft.com/visio/

A standard listing of direct threats that you can browse to see if you have missed any possibilities in your situation analysis can be found at:

Conservation Measures Partnership. 2005. Taxonomy of Direct Threats.
www.conservationmeasures.org/CMP/Site_Page.cfm?PageID=17

Existing tools to support an analysis of stakeholders include:

Methodology to Rank Social and Institutional Stakeholders is available in Spanish and English
http://conserveonline.org/workspaces/cbdgateway/cap/practices/supportmaterials/bp5sm/stakeholders/download
http://conserveonline.org/workspaces/cbdgateway/cap/practices/supportmaterials/bp5sm/actores/download

Caldwell, R. 2002. Project Design Handbook. CARE.
www.aprscp.org/new%20materials/CARE%20Project%20Design%20Handbook.pdf

Conservation Action Planning
Step 6: Develop Strategies: Objectives and Actions

As summarized in TNC's CAP Overview of Basic Practices:

This step asks you to specifically and measurably describe what success looks like and to develop the specific actions you and your partners will undertake to achieve it. In particular, you want to try to find the actions that will enable you to get the most impact for the resources you have. Specific questions that this step answers include:

"What do we need to accomplish?"
"What is the most effective way to achieve these results?"

Expected Outputs
- At a minimum, good objectives for all critical threats and degraded key ecological attributes that your project will take action to address.
- If useful, good objectives for other factors relevant to project success.
- One or more strategic actions to accomplish each conservation objective.

The Importance of Developing Strategies

Developing conservation strategies involves deciding how your project team can overcome critical threats and restore degraded targets, including what specific objectives need to be achieved and what specific actions need to be taken to achieve those objectives. Your team also will want to consider strategies that secure needed project resources and support. High leverage strategies are those that achieve the greatest results for the least amount of investment. Every project is challenged to develop specific strategies-objectives and associated actions-and to describe why these strategies were selected.

A project team typically has a range of conservation actions it can use to achieve its goals, each having different effectiveness in different situations. Resources available to invest in conservation action are limited, so the project team needs to identify and implement actions that will most efficiently achieve desired outcomes given the circumstances they are working within. However, there will always be some uncertainty about the potential effectiveness of any action in a given situation. Taking action in the face of such uncertainty requires a clear statement of the intended outcome for each action in which the project team invests, and an explicit mechanism for measuring the effectiveness of actions at achieving their intended outcomes (*Step 7: Establish Measures*). In this way, the project team can determine if the return on investment is acceptable, and adapt the project as necessary-identify effective actions for continued investment, ineffective actions to discontinue, and possible new actions in which to start investing. Clearly linking actions to outcomes enables the effectiveness of conservation action to be measured, assumptions to be tested, and the project to adapt and learn.

If successfully implemented, the project's conservation strategies collectively should result in accomplishing the project's goals and realizing the project vision (*Step 2: Define Scope & Focal Targets* and *Step 3: Assess Viability*).

The Elements of Conservation Strategies

A conservation strategy is a broad course of action intended to achieve a specific objective (i.e. outcome) that abates a critical threat, enhances the viability of a conservation target, or secures project resources and support.

There are two fundamental components to conservation strategies: Objectives and Strategic Actions (Box 1).

Terms at a Glance

Strategies - Broad courses of action that include one or more objectives, the strategic actions required to accomplish each objective, and the specific action steps required to complete each strategic action.

Objectives - Specific statements detailing the desired accomplishments or outcomes of a particular set of activities within a project. A typical project will have multiple objectives. Objectives are typically set for abatement of critical threats and for restoration of degraded key ecological attributes. They can also be set, however, for the outcomes of specific conservation actions, or the acquisition of project resources. If the project is well conceptualized and designed, realization of all the project's objectives should lead to the fulfillment of the project's vision. A good objective meets the criteria of being: specific, measurable, achievable, relevant and time limited.

Strategic actions - Interventions undertaken by project staff and/or partners designed to reach the project's objectives. A good action meets the criteria of being: linked to objectives, focused, strategic, feasible, and appropriate.

Objectives

Objectives are specific and measurable statements of what you hope to achieve within your project. They represent your assumption as to what you need to accomplish and as such, become the measuring stick against which you will gauge the progress of your project. Objectives can be stated in terms of reducing the status of a critical threat, enhancing or maintaining the status of key ecological attributes of focal targets, securing project resources, and/or the outcomes of specific conservation actions (Box 2 for an example). A typical project will have multiple objectives. Ideally, realization of all the project's objectives should lead to fulfillment of the project goal.

It is important to set good objectives-they are the foundation for selecting strategic actions in which to invest and for determining the effectiveness of those actions. A good objective meets the following criteria defining a "*SMART*" objective:

- **Specific - What exactly does the project team want to achieve?** The specific outcome to be accomplished needs to be described in clear enough terms that all people involved in the project have the same understanding of what the terms mean.
- **Measurable - Is it measurable?** The objective needs to be defined in relation to some standard scale (e.g., numeric, percentage, fractions, or all/nothing states) to allow progress to be measured.
- **Achievable - Can it be done in the proposed timeframe within the social and political context of the project and with available funds?** The objective or expectation of what will be accomplished must be realistic given the market conditions, time period, resources allocated, etc.
- **Relevant - Will this objective lead to the desired results?** The results need to be impact oriented and represent the necessary changes in key ecological attributes, critical threat factors, or project resources to achieve the project goal.
- **Time-Limited - When will the objective be reached?** This means stating clearly when the objective will be achieved.

Strategic Actions

Strategic actions are broad or general courses of action undertaken by a project team to reach one or more of your project's stated objectives. Collectively, the strategic actions should be sufficient to accomplish the objectives. A good strategic action meets the criteria of being:

- Linked - directly related to a specific objective(s).
- Focused - maximizes the effectiveness for achieving the objective(s).
- Feasible - accomplishable in light of the project's resources and constraints.
- Appropriate - acceptable to and fitting within project-specific cultural, social, and ecological norms.

BOX 1: Examples of Objectives and Strategic Actions

Focused on threat abatement

Objective: By 2010, reduce the percent cover of invasive species A to less than 5%, throughout the mixed grassland habitat in Conservation Area X.

> **Strategic Action:** Implement a volunteer-based program to manually control invasive species A.

Focused on enhancing target viability

Objective: By 2010, increase the population size of juvenile chinook salmon to more than 1,000 individuals, within the lower floodplain habitat of Conservation Area Y.

> **Strategic Action:** Improve juvenile salmon recruitment by changing watershed practices that cause a high degree of embedded sediments from excessive erosion.

Focused on threat abatement and enhancing target viability

Objective: By 2015, restore the fire regime to achieve a fire return interval of 5-10 years over at least 5,000 acres of grassland habitat at Conservation Area Z (in this case, fire suppression efforts were identified as a key threat limiting the key ecological process of periodic burning).

> **Strategic Action:** Establish a partnership with the Bureau of Land Management fire crew to conduct annual prescribed burns.

Focused on project resources

Objective: By 2010, the project team and their program are favorably received and supported by the two key constituencies in the project area.

> **Strategic Action:** Engage the two key project constituents in the development and implementation of the project plan.

Commonly Used Methods

The process of developing effective conservation strategies involves five main steps:

1. Review the project vision and goals;
2. Define objectives for abating the critical threats and restoring the viability of focal conservation targets and for securing project resources;
3. Using your situation analysis, evaluate the social, political, and economic context contributing to threats and supporting conservation within the project area;
4. Brainstorm potential strategic actions that might accomplish each objective, or multiple objectives;
5. Select strategic actions to implement based on benefits, feasibility and costs.

Although the ordered presentation of the steps suggests a customary sequence, in practice steps 2 through 4 are often combined, re-ordered, or otherwise intermingled.

The CAP Workbook contains spreadsheets and a Strategy Identification Wizard to facilitate the capture of necessary information relating to the development of Objectives and Strategic Actions.

1. Review the project vision and goals

The project vision and goals defines overall project success, and provides the touchstone to ensure that objectives and actions are of sufficient scope and scale to achieve the vision and goals.

2. Define measurable objectives

Generally stated, the primary conservation project objectives are to abate threats and to restore or maintain the viability of focal conservation targets. But there may not be the need, nor may a project have the resources, to take action on all threats, focal targets, and resource needs. To provide focus for the strategic actions, a project team must define specific, measurable objectives for critical threats, significantly degraded key ecological attributes and urgent project resource deficiencies-outcomes that must be accomplished in order to achieve the project goal.

Review the list of critical threats and degraded key ecological attributes, as well as the underlying causal factors for each as identified in the situation analysis. Critical threats are those sources of stress with an Overall Threat Rank of Very High or High. Degraded key ecological attributes are those that have a current rating of Fair or Poor. Describe the desired outcome that you believe will reduce threats or improve target status to your desired levels.

Generally, an objective should be set for each of the critical threats, because threat abatement typically is accomplished through direct conservation action. On the other hand, some degraded key ecological attributes may be restored through the abatement of critical threats and not need direct action. Thus, when setting objectives with respect to degraded key ecological attributes, focus on those attributes that will need direct conservation action (e.g., ecological restoration).

Objectives also should be set with respect to project resource factors (*Step 9: Implement Plans*). These resource factors are typically assessed once your team has a solid understanding of the objectives and strategic actions related to abating critical threats and maintaining or restoring the viability of conservation targets. Objectives should be set for each of the significant project resource needs, as indicated by the resource factor scores and any limiting information or knowledge gaps that require research and development. Resource factors most in need of attention are those with a Resource Score of Medium or Low. The objective should describe the desired outcome that you believe will improve resource status to your desired levels.

The list of critical threats, degraded key ecological attributes, and resource factors for which you establish objectives can be further narrowed and refined based on the urgency, feasibility and resources required to adequately abate the threat, restore the key ecological attribute, or secure the needed project resources.

In addition to threat abatement and target viability objectives, you also may find it useful to state “intermediate results,” which are specific benchmarks or milestones that your project will work to achieve in route to accomplishing your threat abatement or viability objectives. In this case, “intermediate” typically refers to a temporal dimension.

3. Evaluate context of threats to and support for conservation

Critical threats and degraded key ecological attributes typically result from incompatible economic activities and management of natural resources. Understanding the cultural, political, and economic setting as well as incompatible human uses of natural resources is essential for developing effective actions because the context represents both the driving forces behind the critical threats and degraded viability as well as the opportunities for abating the threats, restoring viability, and securing project resources and support. Thus, before brainstorming and selecting actions, project teams must first probe deeply into the critical threats, their potential underlying causes, opportunities for action, and the linkages to focal conservation targets and other threats.

Such probing should build upon the existing situation analysis (*Step 5: Complete Situation Analysis*), and should focus on those critical threats and key ecological attributes for which objectives have been set. Some project teams use conceptual models (e.g., situation diagrams) to discover and represent the linkages. Others use probing questions looking at potential causes, the scale at which the threats and systems operate, the key constituencies that are harmed by the threat or might benefit from its abatement, etc. Using probing questions to discover underlying causes in combination with conceptual models to visually represent threat factors and their linkages is a particularly effective approach.

4. Brainstorm potential strategic actions

Based on your focused probing of the situation, consider the array of strategic actions that collectively might accomplish the objectives. Some strategic actions will apply to a single objective; others will be relevant to multiple objectives. Your understanding of each critical threat, degraded key attribute and project resource need and their underlying causes should help you identify the appropriate strategic actions and points of intervention to achieve the objectives. The most appropriate point of intervention may be at the key ecological attribute (e.g. restoration), at the critical threat, or at a causal factor more distal in the chain of causation (Box 3).

The types of actions your team might consider to achieve its objectives will be varied, depending on the specific situation of your project, but typically will include a mix of:

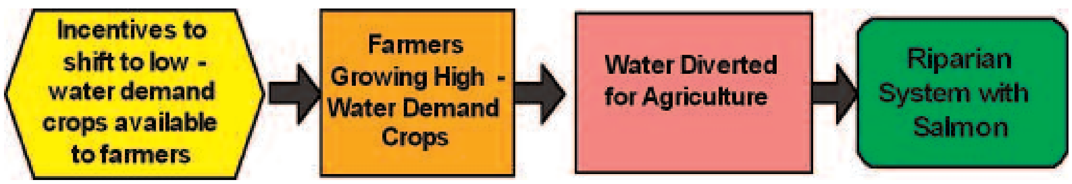
- Land and water protection
- Land and water management
- Species management
- Education and awareness
- Law and policy
- Livelihood, economic and other incentives
- External capacity building

Any action identified by your team needs to be explicitly linked to one or more objectives.

BOX 2: Setting Objectives and Selecting Strategic Actions

An objective should focus on either a critical threat or a degraded key ecological attribute of a focal conservation target. The point of intervention of strategic actions to accomplish the objective may be directly at the critical threat or at other factors further back in the causal chain.

For example, consider a riparian system target with salmon that is stressed by low river flow in mid-summer; low flow results in elevated water temperature and increased fish mortality. The low river flow is directly caused by agricultural water diversion, which in turn is caused by incompatible agricultural practices (i.e., growing high-water demand crops). The project team has set a threat abatement objective focused on the critical threat of groundwater pumping: "By 2010, reduce the amount of water from the Blue River diverted for agricultural purposes from 5000 gallons/day to 1000 gallons/day". The strategic action to accomplish the objective is to convince farmers to switch to crops that require less water through incentives or legislative mandates. In this case, the point of intervention is at the causal factor (agricultural practices), not directly at the critical threat (water diversion). The diagram shows the presumed linkages between the strategic action, causal factor, direct threat, and conservation target.



5. Select priority strategic actions

The potential strategic actions identified through the brainstorming exercise should be evaluated to select those actions that, if implemented, will most effectively and efficiently accomplish the objectives. We recommend that potential strategic actions be evaluated and rated using three criteria: Benefits, Feasibility, and Cost.

- **Benefits** - The benefits of a given strategic action derive from directly achieving threat and viability objectives (direct benefit) as well as from enabling or catalyzing the implementation of another strategic action (indirect benefit or leverage). To assess the potential benefits of a strategic action, consider four factors:
  - **Scope and scale of outcome** - The degree to which the proposed strategic action, if successfully implemented, is likely to secure the desired objective(s) at a scope and scale-degree of intensity and/or spatial scale-sufficient to reduce critical threat ranks to one or more focal conservation targets to a Medium rank and/or to increase a key ecological attribute to a Good rank for one or more focal conservation targets.
  - **Contribution** - The degree to which the proposed strategic action, if successfully implemented, will contribute to the achievement of the objective.
  - **Duration of outcome** - The degree to which the proposed strategic action, if successfully implemented, is likely to secure a long-lasting outcome. Strategic actions likely to achieve enduring, long-lasting outcomes are most desirable; those with short duration less desirable, all other things being equal.
  - **Leverage** - The degree to which the proposed strategic action, if successfully implemented, will enable or catalyze the implementation of other strategic actions (and thus achieve other important objectives), either within the immediate conservation project, or elsewhere.

Note that “Scope and scale of outcome” may not be applicable to strategic actions linked to project resource objectives because such actions are unlikely to have the direct benefit of threat abatement or viability enhancement; rather, they have an indirect benefit derived from leverage.

- **Feasibility** - Overall feasibility of a strategic action is based on three factors:
    - **Lead individual and institution** - The availability of a lead individual with sufficient time, proven talent, relevant experience, and good institutional support to implement the strategic action.
    - **Ability to motivate key constituencies** - The degree to which key constituencies (e.g., landowners, public officials, interest groups) whose involvement is necessary to implementing the strategic action and their motives are understood and the action appeals.
    - **Ease of implementation** - Strategic actions that are less complex, have been successfully implemented previously, fit within the core competencies of the lead institution, and for which funding is accessible have a higher likelihood of success than other actions.

- **Cost** - Strategic action costs should be estimated for the time horizon of the strategy, but no longer than 10 years. Cost estimates should focus on the use of discretionary or unrestricted dollars (or other appropriate currency). Overall cost of a strategic action is based on four factors:
    - **One time cost** - The amount of any direct, one-time costs.
    - **Annual costs** - Other direct costs, excluding staff time, that will be accrued annually.
    - **Staff time** - The average number of staff (FTE) required to implement the strategic action.
    - **Number of years** - The number of years the strategic action will require staff time and annual costs for implementation.

The overall rank for each strategic action, based upon Benefits, Feasibility, and Cost, should serve as a guide for selecting the strategic actions to implement. The scoring system in the CAP Workbook is designed to reward strategic actions that produce very high benefits for reasonable cost. It also identifies strategic actions that are “low-hanging fruit”, i.e., lower cost actions with medium benefits that are very feasible to implement.

These rankings are not intended to provide a “perfect” evaluation, but rather to provide you with a relative assessment of an array of potential strategic actions. Your project team will still need to use good judgment and experience to decide which strategic actions to implement.

Finally, the strategic actions represent broad courses of action, but do not provide the specificity needed to take action. In order to implement your strategic actions, your team will need to identify the specific action steps that spell out the actual work to be done, including who's responsible for doing it and a timeline (see *Step 8: Develop Work Plans)*.

BOX 3: Fostering a Planning Environment Conducive to Developing Strategies

Developing effective conservation strategies typically requires a more creative approach than the more analytical process of assessing conservation targets and threats. Thus, it is important to create an environment that fosters creativity, innovation, and "out of the box" thinking. While there is no exact recipe for creativity, bringing together people with the right set of skills and competencies into a nurturing environment should facilitate the process. Here are some key ingredients to consider:

Skills, Competencies, and Personalities for Developing Strategies

- Knowledge of project area:
  - Ecology and Conservation Targets
  - Socio-economics
  - Politics
  - Culture
- Creative thinking
- Analytical thinking
- Conceptual thinking (to bring the process/outputs into comprehensible and unified form)
- Facilitation - to ensure that the process moves forward and is designed to foster new ideas to emerge through creative brainstorming and open, critical review ("tough love")
- Subject expert (to bring knowledge from relevant disciplines such as government relations, philanthropy and marketing, etc.)
- External perspective
- Influence and respect (both internally and outside of your organization)
- Responsibility for implementation

Creating the Right Environment for Developing Strategies

- Importance of place (e.g., inspiring location, comfortable meeting room)
- Good set up (clear expectations and compelling agenda for meeting/process)
  - Build in down time - this is when innovative thinking and synthesis often occurs
  - Field trips to see targets, threats, situation
- Right mix of skills, competencies, and personalities (see above); often times, critical strategic thinkers will not have been deeply involved in the assessment of targets and threats, and will need to be brought into the process for developing strategies.
- Iterations - a single planning meeting may not be sufficient to design good strategies; often, inspiration and creativity are the products of cumulative and increasingly more informed assessments of the conservation situation.

Opportunities for Innovation

- **Developing Strategies of Sufficient Scope and Scale to Achieve Objectives** - As discussed above in the section on selecting priority strategic actions, one of the criteria for rating the benefit of a strategic action is the degree to which it is of sufficient scope and scale to achieve the desired objective. The current procedure in the CAP Workbook for evaluating the scope and scale of impact of a strategic action is based on the number and current rank of the threats and/or targets that the strategic action will affect. Strategic actions that are expected to change the current ranking by at least one ranking category for a greater number or Very High or High ranked threats and Poor or Fair ranked targets receive a higher benefit score. This procedure provides a very coarse and relatively subjective assessment of the scope and scale of impact. Innovations that consider more explicit definitions of the scope and scale of impact, perhaps linked to spatial analyses of targets and threats, yet are easily applied and incorporated with other strategy ranking criteria, are encouraged.

- **Building Links to Situation Analysis** - To identify and select the most effective strategic actions, we must understand the system that drives the critical threats and degradation of conservation targets-the biological, political, economic, and socio-cultural context within which our targets. A good situation analysis allows you to make explicit your assumptions as to what specific factors are behind each critical threat and degraded target so as to provide insights and prompt discovery of effective points of entry or courses of action.

  As noted above, conceptual models are one tool for depicting the conservation situation and being explicit about where to intervene, what sort of intervention is called for, and what is the desired outcome. The existing CAP Workbook does not support this type of conceptual modeling, but tools that do are in development (see *Resources and Tools*).

  The Conservation Strategy Development tool outlined in Low (2003) covers a good deal of ground that is covered in a situation analysis. The tool essentially "works the problem from the other side" using a conceptual model. It begins with the strategy that you will employ and uses probing questions to determine the situation to which you will apply this strategy. It would be interesting to see if that tool can be explicitly extended to map out the situation before the project team takes action.

- **Developing and Ranking Project Resource Objectives and Strategic Actions** - The guidelines for developing conservation strategies suggest that, like critical threats and degraded key ecological attributes, project resource factors can serve as a focus for objectives and strategic actions. And, that strategic actions linked to resource objectives can be rated based on benefits, feasibility, and cost, with the noted exception that resource-related actions derive their benefit from leverage rather than direct impact on threats or targets. Logic and initial experience support the inclusion of project resource strategies within the domain of conservation strategies, but further refinement of the similarities and differences between direct threat abatement and viability enhancement strategies, on one hand, and resource or enabling strategies, on the other, is warranted.

Resources and Tools

Basic guidance and examples of developing conservation strategies can be found in the following sources:

Low, G. 2003. Landscape-Scale Conservation: A Practitioners Guide. The Nature Conservancy.
http://conserveonline.org/docs/2003/09/Landscape_Practicitioners_Handbook_July03_--_NEW.pdf

Standardized list of possible strategic actions:

IUCN & CMP. 2006. Classification of Conservation Actions.
www.conservationmeasures.org

References related to situation analysis and its link to developing strategies:

Margoluis, R. and N. Salafsky. 1998. Measures of Success: Designing, Managing, and Monitoring Conservation and Development Projects.
www.IslandPress.org (English in hardcopy only)
www.FOSonline.org (Spanish online)

WWF. 2000. WWF Assessing Root Causes Guide.
http://assets.panda.org/downloads/rcuser.pdf

Software that can be useful for building conceptual models incorporating objectives and strategic actions includes:

Miradi Adaptive Management Software. Forthcoming in the near future.
www.miradi.org

Microsoft Visio.
www.office.microsoft.com/visio/

Conservation Action Planning

Step 7: Measuring Results

As summarized in TNC's CAP Overview of Basic Practices:

This step involves deciding how your project team will measure your results. This step is needed to help your team see whether its strategies are working as planned and thus whether adjustments will be needed. It is also needed to keep an eye on those targets and threats that you are not acting on at the moment, but may need to consider in the future. Specific questions that this step answers include:

> *"What do we need to measure to see if we are making progress towards our objectives and whether our actions are making a difference?"*
> *"Are there other targets or threats that we need to pay attention to?"*

Expected Outputs

- A realistic list of the indicators your project will measure to track the effectiveness of each conservation action.
- If necessary, a list of the indicators your project will measure to assess the status of selected targets and threats that you are not currently working on.
- Briefly describe the method(s) for collecting each indicator.

The Importance of Measuring Results

Measuring the results of your conservation work is perhaps most important for the members of your project team. Good measures allow your project team to determine whether you are making progress relative to your desired results, assess the effectiveness of your management actions, and adapt your conservation action plan to get the best results.

Measuring and reporting on results also can enhance your relationships with people outside the project team. Good measures will enhance your team's accountability, credibility and transparency with donors who are increasingly looking for evidence of a return on their investment. They are also the foundation for an improved understanding of what strategies work well under which circumstances that can in turn lead to better decisions on future priorities and strategies both locally and by other project teams.

One of the strengths of the CAP process is the full integration between conservation planning, taking action, and measuring results. This chapter will describe this linkage and how it creates a connected feedback process that is critical for adaptive management.

Defining Measuring Results

To measure results, first and foremost, you must define the questions you want to answer. For most conservation projects, measuring results answers two basic and interrelated questions: (1) Strategy effectiveness - Are the conservation actions we are taking achieving their desired results? and (2) Status assessments - How is the general status of the project changing?

Each of these two questions is discussed in more detail below. The distinction between strategy effectiveness and status assessment questions is not what is being measured (either can focus on biodiversity targets, threats, or conservation management status) but why you are measuring it. Are you spending money and taking action to achieve some kind of specific result? If so, you will want to measure the effectiveness of these actions. If instead you are measuring something that is not the focus of current conservation action but you want to determine whether action is warranted, then you are measuring for status purposes.

> Terms at a Glance
>
> Strategy Effectiveness - Answering the question: "Are the conservation actions we are taking achieving their desired results?"
>
> Status Assessment - Answering the questions: "How is the biodiversity we care about doing?", "How are threats to biodiversity changing?", or "How is the conservation management status changing?" Answers to these questions, even when no actions are occurring, are important to determine if actions are needed.
>
> Indicators - Measurable entities related to a specific information need (for example, the status of a key ecological attribute, change in a threat, or progress towards an objective). A good indicator meets the criteria of being: measurable, precise, consistent, and sensitive.
>
> Methods - Specific techniques used to collect data to measure an indicator. Methods vary in their accuracy and reliability, cost-effectiveness, feasibility, and appropriateness.

The same information can thus address status assessment or strategy effectiveness questions. For example, a project may gather water quality data for status purposes to confirm that upstream industrial sources are not discharging excessive levels of pollutants. If status assessment measures reveal undesirable levels of pollutants, strategies may be implemented to abate the pollution threat and the same water quality indicator will shift from a status role to a strategy effectiveness role (some additional strategy effectiveness measures with closer ties to the actions being implemented may be added as well). Similarly, population size of a particular species may be tracked to see if it is above or below a particular threshold. Declining trends or a drop below the threshold level may serve as a trigger for taking management action and a shift from status to strategy effectiveness measures.

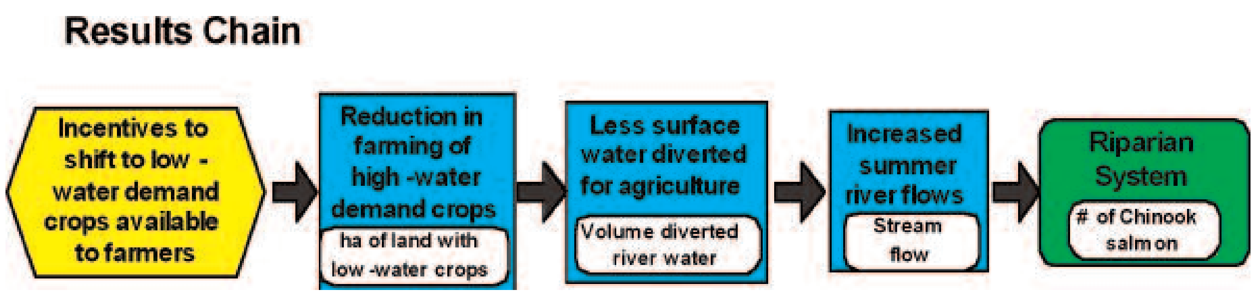
The Two Components of Measuring Results

Strategy Effectiveness

Returning to our two questions above, strategy effectiveness measures are designed to tell us if our actions are leading to their intended results. Strategies in biodiversity conservation projects ultimately aim to affect the biodiversity we care about. Sometimes actions have a direct link to the conservation targets and measuring results is fairly straightforward. For example, if the action is planting trees to restore species composition and abundance, you may use percent survival of planted trees two years after planting as the primary indicator of strategy effectiveness. In other cases, conservation actions affect biodiversity indirectly by focusing on underlying causes behind the sources of stress. In these cases, you should consider measuring indicators at multiple stages of the causal chain(s) that link the actions to the biodiversity to better assess whether the strategies are working. Consider the example shown in Box 1 where the conservation action is passing legislation to motivate farmers to switch from high water demand crops to low water demand crops to benefit salmon, who are suffering from low river flows influenced by agricultural water diversions.

Box 1. Example of Measuring Strategy Effectiveness

Consider the following conservation situation where salmon are part of a riparian system conservation target that is stressed by extremely low river flows. Water is being diverted from the river to grow high water-demand agricultural crops. A strategy is identified to pass legislation providing financial incentives to motivate farmers to switch to low water demand crops. The project team has specified the following threat abatement objective: "By 2010, reduce the amount of water from the Blue River diverted for agricultural purposes from 5000 gallons/day to 1000 gallons/day". The following results chain diagram conveys the underlying assumptions that link the legislative strategy to the source of stress to the conservation target. Potential strategy effectiveness indicators are listed below each desired result.



How could the effectiveness of the incentive strategy in this situation be monitored?
Consider the following candidate strategy effectiveness indicators:

1. **Number of Chinook salmon** - Salmon population size is a key ecological attribute and there is hope that conservation action will ultimately lead to increases in salmon numbers. However, there are many other factors affecting the salmon population and using this as the sole indicator will not provide very sensitive feedback to the effectiveness of the strategy.
2. **Stream flow** - Altered flow regime is an identified stress (or altered key ecological attribute) and determining if this key attribute is improving is important. But once again, it does not provide a very direct measure of the effectiveness of the particular conservation action and is likely influenced by other factors such as annual variation in rainfall.
3. **Volume of water diverted** - Actually tracking the amount of water used for agricultural purposes adds an important measure of the threat itself and specifically measures progress towards the stated threat abatement objective.
4. **Hectares of low-water crops** - An additional indicator that will help inform the effectiveness of the strategy is the hectares of farm land converted from water-intensive crops to low-water need crops.
5. **Actions taken and immediate output** - It is also helpful to track whether actions are being implemented as planned and to record the immediate outputs of these actions (e.g., what specific actions were taken?, did legislation pass?, how many farmers signed up for the incentive program?).

Simply tracking the number of salmon in the river does not provide a sensitive measure of strategy effectiveness given the series of linked changes that must occur for the legislative action to affect the salmon. Likewise, simply tracking whether or not the legislation passed provides an insufficient measure of strategy effectiveness - what if farmers never use the new incentive program?

The series of if-then assumptions that link actions and desired results can be recorded in narrative descriptions but diagrams like the one shown in Box 1 are particularly valuable for capturing and communicating these relationships. These diagrams, known as "Results Chains" (WWF & FOS 2006) are similar to the situation analysis diagrams described in *Step 5: Complete Situation Analysis*. Situation analysis diagrams include boxes and arrows that show the relationship between targets, threats, and underlying causes to assist with strategy identification. Results Chains start with selected strategies and change the boxes to result-oriented descriptions that capture the presumed consequences of taking actions. Situation analysis diagrams show the project situation today whereas the results chain diagram shows the desired future condition of the project.

Status Assessment

Most projects will have some conservation targets, or at least some key ecological attributes for some targets, that are currently within an acceptable state (i.e., target viability goals are being met) and without critical threats bearing down on them and therefore do not require any immediate management attention. With no strategies or stated objectives, there will be no need for strategy effectiveness measures. Does this mean the project team should ignore these targets entirely? No - some type of periodic status assessment is needed to reaffirm that the targets continue in a state that does not require management attention. The status assessment needs of a project can often be addressed with less intensive, and/or less frequent measurements than strategy effectiveness measures. Status assessment needs can sometimes be met with data that is periodically gathered by someone else as part of long-term monitoring efforts. In addition to evaluating whether a conservation target is at an acceptable state (e.g., meeting long term goals set for that target), status assessments often serve an early warning role to trigger action or more intensive measurement when undesirable changes are detected.

Why Bother Distinguishing Between Strategy Effectiveness and Status Measures?

Project teams are typically challenged by the need to take action, measure the effectiveness of actions being taken, and measure the status of biodiversity to determine if new actions are needed. The allocation of limited resources across these three needs is often done without a deliberate consideration of the tradeoffs among these competing priorities.

Many conservation projects do not measure or report on the results of their conservation actions. For example Bernhardt et al. (2005)[9] found that for 37,000 river restoration projects in the United States costing an estimated $14-$15 billion, less than 10% of the restoration projects had any form of assessment or evaluation. The consequence of this low attention to measuring results is significant: “Because most project records were inadequate to extract even the most rudimentary information on project actions and outcomes, it is apparent that many opportunities to learn from successes or failures, and thus to improve future practice, are being lost.” Choosing to not measure results can lead to inappropriate allocations of valuable resources if, for example, we continue to unknowingly invest in actions that are not having the desired impacts.

At the other extreme, occasionally we find very large status assessment allocations for projects in relatively intact, unthreatened landscapes with few identified conservation actions. There is practically no limit to what you can spend money on in the name of status assessment - detailed vegetation measures with canopy and under story sampling, population monitoring of large mammals, small mammals, birds, amphibians, reptiles, and insects. But what is the conservation impact of all this status assessment information? In many cases it may be quite limited. Certainly, some studies of intact systems are needed to serve as reference areas or to establish baseline conditions if future impacts are anticipated. However, investment of limited conservation resources in this type of status assessment should be carefully evaluated if there are competing resource needs for implementing strategies and measuring strategy effectiveness.

9. Bernhardt, E.S., et al. 2006. Synthesizing U.S. River Restoration Efforts Science 308 (5722), 636.
http://www.sciencemag.org/cgi/content/full/308/5722/636/DC1

Clearly defining the need for strategy effectiveness and status measurements contributes to making informed decisions that will lead to stronger applied investments in taking action and measuring results. See the Case Study titled "From Status to Effectiveness Measures for a Globally Rare Plant" in the *Resources and Tools* section below for an example where changes in the allocation of resources improved the management relevance of the measured results. For additional information on the challenges and solutions associated with allocating resources between taking action, measuring the effectiveness of actions taken, and doing status assessments, see Salzer and Salafsky (2006) in the *Resources and Tools* section.

Indicators and Methods

Regardless of the question being addressed, developing a plan for measuring results ultimately involves determining the indicators that you will collect and the methods you will use to measure the indicators.

An indicator is a measurable entity related to a specific information need, such as the progress towards achieving an objective, change in a threat, or status of a target. Indicators can be quantitative measures or qualitative observations. Good indicators meet the following criteria:

- **Measurable:** Able to be recorded and analyzed in quantitative or in discreet qualitative terms.
- **Clear:** Presented or described in such a way that its meaning will be the same to all people.
- **Sensitive:** Changing proportionately in response to actual changes in the condition or item being measured.

Methods are specific techniques used to collect data to measure an indicator. Good methods meet the following criteria:

- **Accurate:** Gives minimal or no error.
- **Reliable:** Results obtained using the method are consistently repeatable.
- **Cost-Effective:** Not overly expensive for the data the method yields or for the resources available to the project.
- **Feasible:** Project team has people who can use the method, as well as the material and financial resources to use the method.
- **Appropriate:** Appropriate to the environmental, cultural, and political context of the project.

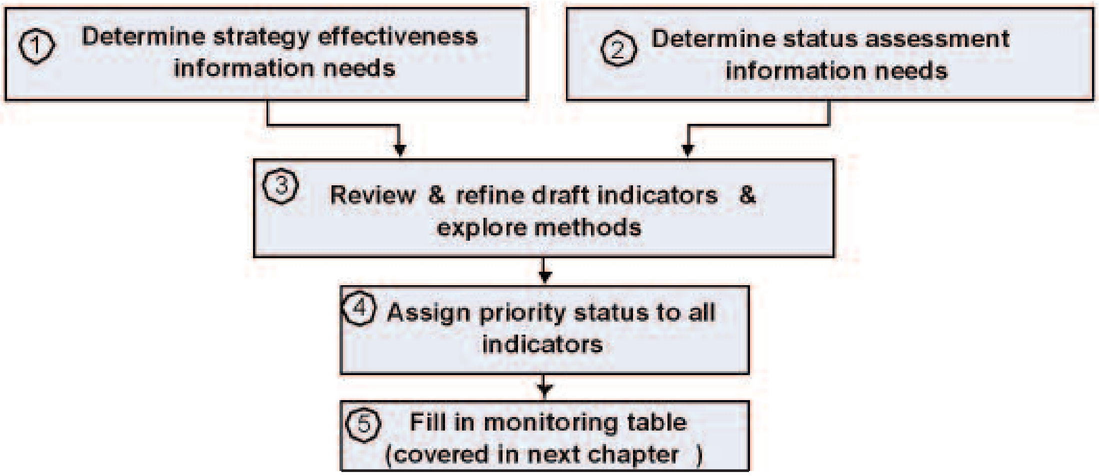
Instructions on providing additional details to complete a monitoring plan - who, where, when, and cost information - is covered in the following chapter - *Step 8: Develop Work Plans.*

Commonly Used Methods

By completing steps 1-6 of the CAP Basic Practices process you and your project team will have done much of the work needed to design an effective program to measure your conservation results. These earlier steps outline the desired outcomes and key assumptions underlying your project that serve as the basis for your measures plan. Well-defined objective statements and strategic actions (*Step 6: Develop Strategies*) identify threat-based and action-based indicators to measure. The threat summaries (*Step 4: Identify Critical Threats*) and diagrams from your situation analyses (*Step 5: Complete Situation Analysis*) will suggest additional candidate indicators. Initial viability analyses identify candidate key ecological attributes and indicators for measuring the impacts of actions on targets or for periodic tracking of their status (*Step 3: Assess Viability*). If your project team invests the up-front time in these design steps, then deciding what to measure and developing your measures plan will be straightforward.

Commonly used methods follow the sequence of numbered steps in Figure 1.

Figure 1. Commonly Used Method for Developing a CAP Measures Plan



1. Determine Strategy Effectiveness Information Needs

You should start by identifying what information is needed to track the effectiveness of strategies being implemented by your project. Resources are being spent to achieve desired results and you need to know whether the current course of action is showing progress and should continue or is not showing progress and should be revised.

Every stated objective should have at least one indicator used to track progress towards achieving the desired results. The number and type of strategy effectiveness indicators needed per objective will vary depending upon the complexity, risk, or uncertainty associated with the strategic actions being implemented. If your project team has developed good viability assessments and written clear and measurable objectives and described the strategic actions needed to achieve them, you will already have the most important information you need to identify priority strategy effectiveness needs and corresponding draft indicators.

In many cases, the selection of strategy effectiveness indicators is very straightforward. Because most strategies focus on abating critical threats or improving degraded key ecological attributes, strategy effectiveness information needs are often associated with the highest ranked threats and the key ecological attributes of targets that are of greatest concern to the project team. Indicators for measuring the effectiveness of strategies should correspond to threats listed in the threat summary table and/or to key ecological attributes of concern listed in the viability assessment. Consider the following examples of strategy effectiveness indicators for objectives from actual Conservation Action Plans:

Project: Cookson Hills
Objective: Secure legal protection on 18,000 acres by 2015
Indicator:
- Acres in legal protection (addresses critical threat)

Project: Bering Sea

Objective: Reduce current (2005) number of albatross caught in longlines & nets by 50% by 2010 in US waters and by 2015 in Russian waters

Indicators:

- Short-tailed albatross incidental take (addresses critical threat)
- Short-tailed albatross breeding population size (from target viability assessment)

Project: Lake Wales Ridge

Objective: By 2013, climbing ferns have been completely eradicated from within 10 miles of all conservation properties

Indicator:

- Number and aerial extent of climbing fern locations (addresses critical threat)

Project: Current River

Objective: Achieve and maintain less than 20% in-stream grazing in target creeks.

Indicator:

- Percent of stream subjected to in-stream grazing (addresses critical threat)

Project: Cookson Hills

Objective: Protect all caves in the Conservation Area from human intrusion by 2008

Indicators:

- Evidence of anthropogenic disturbance (addresses critical threat)
- Bat diversity/ abundance (from target viability assessment)

These five examples illustrate strategy effectiveness approaches that rely on indicators of critical threats and/or target viability. For situations where strategic actions are aimed at underlying causes behind critical threats, consider selecting indicators at key steps along the causal chain that connect the action(s) to the target. For example, consider the following objectives and strategic actions for the Andean Bear target from the Condor Bioreserve in Ecuador where bears are killed due to conflicts with livestock grazing.

Goal: Andean Bear / Population size of at least one adult bear per km^2 of available habitat.

Threat: Illegal hunting of Andean Bears

Objective: By September 30 2007, 50% of Andean bear conflict hunting has been reduced over 2000 hunting levels in three critical sites of the CBR: Oyacachi, Cosanga and Cuyuja.

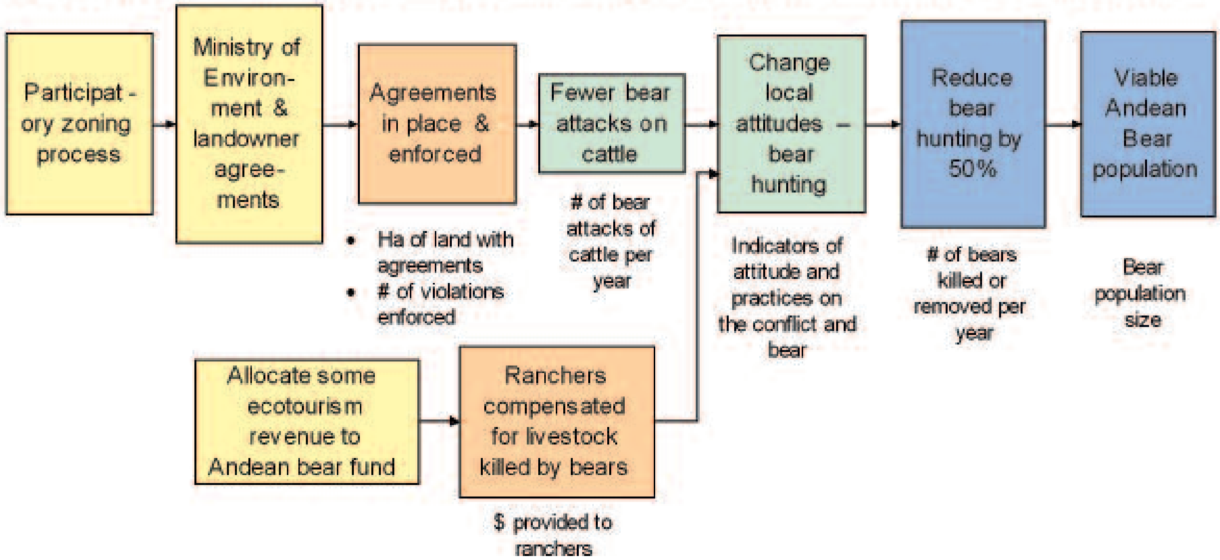
Strategic Actions:

(1) Work with private land owners and communities to create separate land use zones for cattle grazing and bear conservation areas to reduce the hunting of Andean bears due to conflicts with cattle grazing, especially in Oyacachi, Juan Montalvo and Cosanga.

(2) Allocate some ecotourism revenue to an Andean Bear fund to compensate ranchers for cattle killed by bears.

The project team has made the linkage between the actions they are taking and their desired results explicit through the use of a Results Chain diagram (WWF and FOS 2005) as shown in Figure 2.

Figure 2. Results Chain for the Andean Bear focal target at the Condor Bioreserve project in Columbia



The indicators listed below the factors are *potential* indicators for measuring the results of the actions being taken. The project team needs to decide which indicators are most important and/or feasible to monitor with available resources. If the objective is to cut in half the number of bears killed each year and you suspect the primary motivation is conflict with cattle, it seems you would at least want to keep track of # of bears killed, # of bear attacks on cattle, and some periodic estimate of the bear population itself.

The Results Chains tool is very useful for guiding the selection of strategy effectiveness indicators. See *Resources and Tools* for instructions and examples of completed Results Chains (WWF-FOS 2005).

The CAP Workbook includes a data entry wizard - the Strategy Identification Wizard - that makes is easy to associate threat-based, target-based, or any other indicators to your stated objectives. The threat summary table includes a utility that makes it easy to link your indicators to specific threats (double-click on threat-threat ranks to open the utility).

2. Determine Status Assessment Needs

Your draft strategy effectiveness indicators likely address most of your critical threats and a subset of the key ecological attributes of your focal targets. You should review the threats and key ecological attributes that are not the focus of your current action plan to identify additional potential status assessment indicators to monitor.

Start by reviewing your threat summary table. Are there threats that are not the subject of current actions, perhaps with Medium or Low ranks, that raise sufficient concern to warrant measuring? Undesirable changes in these threats may trigger new conservation action. For example, you may currently consider illegal timber harvesting to be a Low-ranked threat but confidence in the threat rating was weak so you may ask rangers and other project staff to keep records of any newly cut stumps they observe on routine visits through the project area.

Add additional threat-based status indicators into the CAP Workbook by double-clicking on target-threat ranks in the Threat Summary Table and using the "Add Indicators" utility.

Next, review the indicators from your target viability assessment. The viability assessment process often generates lists of Key Ecological Attributes and Indicators that exceed the capacity of project teams to assess on a regular basis. Thus, it is important to identify the indicators that are most important to regularly measure. Some of the viability indicators will have already been selected for strategy effectiveness purposes and likely represent the highest priority viability indicators for measuring (the monitoring table in the CAP Workbook lists all viability indicators and shows which ones are linked to the project's objectives).

Identify key ecological attributes and indicators where you have hypothesized a connection to potentially critical threats but where uncertainty in target status is serving as a barrier to taking action. Improving the understanding of the status of these key ecological attributes and indicators will inform pending conservation action decisions. For example, you may know that periodic flooding is necessary to lead to riparian forest recruitment events but you don't yet know whether upstream water uses are sufficiently altering the flow regime to prohibit recruitment. Measuring an indicator of riparian tree recruitment will help you determine if strategies affecting upstream water management are needed.

It will be less important to regularly measure viability indicators associated with key ecological attributes confidently assigned to Good or Very Good status ratings that are not associated with critical threats. Lower priority ranking may lead to the selection of less costly measurement techniques (qualitative vs. quantitative methods) or less frequent assessment intervals.

3. Review and Refine Draft Indicators and Explore Methods

When people think of measuring results, they also often think of complex methods involving quantitative indicators that require specialized skills - for example, mark-recapture population monitoring of an animal population or counts of plants in rectangular quadrats. Methods, however, do not need to be complex or sophisticated and indicators can be quantitative or qualitative. In fact, if you can get the information you need using a simple, inexpensive method, it is far preferable to do this than to choose a complex, expensive method. While the information you gather may be less precise, it may be sufficient for the types of decisions you are making. When planning for measuring results, you need to keep in mind that it should be a relatively small portion of your project budget - a general rule of thumb is about 5-15% of your overall budget (this will vary considerably depending on the project and the actions being taken). If your methods for measuring results are too complex, you will not have enough money to implement actions and measure the results.

For example, consider the following alternative indicators and methods for tracking the abundance of an invasive plant population:

- **Indicator:** Patch location and size. **Method:** Detailed mapping of all patches of the invasive species using a global position system and management of the data within a Geographic Information System.
- **Indicator:** Population size. **Method:** Total census of all plants in the population.
- **Indicator:** Mean density or cover. **Method:** Quantitative assessments of density or cover in randomly positioned quadrats to estimate the average plant density or average cover with confidence intervals around estimates.

- **Indicator:** Relative abundance rank. **Method:** Qualitative estimates of abundance based on wandering transect survey method.
- **Indicator:** Presence/absence. **Method:** Quick site visit to determine whether the invasive species is present or not.

All of these indicators and methods are valid, but each varies in its level of effort, cost, and accuracy. You will need to balance the need for greater accuracy and precision with considerations of the risk and uncertainty of anticipated results and resource availability.

As you review the list of draft strategy effectiveness and status assessment indicators, consider the following tips for refining indicators and selecting potential methods:

- Use existing data sources
- Consider alternative methods
- Pursue locally-based solutions
- Measure surrogate indicators
- Evaluate potential indicators and methods using desired criteria
- Record a brief description of selected methods for each indicator

Use existing data sources

Before you invest time and effort into developing and implementing your methods for measuring results, you should determine if the data you need is available from existing, reliable sources. Assuming these methods meet the criteria for good methods, you should try to use this data rather than spending your project resources on collecting primary data. In some cases, you may not be able to get exactly what you need from secondary sources, but you should evaluate whether what you can get would meet your needs. If so, you should consider modifying your indicator so that you can draw on this existing source. For example, if you have identified the need to measure river flows, you may discover that a government agency has an automated stream flow gauge 10 miles upstream that provides a reliable enough estimate of stream flows within your project area and you may be able to download annual flow data from the internet. You should be careful, however, that your new indicator does truly serve as a good measure of your information need. Good sources of data include ongoing research projects and routine monitoring by scientific institutes, universities or government agencies.

Consider alternative methods

If existing data sources cannot meet your needs, consider alternative methods before selecting a particular approach. There is typically a wide range of potential methods to assess a given indicator. These methods vary in terms of specific measurement techniques, the use of statistical sampling methods, and the degree to which management treatments are spatially replicated and compared to themselves and/or to untreated controls over time.

There are typically many alternative measurement techniques. For example, measures of aerial extent of an ecological system can be measured directly on the ground by pacing or with measuring tapes, tracing polygons on aerial photographs and estimating cover with a grid-overlay, walking the perimeter of patches with a global positioning system, or collecting and analyzing geo-referenced satellite imagery. The size of animal populations can be assessed via a variety of methods including asking local villagers to report the number of animals they have seen or heard recently, conducting a complete census, using relative indices of abundance (e.g., track or scat counts), using mark-recapture techniques, or using distance sampling methods. Plant populations can be assessed via total counts, rank order estimates of abundance (e.g., 1-100, 101-1000, 1000-

10,000, > 10,000 individuals), demographic techniques, simple or nested frequency measurements, biomass estimates, or estimates of plant cover (e.g., ocular estimates, point-intercept, line-intercept, or direct cover measurements). See Elzinga et al. 2001 in the *Resources and Tools* section for an overview of many common measurement techniques for plant and animal populations.

You need to decide whether or not your methods will involve statistical sampling procedures. Sampling is the act or process of selecting a part of something with the intent of showing the quality, style, or nature of the whole (e.g., counts of plants gathered within randomly positioning quadrats used to estimate the overall population size with 95% confidence intervals). Many monitoring methods do not require sampling procedures. Sometimes, you can count or measure all individuals within a population. Other times, you may select qualitative approaches such as subjectively positioned permanent photo-points. If you do elect to use sampling procedures, there are many sampling decisions that must be considered including the selection of specific sampling units (e.g. quadrats, points, line transects), the size and shape of the sampling units, the arrangement of sampling units within the area of interest (e.g., simple random sampling, systematic sampling, stratified random sampling), whether sampling unit locations should be permanently marked or temporary, and the number of sampling units to sample. See the *Resources and Tools* section of this chapter for several good books to guide the selection of efficient sampling designs.

Assessing the results of specific conservation actions with a high level of scientific certainty requires an experimental research design with adequate levels of replication and controls. Although it is desirable to achieve strong scientific inferences regarding the consequences of your actions, competing demands on limited resources typically limit the opportunity for full field experimentation to assess the impacts of most conservation actions. You should pursue more rigorous experimental research designs when the uncertainty or risk associated with your actions warrants this higher level of scientific certainty. Even without a fully replicated experiment design, you can markedly improve the probability of learning whether actions being implemented are leading to the desired results by measuring a combination of indicators located at different positions along a results chain (see WWF-FOS 2006 for more information on Results Chains).

In many cases you or your colleagues will be aware of the range of methods available. If this is not the case you can learn about various methods by talking to experienced people, reviewing documents or manuals on the subject, taking courses, or scanning through examples of monitoring plans available through shared information systems such as TNC's Conservation Project Database (http://conpro.tnc.org).

Explore the use of locally-based monitoring methods

Locally-based monitoring methods embraces a broad range of approaches, from censuses by local rangers, inventories by citizen scientists, or using economic or resource use/extraction data from the very actors that may be creating threats.

There are many examples of manuals that guide the establishment of local volunteer monitoring programs. See *Resources and Tools* for links to the U.S. Environmental Protection Agency (EPA)'s published manuals for volunteer monitoring of lakes, streams, estuaries, and wetlands and the U.S. Forest Service's 2006 guide on Broadening Participation in Biological Monitoring: Handbook for Scientists and Managers.

Locally-based options may be particularly appropriate when local communities are actively using the natural resources within the project area. In some natural resource use cases, you can find an indicator that simultaneously informs threat status and target viability status.

Consider a situation where you are concerned about the potential downward trend in the population of some fished species. You could focus strictly on target viability measures and do underwater surveys where counts of fish by estimated size class are made for a fixed duration of time at numerous monitoring stations. Alternatively, you could take a completely threat-based approach where you track the number of fishing boats working in the area, number of fishing trips, or the number of people employed as fisherman. However, you could simultaneously track the threat and the target if you work with the fisherman to keep and share good catch records. Measuring trends in the total weight or volume of the catch, the size distribution (or simply the average size) of fish caught, and the effort required to obtain their catch (number of hours spent fishing) could yield valuable threat and target status information. For example, if it is taking fisherman more time to catch the same quantity of fish and the average fish size is steadily declining, you have reason to be concerned about the status of the fish population. Alternatively, perhaps a large marine reserve has been established nearby and more and larger fish are being caught with less effort providing an indicator of stable or increasing population size. In either case, as long as you believe your catch records are accurate and complete, you may not need separate underwater fish counts to assess the status of the fish population.

Similarly, if you are concerned about the over-harvesting of non-timber forest products, the most cost-effective assessment approach might be to measure harvest levels rather than directly measuring the population of plants in the forest. For example, if in year one it takes a villager an average of four hours to fill a basket with masuatake mushrooms and in year three it takes an average of 8 hours to collect the same volume of mushrooms, there is reason to be concerned about the status of the masuatake mushroom population, even without separate counts of mushrooms in the field.

See *Resources and Tools* at the end of this chapter for a set of 15 locally-based monitoring case studies (Danielsen et al. 2005).

Consider measuring proxy indicators

In some cases you cannot collect the information you need directly because data are too difficult, too expensive, or culturally inappropriate to acquire. In these cases you should consider measuring proxy or surrogate indicators. For example, you might use the number of orangutan nests as a proxy for the orangutan population size. Or if you are working to control a non-native plant species by having volunteer work crews annually pull out all established plants, you may rely on the number of person-hours it takes each year to control the population as a proxy measure of the abundance of the non-native species. A steady decline in the annual control effort needed to treat the population suggests a reduction in the abundance of the non-native species.

Evaluate potential indicators and methods using desired criteria

As you consider alternative indicators and methods, you should review and apply the criteria introduced in the “Defining Measuring Results” section, repeated here:

<u>Criteria for Indicators:</u>

- **Measurable** - Able to be recorded and analyzed in quantitative or in discreet qualitative terms.
- **Clear** - Presented or described in such a way that its meaning will be the same to all people.
- **Sensitive** - Changing proportionately in response to actual changes in the condition or item being measured.

<u>Criteria for Methods:</u>

- **Accurate** - Gives minimal or no error.
- **Reliable** - Results obtained using the methods are consistently repeatable.
- **Cost-Effective** - Not overly expensive for the data the method yields or for the resources available to the project.
- **Feasible** - Project team has people who can use the method, as well as the material and financial resources to use the method.
- **Appropriate** - Appropriate to the environmental, cultural, and political context of the project.

Record a brief description of the method associated with each indicator

The proposed method should be briefly summarized in the monitoring plan. If the method is not well known to those doing the measurements, it may be necessary to define and describe the method more fully in a separate document (see Slapcinsky & Gordon 2003 and Slapcinsky et al. 2006 in the *Resources and Tools* section for examples of monitoring plans for quantitative and qualitative monitoring from TNC's Florida Program).

> The monitoring table in the CAP workbook includes a field to record a brief description of the method and also includes a separate field to record the citation and location of a more detailed monitoring plan.

4. Set Priority Status for all Indicators

You have now developed the basic elements of a plan for measuring results by selecting strategy effectiveness indicators, status assessment indicators, and providing a brief description of the methods for measuring each indicator in a draft monitoring table. You should have also linked all indicators to objectives, targets, key ecological attributes, and threats.

The previous steps for identifying indicators and methods incorporated many priority-setting criteria. We have emphasized the importance of covering the project's strategy effectiveness needs before exploring the status assessment needs. We have placed higher priority on measuring high-ranked threats and the key ecological attributes of greatest concern. We have suggested ways of reducing the overall cost for measuring results, and thereby allow you to cover more of your measures needs, by using existing monitoring data collection efforts, engaging local participants in the data collection efforts, and considering qualitative approaches. Still, it may not be possible to implement all identified indicators in the early phases of a conservation project. Consider assigning a priority status to each indicator to help ensure that the most critical indicators are measured first. Within the CAP Workbook, each indicator can be assigned a Very High, High, Medium or Low status within the Monitoring worksheet.

5. Complete Monitoring Table

You are now ready to complete more details in the monitoring table to set the stage for implementing the plan for measuring results. The additional detail includes specifying the following categories of information for each priority indicator:

- When (timeframe & frequency of data collection)
- Where (location of data collection)

- Who (people responsible for data collection, data management, and analysis)
- Cost (of monitoring the indicator)
- Funding source
- Current indicator status (measurement value and date)
- Complete monitoring plan (reference and date)
- Summary report (reference and date)
- Implementation status

Guidance associated with completing the monitoring table is covered as part of the next chapter, *Step 8: Develop Work Plans.*

Opportunities for Innovation

- **Share your approaches for measuring results.** Developing and implementing effective and efficient plans for measuring results has lagged behind many of the other steps of the CAP process. Sharing your measures plans via The Nature Conservancy's web-based Conservation Project (ConPro) Database (http://conpro.tnc.org) will facilitate the exchange of ideas and new approaches for measuring the results from conservation projects. Attach Results Chains and any descriptions of tips or innovations you've used as ancillary files to your ConPro project records.
- **Engage local stakeholders in your measures activities**. Explore ways to engage the people who live or work in or near the project area in collecting your measuring results information. Locally-based methods embrace a broad range of approaches, from self-monitoring of harvests by local resource users themselves, to censuses by local rangers, and inventories by amateur naturalists or using economic or resource use/extraction data from the very actors that may be creating threats. See the Danielsen et al. 2005 reference and website in the *Resources and Tools* section for 15 locally-based monitoring case studies.

Resources and Tools

Basic guidance and examples of developing and implementing plans for measuring results can be found in the following sources:

Danielsen F., Burgess N. and A. Balmford. 2005. Monitoring matters: examining the potential of locally-based approaches. Monitoring matters: examining the potential of locally-based approaches. Biodiversity and Conservation 14:2507-2542.
http://www.monitoringmatters.org

Elzinga, C., D. Salzer, J. Willoughby, and J Gibbs. 2001. Measuring and Monitoring Plant and Animal Populations. Blackwell Science. Massachusetts, U.S.A. 360 pp.
Note: This book has a companion website with many links to other plant and animal monitoring websites, online sample size calculators, online statistics tools and more.
http://www.esf.edu/efb/gibbs/monitor/popmonroot.html
Also: This work (except for the animal population monitoring sections and plant community section) is downloadable online at:
http://www.blm.gov/nstc/library/pdf/MeasAndMon.pdf

Herrera, B. 2006. Medidas del éxito en la conservación. In: Granizo, Tarsicio et al. 2006. ed. Manual de Planificación para la Conservación de Áreas, PCA. Quito: TNC USAID.
Note: This is the Measures chapter from the Spanish CAP Handbook. The whole document is available for download at:
http://conserveonline.org/workspaces/cbdgateway/cap/resources/2/2/Manual_PCA_Spanish.pdf/download

Herweg, K, K. Steiner, and J. Slaats. 1998. Sustainable land management: Guidelines for impact monitoring. A good, practical resource for conservation practitioners interested in designing monitoring systems and in specific methods, including low cost alternative approaches.
http://srdis.ciesin.org

Margoluis, R., and N. Salafsky. 1998. Measures of Success: Designing, Managing, and Monitoring Conservation and Development Projects. Island Press. Washington D.C. Measures of Success is a practical, hands-on guide to designing, managing, and measuring the impacts of community-oriented conservation and development projects. It presents a simple, clear, logical, and yet comprehensive approach to developing and implementing effective programs, and can help conservation and development practitioners use principles of adaptive management to test assumptions about their projects and learn from the results.
Book is available for free download in Spanish at:
http://fosonline.org/Resources.cfm

Pilz, David; Ballard, Heidi L.; Jones, Eric T. 2006. Broadening participation in biological monitoring: handbook for scientists and managers. Gen. Tech. Rep. PNW-GTR-680. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 131 p.
http://www.treesearch.fs.fed.us/pubs/24897

Salzer, D., and N. Salafsky. 2006. Allocating resources between taking action, assessing status, and measuring the effectiveness of conservation actions. Natural Areas Journal 26(3):310-316.
http://conserveonline.org/workspaces/cbdgateway/cap/practices/supportmaterials/bp7sm/Effectiveness_Measures_Salzer_Salafsky_NAJ_2006.pdf/download

Slapcinsky, J.L. and D.R. Gordon. 2003. MONITORING REPORT for Pine Rocklands for the Terrestris Preserve, Big Pine Key, Florida.
http://conserveonline.org/workspaces/cbdgateway/cap/practices/supportmaterials/bp7sm/PINE_ROCKLAND_2003.pdf/download

Slapcinsky, J.L., Pace-Aldana, B., and D.R. Gordon. 2006. MONITORING REPORT 2006 Paronychia chartacea ssp. chartacea on the Tiger Creek Preserve.
http://conserveonline.org/workspaces/cbdgateway/cap/practices/supportmaterials/bp7sm/Parochar_2006.pdf/download

USEPA 2006. Volunteer Monitoring. US Environmental Protection Agency website with resources for volunteer monitoring of Estuaries, Lakes, Streams, Wetlands, or Quality Assurance Project Plans.
http://www.epa.gov/volunteer/

WWF/FOS. 2005. Sourcebook for the WWF Standards: Results Chains.
http://conserveonline.org/workspaces/cbdgateway/cap/practices/supportmaterials/bp7sm/Tools-Results_Chain_2005-10-21.pdf/download

Conservation Action Planning

Step 8: Develop Work Plan for Actions and Measures

As summarized in TNC's CAP Overview of Basic Practices:

This step asks you to take your strategic actions and measures and develop specific plans for doing this work as your project goes forward. Specific questions that this step answers include:

"What do we specifically need to do?"
"Who will be responsible for each task?"
"What resources do we need?"

Expected outputs:

- Lists of major action steps and monitoring tasks, especially those needing to take place in the near future.
- Assignments for specific individual(s) and a rough implementation timeline.
- A rough project budget.
- A brief summary of project capacity (the project resources scorecard in the CAP Excel workbook is one tool to help with this summary).
- If needed, objectives and strategic actions for enhancing project resources.

The Importance of Developing a Workplan

A well developed workplan provides clear and specific guidance pertaining to the staffing, timeline and costs associated with the implementation of conservation actions. A workplan identifies the specific tasks that need to be completed, or in TNC parlance the strategic actions and action steps, associated with a conservation action plan. Additionally it defines the what, who, when and how of each of these actions. Finally, a good work plan lays out the monitoring tasks necessary for the project. The process of completing a workplan will also help a team identify gaps in the availability of critical resources and capacity necessary to achieve objectives.

Detailing the work involved to achieve stated objectives of a conservation action plan has many benefits. The workplan helps the project team to:

- Ensure all the essential tasks in the project are planned and reduces the chance of overlooking an essential step in completing the project
- Allocate tasks efficiently to individuals without duplication of effort
- Establish short-term priorities and individual performance expectations
- Establish a project schedule that can be tracked and monitored
- Set expectations for project progress and establish accountability
- Analyze problem areas more effectively
- Develop a more accurate budget

You developed the framework for your work plan in *Step 6: Develop Strategies* of the CAP process when you wrote objectives and strategic action statements. Planning at the strategic action level often describes a general course of action over several years. The more detailed work planning covered in this chapter is typically done for a shorter period of time, often annually, when you know who is available to do the work and have a better idea of what needs to be done.

Elements of a Workplan

After articulating conservation objectives and the strategic actions necessary to achieve those objectives, action steps and monitoring tasks are the next level of detail in planning for implementation.

Action steps are the specific tasks required to advance and make progress toward a strategic action. The workplan lays out the details of how a team along with partners, if applicable, will begin to implement these actions in the short-term.

> If you are using the CAP Workbook, this information will be recorded in the Strategies Worksheet.

> **Terms at a Glance**
>
> Strategic Actions - Interventions undertaken by project staff and/or partners designed to reach the project's objectives. A good action meets the criteria of being: linked (to threat abatement or target restoration), focused, strategic, feasible, and appropriate.
>
> Action Steps - Specific tasks required to advance and make progress toward a strategic action.
>
> Monitoring Tasks - Specific activities required to measure each indicator.

Monitoring tasks are the specific activities required to measure each indicator the team identified to track progress toward reaching conservation objectives.

> If you are using the CAP Workbook, this information will be recorded in the Monitoring Worksheet.

For action steps and monitoring tasks, a workplan will contain:
- List of action steps needed to accomplish a strategic action
- List of monitoring tasks needed to implement measures
- Start and end date for each action step and frequency, timing and location for each monitoring task
- Description of the method to be used to accomplish each action step or monitoring task
- Current status of the step/task
- Identification of person(s) responsible
- Estimate of labor and other costs associated with the action step, monitoring task or strategic action

A sophisticated workplan is only as good as the resources available to the project. If you have not done so already it is important to assess project resources and develop ways to address unmet critical needs (see *Step 6: Develop Strategies* and *Step 9: Implement Plan* for additional details). Elements of your project's capacity include project leadership and staff availability, funding, community support, an enabling legal framework, and other resources such as partner capacity and buy in from leaders. As you develop your workplan, it is important to consider how the current capacity in the project area matches up with the resources required to achieve this plan. If there is a rough balance, then you are okay. However, if you have greater needs than your current capacity, you may have to invest in developing new resources and/or scale back your plans.

Depending on your project team's preference, workplans can be developed at different levels of specificity, ranging from a broad summary of action steps and monitoring tasks for the whole project team for a year or quarter-year to specific detailed descriptions of work for specific individuals on the team for a given week or even day. No matter what time scale you use, your workplan will be more detailed for the immediate future (typically the coming two to four quarters) and then more general for out-years. Workplans are dynamic and should be revisited and refined frequently. Setting a revision schedule to review and enhance workplans at regular intervals will help ensure that implementation of conservation actions are being carried out in the most effective and efficient manner. A typical review interval might range from quarterly to annually.

Completed workplans are not meant to sit on a shelf. Adherence to the workplan requires consulting the plans frequently. Workplans also inform the project budgeting and monitoring processes and can be a useful reference for individuals' performance assessments.

Commonly Used Methods

Workplans

A workplan can be completed a number of ways. Workplans are typically developed by the project core team and partners, if partners will have implementation responsibilities. Outputs may include a written report, a spreadsheet associating persons, cost and time estimations for each task, and/or a Gantt chart showing tasks along a time line (Box 1).

> If you are using the CAP Workbook, the Action Steps Wizard will walk your team through the process of creating a workplan.

The following five steps are typically carried out during the process of developing a useful workplan:

1. Identify specific action steps that need to be done
2. Define “who” will be responsible for each action step
3. Determine when each action step will take place
4. Estimate resources required for each action step
5. Revisit and revise the workplan on a regular basis

Here each of these points is described in more detail.

1. Identify specific action steps that need to be done

Developing a workplan starts by reviewing the various activities that you identified while developing strategies and measures and determining which of these need to be implemented over the current planning period. These can be compiled in a table- the list of your objectives, strategic actions, and monitoring needs. You then need to take each activity and think about breaking it down into specific action steps or monitoring tasks that will need to be completed to accomplish the activity. Action steps should capture a discrete package of work that is assigned to specific individuals to complete over a relatively short time frame.

Each action step should be defined such that:

• It has clearly identified beginning and end points,
• The time and cost needs can easily be estimated,
• Its progress and completion can be easily assessed,
• It is distinct from other action steps.

In many cases, breaking down a strategic action into its component pieces is a relatively straightforward process and the full suite of necessary action steps can be identified. In some cases, however, where the work is more complex or new to the group, only the first few action steps to launch the work may be apparent. In this case, you may want to brainstorm a range of possible action steps, evaluate these possibilities to see which make most sense, and then, once implemented, frequently assess the effectiveness of the action steps to identify additional action steps that may be needed to fully implement the strategic action. In addition, if you find that an action step is difficult to define as outlined above, you may have to break it down into smaller pieces. It is often helpful to show the linkages or dependencies between strategic actions and between action steps - a dependent action is one that cannot start until a previous action has been completed.

The art of this process involves breaking down strategic actions into separate action steps, but not going too far. For example, an action step could be:

1. Hold a community meeting.

Or that action step could be broken-down into more specific sub-steps:

1a. Develop agenda for meeting
1b. Select and invite participants for the meeting
1c. Set up folding chairs for meeting
1d. Prepare the refreshments for the meeting
etc…

Most of the sub-steps in the above list could be broken down still further. It is up to the project team to determine the appropriate level of detail for their planning needs.

2. Define "who" will be responsible for each action step

As you develop your action steps, it is also important to define who will be responsible for it across your project team members, consultants, and partners. The following factors should be considered when defining responsibilities for a task:

- Skills and knowledge required for the action step
- Availability of individual - does the person have the time to do the work?
- Individual's interest in the action step
- Organizational structure foreseen for the whole project
- Level of authority or positional power required for the action step
- Natural groupings of action steps

In addition to defining who is responsible for completing an action step, some planners also like to decide who is accountable for overseeing that the step is completed, who must be consulted in undertaking the step, and who must be informed about the results. One additional benefit of defining who is responsible for each action step is that doing the overall project workplan also then helps set up individual performance assessments.

3. Determine when each action step will take place

As noted above, for each action step you should estimate either, a start date and end date, and/or the total number of days required to complete the step. The accuracy of a step's time estimate usually depends on whether you have done similar work in the past. Where this experience is lacking, sometimes you just need to accept this uncertainty and get on with the step. It is important to make the project schedule realistic and take into account everything from dependencies between action steps to holidays to other activities that project staff have to do.

Box 1: The CAP Workbook Outputs.

The workbook produces types of workplan outputs displaying (1) Objectives, Strategic Actions and Action Steps; (2) Gantt Chart by Strategic Action and Action Step; and (3) Action Step Detail.

Strategies

Berkshire Taconic Landscape

#	Objectives, Strategic Actions and Action Steps (1 of 8 objectives displayed)
Objective	**By 2008, improve the condition of the Northern Hardwood Matrix forest target by reducing the mean percent cover of invasive species to less than 5% across at**
Strategic action	Implement Weed It Now Program focusing on reducing the mean percent cover of invasive species in the matrix forest to less than 5% by 2008.
Action step #1	Complete annual monitoring of target and non-target impacts from treatment of invasive species.
Action step #2	Secure contracts for invasive species treatment and monitoring. Complete relevant permitting at federal, state and local levels annually.
Action step #3	Secure federal funding through congressional earmark submitted by three legislators from the BTLP regions (MA, CT, NY) and channelled through NRCS.
Action step #4	Secure private and public landowner permission for invasive species control on their lands.
Action step #5	Survey for presence/absence of invasive species along roads, trails and off-trail plots within the matrix forest boundary.

#	Strategic Actions with Steps (1 of 11 strategic actions displayed)	Start Date	End Date
Strategic action	Implement Weed It Now Program focusing on reducing the mean percent cover of invasive	Jun-00	Nov-08
Action step #1	Complete annual monitoring of target and non-target impacts from treatment of invasive species.	Jun-02	Nov-08
Action step #2	Secure contracts for invasive species treatment and monitoring. Complete relevant permitting at federal, state and local levels annually.	Apr-01	Oct-08
Action step #3	Secure federal funding through congressional earmark submitted by three legislators from the BTLP regions (MA, CT, NY) and channelled through NRCS.	Jan-01	Feb-07
Action step #4	Secure private and public landowner permission for invasive species control on their lands.	Mar-01	Oct-07
Action step #5	Survey for presence/absence of invasive species along roads, trails and off-trail plots within the matrix forest boundary.	Jun-00	Aug-00

#	Strategic Actions with Steps (1 of 11 strategic actions displayed)	Person Responsible	Start Date	End Date
Strategic action	Implement Weed It Now Program focusing on reducing the mean percent cover of invasive species in the matrix forest to	Jess Murray, Ecological Restoration Coordinator	Jun-00	Nov-08
Action step #1	Complete annual monitoring of target and non-target impacts from treatment of invasive species.	Contractor	Jun-02	Nov-08
Action step #2	Secure contracts for invasive species treatment and monitoring. Complete relevant permitting at federal, state and local levels annually.	Jess Murray, Ecological Restoration Coordinator	Apr-01	Oct-08
Action step #3	Secure federal funding through congressional earmark submitted by three legislators from the BTLP regions (MA, CT, NY) and channelled through NRCS.	Jess Murray, Loring Schwarz, Willie Janeway, Linda Orel, David Sunderland	Jan-01	Feb-07
Action step #4	Secure private and public landowner permission for invasive species control on their lands.	Jess Murray, Ecological Restoration Coordinator	Mar-01	Oct-07
Action step #5	Survey for presence/absence of invasive species along roads, trails and off-trail plots within the matrix forest boundary.	Kay Sadighi	Jun-00	Aug-00

4. Estimate resources required for each action step
As you develop each action step, you should also estimate the monetary cost of completing the step as well as describe any other resources that will be required. There are essentially four major types of costs associated with any activity:

- Labor
- Materials
- Other direct costs (travel, telephone etc.)
- Indirect costs (i.e. overheads - office rental, utilities, administrative costs)

For most action steps in conservation projects, the largest expense will be labor -staff, consultants or partners - which is why it is important to identify who is responsible and estimate how long each activity will take before estimating the financial cost. You need to judge on a per project basis how accurately you need to identify and allocate costs at the action step level. Usually it is useful to have reasonable estimates in place to help you produce budgets, but don't make it a long exercise. Within the CAP workplan, project teams can either estimate costs at the level of strategic actions or at the scale of action steps. If cost estimates are entered for action steps, you have the choice of having the CAP Workbook tool automatically add these costs to report on overall cost of each strategic action.

5. Revisit and revise the workplan on a regular basis
As stated above, if a workplan is truly being used to guide a project's activities, then the project staff should be consulting regularly. It is also good practice, however, to make time to formally review and revise your workplan at least annually and perhaps quarterly. Workplans must be followed, updated and maintained to reflect an accurate picture of current status. In a multi-year project, you should produce a new workplan as part of your annual planning cycle.

Monitoring Plans

In *Step 7: Establish Measures*, you developed the basic elements of a monitoring plan by selecting strategy effectiveness indicators, status assessment indicators, a brief description of the monitoring methods, and assigned a priority rank to each indicator in a draft monitoring table. You should have also already linked all monitoring indicators to objectives, targets, key ecological attributes, and threats. In this step, you will complete more details in the monitoring table to set the stage for implementing the monitoring plan. This includes determining:

1. When- time and frequency of data collection
2. Where - location of data collection
3. Who - people responsible for data collection data management and analysis
4. Cost- of monitoring the indicator
5. Source of funding
6. Current status of indicators - measurement value and date
7. Completion of the monitoring plan - reference and date
8. Summary report - reference and date
9. Implementation status

Each of these steps are explained in further detail below. Table 1 below shows an excerpt of the monitoring table from the Condor Bioreserve Project in Ecuador.

1. When (timeframe & frequency of data collection)
You should define how frequently the monitoring indicators will be measured and the appropriate time of year to collect the monitoring information. Consider the following factors:

- **Time period to effect change.** Some desired results will occur more rapidly (e.g., many changes related to threat abatement) and require more frequent monitoring intervals whereas other desired results (e.g., those involving changes in key ecological attributes) will often take longer to achieve. Specify a monitoring interval that fits logically with anticipated changes.
- **Natural variability of the phenomenon to be monitored**. For example, if you are working to restore the natural flow regime of a river system, you will likely need measurements collected throughout the year to capture high flow and low flow conditions.
- **Seasonality issues in terms of data availability and variation**. For example, measures of vegetation cover will vary significantly through the growing season. It is import to time monitoring visits to a consistent time of the growing season so that data will be comparable over time.
- **Project life cycle**. It may make sense to collect and review data in advance of key project reviews, planning or reporting timings

2. Where (location of data collection)
Describe briefly the specific physical location or community where the monitoring will be carried out. As noted above, in many cases, secondary data can be downloaded or obtained from other sources.

3. Who (people responsible for data collection, data management, and analysis)
Monitoring can require extensive resources, especially commitments of project team members' time. It is important to ensure that the appropriate person(s) with the right skills are designated to handle these functions. Whilst multiple staff may be responsible for collecting and recording data, it is also important to have a single driving force and 'owner' of the overall monitoring process. You should state the name of the individual or the organization responsible for measuring each indicator and the name of the person in the project team responsible for getting the information (where this is not the same person). It is also important to systematically check, clean and code raw data as soon as you get it; store and backup your data, and then analyze and discuss your data to check if you are on track. If the person responsible for data management and analysis is not the same person responsible for data collection, you should also list these additional individuals and identify their responsibilities.

4. Cost (of monitoring this indicator)
For your own management purposes it is important to assess the resources required to do the monitoring. You should state the approximate financial cost and/or the amount of staff time that will be needed to monitor the indicator by the stated method. Within the CAP Workbook, there is a cost calculator that can facilitate estimating annual monitoring costs based on personnel and other fixed costs.

5. Funding source
Identify the source of funding for the monitoring of each indicator. Specify whether costs are covered by partners, grants, or as part of core operating budgets.

6. Current indicator status (measurement value and date)
If the current indicator status is known, this should be specified in the monitoring plan. The first measurements of indicators are often referred to as baseline data. Collection of baseline data is the first step in the actual use of the monitoring plan. It is critical that baseline data is collected early in order to inform the project design, and because all subsequent data gathered over the life of the project will be measured against the baseline.

The use of already existing data for a baseline is strongly encouraged, provided it is of acceptable quality and its source is adequately acknowledged. In some cases data may be available backwards through time (e.g. remote sensing or human population data). In this case it is will be possible to compare trends before and after the start date for the project.

In the monitoring plan you should provide the current status of the indicator and the applicable date (the date when the measurement was made). Within the CAP Workbook, current indicator status for viability indicators can be entered in either the viability worksheet or the monitoring worksheet. Current indicator status for threat-based or other indicators is entered in the monitoring worksheet.

7. Complete monitoring plan (reference and date)
The information listed above can be captured in table format, like the one available within the CAP Workbook (Table 1). However, this information provides only a brief summary of the monitoring approach. A more thorough description of the monitoring methods should be captured within a separate monitoring plan that includes sufficiently detailed descriptions and maps so that someone unfamiliar with the monitoring protocol could successfully gather an iteration of the monitoring data. The title and date of this monitoring plan should be included in the monitoring table along with a web link if the monitoring plan is available on the internet.

8. Summary report (reference and date)
The table format described above and shown below includes a field for the most recent monitoring data but it is important to regularly convert the monitoring data into information used to guide conservation management decisions. Summary reports should be prepared in a format and style appropriate to key audiences. The title and date of the most recent reports should be included in the summary table along with a web link if the monitoring plan is available on the internet. These reports should include short summaries that convey the main messages to guide managers and other key decision makers to appropriate management actions.

9. Implementation status
When the monitoring plan is initially developed, ongoing data collection may already exist for some indicators whereas data collection for other indicators may not have started yet. Within the CAP Workbook, each indicator can be assigned a “planned” or “ongoing” status and this will convey to any reviewers the current implementation status for the monitoring plan. Update the status at least annually to demonstrate progress implementing the monitoring plan.

Table 1. Condor Biosphere Reserve - Ecuador

Objectives and Indicator	Target, Category and Key Attribute References	Threat References	Methods	Priority	Status	Frequency and Timing	Location	Who monitors	Annual Cost	Funding Source*
Obj. By September 30, 2007 10,000 hectares are conserved in three critical area park in the buffer zones, maintaining vegetation cover and reducing the loss of natural vegetation.										
Number of hectares of natural vegetation cover in key areas outside P.A.	Low montane forest - - Size: area of available habitat	Expansion of agriculture frontier	Satellite image interpretation and field work	High	Ongoing	Every 3years	All CBR	EcoCiencia	$2,000	USAID - TNC Parks in Peril Project
Deforestation rate outside protected areas	Low montane forest - - Size: area of available habitat	Expansion of agriculture frontier	Multi-temporal studies: satellite image interpretation and field work	High	Ongiong	Every 3 years	All CBR	EcoCiencia	$2,000	USAID - TNC Parks in Peril Project
Number of hectares of available habitat	Andean Tapir -Size: Area of available habitat Andean Bear -Size: Area of available habitat	Expansion of agriculture frontier	Development of habitat availability models for target species: Andean Bear-Andean Tapir	High	Ongoing	Every 3 years	All CBR	EcoCiencia	$5,000	

Objectives and Indicator	Target, Category and Key Attribute References	Threat References	Methods	Priority	Status	Frequency and Timing	Location	Who monitors	Annual Cost	Funding Source*
0.5 By September 30 2007, 50% of andean bear conflict hunting has been reduced in three critical sites of the CBR: Oyacachi, Cosanga and Cuyuja.										
Number of Andean Bears killed by conflict hunting	Andean Bear -Size: Population density	Hunting	Interviews and field visits	High	Ongoing	Annually	Critical sites for conflict: Oyacachi, Cosanga	Parkguards and EcoCiencia	$3,000	USAID - TNC Parks in Peril Project
Relative abundance	Andean Bear -(Size): Population density from 1 site in CBR)	Hunting	Under development: combination of indirect records with genetic analysis, using spatial data	Medium	Planned	TBD	Oyacachi	EcoCiencia	$0	
Viability Status Assessment Indicators										
H-W index	Andean Bear -Condition: Genetic variability		Hair traps, genetic analysis	Medium	Planned	TBD	Oyacachi	EcoCiencia	$0	TBD

Objectives and Indicator	Target, Category and Key Attribute Reference	Threat References	Methods	Priority	Status	Frequency and Timing	Location	Who monitors	Annual Cost	Funding Source
Capacity 1. By 30 September 2007, key stakeholders, such as the Ministry of Environment and other institutions, and partners will increase their capacity to implement conservation strategies.										
Institutional strengthening			Institutional self-assessment tool: interviews with partners	High	Ongoing	Annually	Partners office	TNC		USAID - TNC Parks in Peril Project
# communities participating in management on P.A.			Multi-temporal studies: satellite image interpretation and field work	High	Planned	Annually	All CBR	TBD		
# partners and stakeholders using socio-environmental database			Development of habitat availability models for target species: Andean Bear-Andean Tapir	High	Planned	Annually		TBD		
Capacity 2. By September 30, 2007, legislation and policy on biodiversity and infrastructure projects are strengthened by developing two national proposals.										
Number of new biodiversity law proposals or laws approved				High	Planned	Annually		TBD		

Opportunities for Innovation

- **Adapting Project Planning Software to Conservation Needs** - The business world has developed sophisticated software programs for planning and managing projects - perhaps the best known is Microsoft Project. These powerful tools allow a project manager to list out tasks in a hierarchical format, assign resources, display the data in Gantt Charts and project calendars, and conduct critical path analysis to see where the rate limiting steps might be. They are designed, however, primarily for large complex projects in which there are many interchangeable parts. For example, if you are building a bridge, then you might be able to speed up your completion date if you add 4 more welders to the crew. Most conservation projects, however, have a different format - they tend to have many different tasks being implemented by the same small set of people. As a result, it is often hard to use these software programs to describe conservation projects. It would be useful to adapt this software to meet the specific needs of conservation projects.

Resources and Tools

Basic guidance and examples of developing workplans can be found in the following sources:

CIDA. 1999. Planning and Reporting for Results. Strategic Planning and Policy Division, Canadian International Development Agency (CIDA) Asia Branch.
http://www.universalia.com/files/rbmbook.pdf

Washington State Dept. of Information Services. Project Management Framework Guidelines.
http://isb.wa.gov/tools/pmframework/index.aspx

European Commission. 2002. Project Cycle Management Handbook. EuropeAid Evaluation Unit.
http://ec.europa.eu/comm/europeaid/reports/pcm_guidelines_2004_en.pdf

Conservation Action Planning
Step 9: Implement Your Actions and Measures

As summarized in TNC's CAP Overview of Basic Practices:

Now you have your action and monitoring plans. They won't do any good sitting on the shelf - your challenge here is to trust the hard work you have done and implement your plans to the best of your ability. Implementation is the most important step in this entire process.

Expected Outputs
- Action
- Measures

The Importance of Implementing Actions and Measures

You have assembled a team of experts of all kinds. You have endeavored to have a shared vision of success, you have poured over all kinds of information and worked together long and hard, trying to understand where your efforts will make the most difference. All this has allowed you to define some strategies and action steps to take to make progress towards your objectives. Trust this hard work and now put your ideas into action. Implementation is the most important step in the project cycle. Without implementation of your actions, there is no conservation. Without implementation of your monitoring plan, you will have no information to let you know whether you are making progress or how to steer your course of action.

The other chapters in this handbook provide specific step-by-step instructions for going through the CAP process. In this chapter, however, there is not much step-by-step guidance that we can give you about implementing your project. Instead, we have asked some seasoned conservation project managers to share their “secrets” about getting started on a new project and maintaining momentum. Here's what they had to say.

Commonly Used Methods

1. Make sure the plan has at least one “owner.”
In the best of all worlds, the people who are key to implementing the plan should have been part of the planning process. If this is the case, you will have specific names next to individual action and monitoring steps in your plan. If this is not the case however, don't despair. If you have at least one person who is willing to push the plan forward, someone who is truly invested in the outcome and will champion the course of action, you can make progress on the plan. If this one person actively works to build trust by listening to and learning from others, always assumes that the people they hope to engage in the work are well-intentioned, and neither lays blame or cares who gets credit, they will not only move the plan forward, they will become the start of a caravan of action.

2. Take a few small steps right away.

Don't worry about having everything mapped out perfectly. Don't worry about knowing exactly what is the “perfect” or “right” place to start. There will be holes in the plan of action. Chances are, especially with a new project, many of the details will be vague. If this is the case, just take a few small steps. These can be as small as calling an expert to hear how they dealt with a similar threat or as simple as sharing your plan with your program's fundraising team. The single most important thing to do is to do something. Don't lose the momentum you have gained especially if your plan involved a lot of partners. Keep moving. Consider the act of developing the plan not an end point, but a launch.

3. Don't be stopped by fear of failure.

All too often, project teams are so worried about making a mistake that they become paralyzed and unable to take any actions at all. Accept the fact that you will make mistakes and trust that you will learn from them and correct them over time.

4. Look for early winners.

In general, whether your plan consists of strategies that are familiar to you or things that are completely new, look for action steps that are likely to provide your team and the project stakeholders at least a small taste of success fairly quickly. These kinds of things will build your team's confidence and inspire others to join you. In the Landscape Practitioners Handbook, Greg Low (2003) terms these actions “early winners.” He further recommends that you select those actions that “show early, tangible success that reinforces the interests and issues important to key constituencies.” This advice is particularly germane, when you are embarking on a complex strategy or one that is likely to be fraught with “perils or pitfalls” - for example, that could potentially engender bad feelings with an important stakeholder or opinion leader.

5. Look for “no regret” actions.

Related to but slightly different from the previous point is to also look for actions that are relatively simple and likely to be useful no matter what else you do. This is especially good advice if you are endeavoring to execute a strategy that is likely to be long-term and difficult. Get funding for additional law enforcement officers while you work on changing the regulations on snow mobiles in the National Forest. Install the mooring buoys on your way to developing a new zoning plan for the reef. Put in the channel markers as you are learning how to restore sea grass beds. Even though in the long run you know that these aren't the whole solution, they will be helpful in their own right.

6. Set up regular progress checks.

Assuming you have a work plan with the names of “lead” people associated with the actions, set up regular monthly calls with the leads to share progress. If that is too frequent, set up a time to meet in a few months for the express purpose of reviewing progress. Nothing breeds action like deadlines for some people. And if your project involves a number of partners, a regular time for sharing progress can set up a little “friendly” competition. Most of us don't want to be the one member of the team with no progress to report, especially twice in a row.

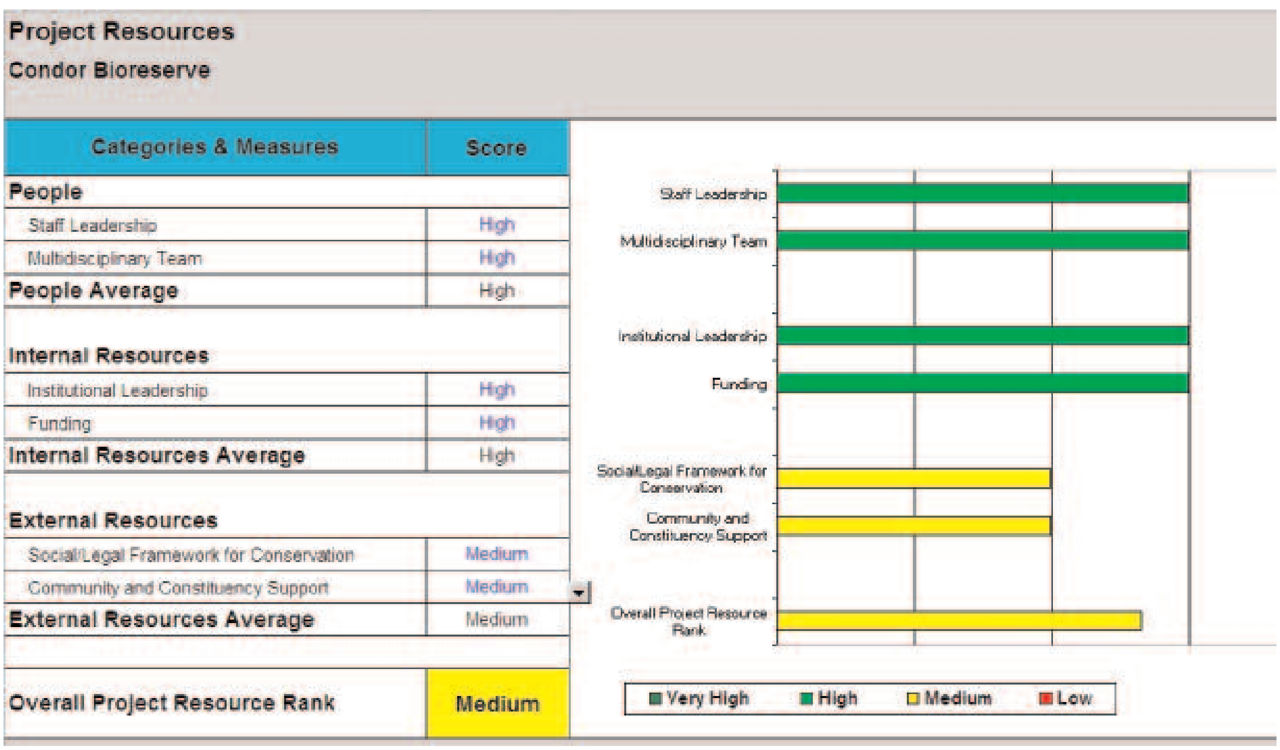
7. Invest in capacity.

Often your action plan will have an early step outlined for one or more objectives to increase capacity by hiring new staff or developing new funding sources. While these things aren't going to have a direct effect on your target's health like executing a prescribed burn in a savannah or removing a source of pollution in a stream, sometimes the best early actions to take involve increasing capacity to execute the work. One way to see if your project might benefit from early capacity investments is to do a quick capacity assessment.

In the "Resources" section of the CAP Workbook there is a short worksheet exercise to prompt you to think about your project capacity. This exercise asks you to "rank" the availability and skills of project leadership and the team necessary to execute the plan. It also asks you to consider the institutional and legal framework in which you must operate, whether these will be supportive or difficult environments. Similarly, the Resources worksheet asks you to consider whether or how possible it will be to have the support and positive involvement of key community and constituency and whether there is or likely to be sufficient operating funds to execute the plan. Box 1 shows the 6 Project Resources categories from the CAP Workbook. Resource ranks of Very High, High, Medium, or Low can be assigned to each category and help guidance clearly defines the specific criteria associated with each Resource rank.

When you take a little time to think about these questions or similar ones, you will determine where your capacity may not be equal to the tasks laid out in your plan of action. If it appears you have some serious deficiencies, consider investing your time in building some capacity as an early step in the process. The work of conservation of biodiversity in any one place is usually a long voyage, sometimes getting the ship provisioned properly first can be a wise investment.

Box 1. Project Resources Scorecard from the CAP workbook



Project Resources
Condor Bioreserve

Categories & Measures	Score
People	
Staff Leadership	High
Multidisciplinary Team	High
People Average	High
Internal Resources	
Institutional Leadership	High
Funding	High
Internal Resources Average	High
External Resources	
Social/Legal Framework for Conservation	Medium
Community and Constituency Support	Medium
External Resources Average	Medium
Overall Project Resource Rank	**Medium**

8. Find allies.

Building capacity doesn't always have to involve hiring new staff in your own organization or raising new money. Think about other organizations or members of your community who would value the intended outcome of this strategy. In particular, think about organizations or individuals whose work to date may be more similar to the work envisioned by this strategy. Go visit them as a first step. Share the logic of your CAP with them. Emphasize how the planning team decided this strategic action was critical to achieve the objective. If you have an idea of a specific thing you would like them to help with, ask. If not, ask them to help you lay out a game plan for moving forward. Chances are by asking their advice on "your" game plan, you will find that they will see themselves as implementing some of the steps in that game plan. Recognize that for this approach to implementation to work effectively, you have to be prepared to give up some control of how things are done at the very least. This is easier to do if you.

9. Keep your eye on the big picture.

Don't get attached to any action or way of doing things or one fixed sequence. When you developed the CAP, the ideas for how to achieve your objectives were based on the knowledge you had at that time. It is an absolute fact that players change, circumstances change and one step you take may lead to a place you never knew existed. Your strategic actions and/or action steps may in fact have to change as conditions change and as you learn more when your monitoring results start to come in. It is your objective that is likely to be largely fixed over time. Keeping some clarity on your objective and investing in monitoring the effectiveness of your actions will help you to understand whether to maintain, change or completely abandon a course of action.

10. With patience and perseverance, you will make progress.

Conservation is a long distance race. It is best to think about your work in this way and be ready to make a long term commitment. But as you travel, keep in mind Margaret Mead's insightful observation: "Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it's the only thing that ever has."

Opportunities for Innovation

The tips outlined above represent only a fraction of the collective wisdom that exists about implementing projects. If you have other thoughts or ideas that work for you, please be sure to share them with your peers!

Resources and Tools

Low, G. 2003. Landscape-Scale Conservation: A Practitioners Guide. The Nature Conservancy.
http://conserveonline.org/docs/2003/09/Landscape_Practitioners_Handbook_July03_--_NEW.pdf

Bernard, F.E. and J.M. Young. 1997. Ecology of Hope: Communities Collaborate for Sustainability. New Society Publishers, British Columbia.

Conservation Action Planning

Analyze, Learn, Adapt, and Share

As summarized in TNC's CAP Overview of Basic Practices:

This step first asks you to systematically take the time to evaluate the actions you have implemented, to update and refine your knowledge of your targets, and to review the results available from your monitoring data. This reflection will provide insight on how your actions are working, what may need to change, and what to emphasize next. This step then asks you to document what you have learned and to share it with other people so they can benefit from your successes and failures. Specific questions that this step answers include:

"What are our monitoring data telling us about our project?"
"What should we be doing differently?"
"How will we capture what we have learned?"
"How can we make sure other people benefit from what we have learned?"

Expected Outputs

- Appropriate and scheduled analyses of your data.
- Updated viability and threat assessments, as warranted.
- Modifications to your objectives, strategic actions, and work and monitoring plans, as warranted.
- Regular updates of project documents.
- Summaries of what you have learned, focusing on both process and results.
- Appropriate communication outputs for each key audience.
- Project's completed CAP Workbook (if available).

Importance of Analyzing, Learning, Adapting, & Sharing

Everyone working in the field of conservation faces so much uncertainty. We are often working to protect complex systems and species about which we know little. Many of our identified challenges are new things that we have not seen before or, if we have, it was in a different context. In a perfect world, we would have all the money and time we needed to do precise experimental research before we took any significant actions. But in the real world, we often lack the money or the time to experimentally test our strategies before putting them into action. If we do nothing while we wait for answers, we know that our beautiful river will continue to degrade or the rare parrot population will decline. Faced with this stark reality, we must act in the face of uncertainty.

Acting in this circumstance is absolutely defensible. But doing so without any means of evaluating whether we are making progress, or a way to learn about the best course of action for the future, is not. Two ecologists, Carl Walters and C.S. Hollings observed this dilemma in their work with large ecosystem restoration projects like the Black Sea and The Florida Everglades. What they saw prompted them to develop the concept of "adaptive management." Adaptive management recommends natural resource managers accept that they must move forward with insufficient knowledge, but that they do so in way that enables them to set up their management as a set of "testable hypotheses" based on their best understanding of the system. And that they monitor what happens in a systematic way so that they can "evaluate their hypotheses," learn what worked and what didn't and adjust their practice accordingly.

If you have followed the CAP process so far, you are set up to practice Adaptive Management. You have assembled the best information you have about your system. You have posited hypotheses about what your targets require to be viable over time. You have established objectives for success and identified a set of actions that are, in essence, a "hypothesis" of what it will take to achieve the objective and secure the viability of your targets. You have acted on this hypothesis by implementing your action steps and monitoring tasks.

Now what you have to do is analyze your information, relate it to your actions, make some decisions about what is or isn't working and determine how you will proceed based on this information. This is adaptive management in action.

Good analysis is one of the most important aspects of adaptive management. It allows you to systematically assess whether you are on track to achieve your stated goals and objectives, and to revisit the assumptions that you made and test whether they still hold true in light of any new information that has been gathered, and make informed decisions on any revisions that are needed. Analysis carried out at regular intervals will ensure that your project is kept on track and remains targeted towards achieving your goals and objectives.

Analysis is also the key to project team learning - the reflection and review that is undertaken leads to the identification of lessons that can add value to the next stage of your project and enable you to adapt your action and monitoring plans. It is this learning and adaptation that will enable you to capitalize on and replicate your successes and to avoid making the same mistakes over and over again.

Finally, conservation is not a one-time action, but rather a long-term endeavor. In almost all cases, conservation projects will need to last far longer than the involvement of any one person. Thus, it is critical that you capture and share the work you do and the knowledge you gain so your team and other practitioners around the world can benefit from what you have learned. Sharing what you and your team learn about good practice can magnify the impact of your project to a national or global level and can inform policy at a national and international level. Additionally, sharing your work can be a testament to your team's discipline, rigor and professional commitment and can be a way to improve your project's visibility and credibility for future funding.

Defining Analyzing, Learning, Adapting, & Sharing

Analyzing

Analysis is essentially about converting the raw "data" that your project team has collected through implementing your monitoring and or by conducting a systematic review of your actions to date into information that will provide feedback to you on progress towards your specific objectives and shed light on the fundamental questions:

- Are things moving in the right direction?
- Are the actions you have taken having the effect you had hoped for?
- Is the status of your targets improving?
- Are you reversing known threats?

Sometimes the data are descriptive or qualitative observations that the project team will need to interpret. In other cases, data are quantitative measurements that have to be summarized in some manner so your team can interpret them. Whatever the source or type of data, they will only be of value if they are summarized in some usable form and used to evaluate the actions we have taken and what we have actually accomplished to date.

The specific analyses that you undertake are largely determined by the nature of the question(s) you are asking, the monitoring design that you employed, the type(s) of data that you have collected, the degree of precision you need to have in your answer, and your analytical skills (see *Step 7: Establish Measures*). There are hundreds of techniques for analyzing different kinds of data - far more than can be covered here. To learn more about specific analyses, such as how to calculate a mean and standard deviation, or how to do a regression analysis, you will have to consult a good statistical text. But whatever type of analysis you undertake, finding a way to involve your entire project team in discussing and interpreting the results, if not actually in doing the analysis, will greatly enhance the utility of this step.

It is also important to keep in mind that ultimately, analysis is not about determining whether a result is "statistically" significant, but whether it is "programmatically" significant. For example, you might have set an objective to raise local stakeholder income by 50%. After 3 years, you may find that your analysis of a sample of households shows a statistically significant increase of 20%. But obviously, this is still not programmatically significant.

Learning

Learning, in this context, isn't just acquiring a new piece of information. What we mean by learning is the active process of using the experience that you are engaged in and the information that you have obtained through analysing your actions and results to date to confirm, modify or change future actions. The process of learning we are looking for is one that results in confidence in your current activities or impetus for changes in action. This type of learning can improve the individual project's chances of success and enhance the effectiveness of the team in this and future conservation work.

This type of learning - having real experiences and evaluating and recording them with your peers in an atmosphere of open discovery - not only ensures that the team and its individual members will move from having a “gut feeling” about something “to having real knowledge born of experience.” It also ensures that the lessons learned will be more transferable to other circumstances and to other people.

Ideally, what you learn will not only enhance your work and the work of the project team, but it will elucidate ideas that are transferable to other similar projects across your organization or beyond as outlined below. In the work of conservation, learning - that is acquiring knowledge that will lead to change - should be happening all the time at many different levels, at the individual and project level but also at the level of the organization and ultimately across the discipline of conservation as a whole.

Not everything you learn will be valuable to the discipline as a whole. But to the degree that you can translate your specific experience to more general applications your efforts may have a magnified effect. The language of CAP, and its use as an adaptive management framework, is designed not only to encourage individual and project learning but also to enable cross project and organizational learning. To this end, The Nature Conservancy has developed a searchable data base populated by over 800 projects with fields analogous to the steps in the CAP process, to allow cross-project analysis, learning and sharing.

Adapting

Adapting is essentially about using what you have learned from your analyses to change and improve your project. In practical terms, it means regularly assessing progress towards your objectives, and reviewing and updating your strategic actions, action steps and monitoring tasks to ensure that your action on the ground is most effective. These updates will be informed by applying your learning to improve the viability and threat assessments and situation analysis. As you make changes, you should also document the reasons behind them so that others will understand what you have learned and why you made these changes.

Sharing

In the conservation field we can share what we learn in many different ways. We can publish articles in the professional literature, give talks or share posters at professional meetings, and/or share stories through our organizational newsletters or other informal newsletters. We can participate in on-line chats, societies, or any number of different types of working groups in our own organizations or beyond. How we share what we learn depends on our purpose for sharing and who we believe would benefit from what we learned from our experiences. Understanding why we want to share this information, who would benefit from knowing it, and how that audience is best reached are all part of the process of sharing effectively.

What we mean by sharing in this context has three primary purposes.

1. **To inform conservation peers engaged in similar work**. Conservation is a relatively new field and the challenges and tasks ahead of every single practitioner are great. Given this fact, actively sharing your most important findings with other professionals working on similar problems or in similar systems is a service worth performing. Who knows, your idea for establishing a new financing mechanism for Protected Area management, might be just what another team needs to help them in their area. Or telling them about something that didn't work for you could save them a great deal of precious time and resources.

2. **To solicit outside feedback and "compare notes."** Actively sharing what you did and what you learned with others in a peer review type of format can enrich your ideas and understanding more than if you have only your own team's "brain power" evaluating your work.

3. **To inspire and energize other practitioners and conservation supporters**. Sharing your work and findings - in stories and talks, popular literature, newsletters and other assessable venues - can be an inspiration to other practitioners, stakeholders, donors and conservation supporters.

Commonly Used Methods

There is obviously no "one-size-fits-all" method for analyzing what you have done, learning from your work, adapting your work and sharing your insights. So much depends on the type of project you are engaged in, the type of information available, the nature of what you learn, who you need to reach out to, and more. Furthermore, the discipline of analyzing, learning, adapting and sharing is the newest addition to the CAP process and as such, practical, specific examples for implementing this step in the process are still being developed. That said, in this section we offer a few key principles to keep in mind as you go through this step.

1. Analyzing

As described above, analysis is about converting raw data into useful information. Key principles include:

- **Commit to a Regular Cycle for Analyzing Your Progress** - Core members of the team need to commit to coming together to take stock of progress at regular intervals and after critical project milestones or events. Depending upon the complexity of the project, the size of your core team, location of team members, urgency of threats, type of information you are working with, the interval will vary. At the very least, your project team should convene once a year, to document actions taken, compile monitoring results, review and discuss data that has been compiled, discuss trends and issues as they relate to what you identified in your viability and threats analysis, and then take what you have learned and apply it to your project action and monitoring plans for the next year. A project team can gain even more from learning if it reflects on its actions and results after key project milestones or events. For example, reflecting on the execution of a prescribed burn, and applying the lessons learned to the next burn, will likely improve project performance.

- **Base Your Analysis on a Clearly Defined Set of Questions** - Using the information contained in your viability and threats analysis, and the logic inherent in the process that led you to your strategic actions, establish a set of questions to guide this review process. These questions should help to inform you about whether you are moving toward your desired goals and objectives by giving you a framework within which to assemble and relate the information you have available. You can establish these types of questions by following the trail of your thinking from the actions you are taking through to your objectives and targets to determine whether you are seeing the results you had hoped to achieve. WWF calls this process, "results chain modeling." (Box 2) By formulating a simple results chain you can make explicit the "hypotheses" that you need to test to determine whether your actions are having the intended results.

- **Start Your Analysis By Summarizing Your Raw Data** - As adults, most of us learn best by doing. This type of learning can result in having good "instincts" or "gut feelings" about something. But if we want to be able to truly understand, apply and share that insight (create transferable knowledge), we have to take it from individual "gut" feeling to well articulated and demonstrated cause and effect through some transparent type of analysis. In most cases, to conduct a systematic analysis, you first need to assemble the data that are relevant to your stated questions and conduct some form of summary analysis to make the information more accessible to discussion and review. For quantitative data, you might look at the maximum and minimum values for any given variable and compare it over time or its status in a similar area. Or for qualitative data, you might pull out the most meaningful responses to critical questions.

- **Use Your Data to Answer Your Defined Questions** - Once you have your summarized data, you use them to address the questions that you have identified. This analysis will typically involve making some kind of comparison - for example, comparing the population of a target species at one date to a later date or comparing average stakeholder household income in a village where you took action to one in which you did not take action. Statistical analyses can help you determine how much confidence you can place in your results. However, the main goal of analyses should not be to demonstrate statistical significance, but rather to demonstrate programmatic significance. A population of elephants may have had a statistically significant increase over time - but if it does not meet your state goal, it is still not programmatically significant.

- **Good Analysis Does Not Require Quantitative Data** - Often teams don't have quantitative data with which to conduct this analysis and review. Maybe it is too soon in the life of the project and the results are not yet available. Maybe the team doesn't have resources to gather a lot of quantitative data. Maybe, some questions that they are asking don't lend themselves to be answered by quantitative analysis. In these instances consider employing an After Action Review (Box 1). This simple, systematic approach will work to generate information and insights with or without hard data.

Box 1: Questions answered in an After Action Review:

1. What did we intend to accomplish through our actions? E.g., we thought that by presenting, at the re-licensing hearing, our assessment of the impact that the Big Bend Dam was having on the shad population, we would gain support for modifying its operations schedule.

2. What actually happened as a result of our actions? E.g., discussion during the hearing suggested that a majority of the licensing board is leaning against voting for removal of the dam.

3. What might have caused the actual results we observed? E.g., questions and comments by members of the licensing board suggest that the board is more concerned about the economic impact of lost power generation (increased power costs) than they are about the decline of the shad population.

4. What actions should we continue to take; and/or how do we think we can improve our actions? E.g., if we can demonstrate, through an economic analysis, that the loss of power generation is minimal and the potential revenues from the increased fishery more than off-set the loss we can generate support for modification of the dam schedule with a powerful constituency that may in turn sway board members.

5. What opportunities lie ahead in our project to test our thinking about how to improve our actions, and how can we test and review this thinking? E.g., the next hearing is in three months. We will commission an economic analysis and meet individually with each board member prior to that hearing to discuss our findings. Based on the feedback we get through these discussions, we will focus our presentation at the hearing on the points that seem to be most important to board members.

(Darling, Marilyn J. and Charles Parry. 2002)

2. Learning

Learning is the active process of using the experience that you are engaged in and the information that you have obtained through analysing your actions and results to date to confirm, modify or change future actions. Key principles include:

- Involve Your Entire Team in Analysis and Review - Involving as much of your project team as possible in your analyses will:
  - Enable the project team to explore underlying causes of how and why results were achieved (or not achieved) and seek practical ways to improve results and to focus on finding solutions rather than seeking to apportion blame if results did not turn out as planned.
  - Bring a range of perspectives, knowledge and experience to bear on an issue to find

solutions and ways forward.
  - Lead to the identification of lessons and good practice that can be shared to leverage a greater impact across other similar projects both within your organization and the wider conservation community.
  - Assist in providing a clear rationale to donors and partners on what changes need to be made and why.
  - Share understanding of challenges faced, and ownership of decisions for change.

- **Invite Practitioners from Outside Your Team to Participate in Your Analyses** - In situations where there isn't a lot of hard data yet available, some teams have found it very helpful to invite known experts to join them in the field, reviewing their objectives and actions and evaluating first hand what is happening in their project. Especially in situations where the actions largely involve hands-on actions, e.g. reintroduction of prescribed fire, invasive species removal, removal of ditches, etc., or where the response of the targets may lag behind the actions by several years, this type of interim expert consultation can be very helpful. While it provides only anecdotal evidence, it can help to give project teams a sense of whether they are moving in the right direction, can elucidate flaws in their plan of action and stimulate suggestions for moving forward in the near term. Even when you are looking at hard data in your analysis and review, it is helpful to have a fresh perspective. Sometimes new eyes and new ears can see and hear things that you have become indifferent to or that you don't even realize are exciting breakthroughs. Also, especially in projects that have been underway for a long time, a kind of “group think” can set in where people accept something as fact because they have always done it that way or they don't want to disagree with a trusted colleague or they don't want to appear out of step with the other members of the team. A respected “authority” from outside the team can break through these group accepted interpretations and norms in ways that members of the team often cannot.

3. Adapting
Adapting is essentially using what you have learned from your analyses to change and improve your project. Key principles include:

- **Update Your Plan to Reflect Adaptations** - This is your chance to acknowledge what you know and what the holes are in your knowledge, and to update your project documents (e.g. CAP workbook). In particular, you should revisit your strategic actions, and work and monitoring plans, update the current status of monitoring indicators, and update your project documents including the viability, threat, situation diagram and capacity tables in your CAP Workbook or the ConPro database. This may involve minor adjustments to a work plan, or it may involve a formal iteration through all the steps in the CAP process.

4. Sharing
Sharing involves documenting your work and communicating it to others. Key principles include:

- **Share Both Successes and Failures** - It is important to share not just your successes, but also the things that have not worked. Also, don't be afraid to share stories and anecdotes that illustrate what youhave learned, sometimes these can be the things some people find most compelling. To share your results effectively, you should think about who your key audiences are, what messages you would like to send them, and what channels would be most effective for reaching each of these audiences.

- **Share With Your Project Team Members** - Once analysis has been completed and documented, outputs should be shared with other team members, partners and stakeholders as appropriate to enable wider understanding of what is happening within the project and what changes need to happen and why. Doing this will help to ensure continued commitment to the project and buy-in for any changes.

- **Share With the Network of CAP Users** - By applying the CAP approach, you are immediately a part of a worldwide community of practitioners who "speak the same language" and may likely benefit from what you learned. You can easily reach this group by uploading your CAP workbook to a new searchable, web-based data base, Conservation Project Inventory (ConPro) at http://conpro.tnc.org. The database includes fast and powerful search capabilities using the language of CAP as search fields that can greatly facilitate cross-project learning and enable practitioners working on similar targets, threats, or employing similar types of conservation action to find each other where ever they are working. The CAP community also has a network of trained coaches who have agreed to support teams in the application of CAP, called the Efroymson Coaches Network. This network spans five continents and includes members from numerous organizations who are connected by the common language and approach of CAP and also by their commitment to helping teams apply the method successfully to their project. You can share your findings with this network by contacting a coach near you (http://conserveonline.org/workspaces/cbdgateway/cap/contact/).

  Another way to reach out to the CAP community is to develop a case study describing your approach to a particular aspect of the CAP process. All over the globe people are learning lessons about what works and what does not when it comes to accomplishing a step of the CAP process. These lessons are valuable to others and can be posted in the CAP Toolbox (http://conserveonline.org/workspaces/cbdgateway/cap/resources). The case study template is available at http://conserveonline.org/workspaces/cbdgateway/cap/practices/capcasestudyform.doc.

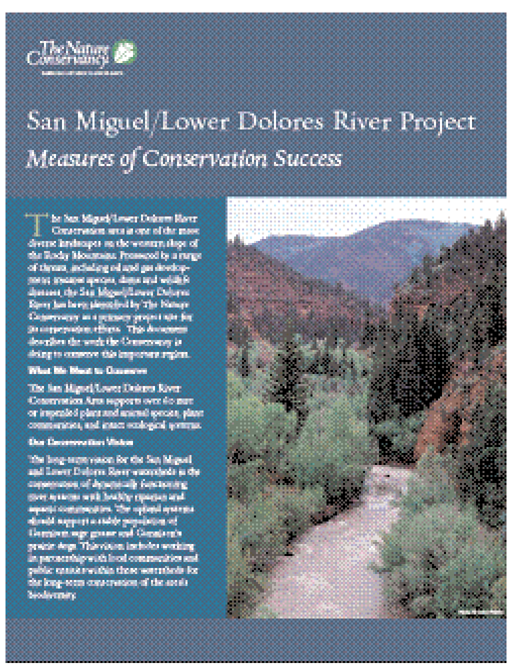
- **Share with Practitioners Doing Similar Projects** - The Nature Conservancy has developed learning networks largely organized around habitat types (i.e. marine and freshwater) or ubiquitous threats (invasive species and global climate change.) These groups of conservation practitioners provide a network for distribution of information and discussion of preliminary ideas and findings related to these specific topics. Box 3 provides some guidance on how to form and maintain your own learning and sharing group.

  Doing something that really works, doesn't have to be complex or even formally organized. Consider this example. Conservation project managers in the Southeastern United States working in restoration of upland pine systems in the mid-1980's faced a situation where they were doing something that no one had done before. A couple of them decided to host a one day field sharing event at their site. They invited a few people they had heard were working to implement restoration projects in other parts of the region to compare notes. The invitees knew of others and the first field meeting was attended by a dozen or so people. The participants all learned something new. They heard about promising practices that others were experimenting with and what people had tried to do and failed. The hosts got some great specific suggestions for their project. The host agreed to summarize the discussion in a short white paper. That group met annually for almost a decade at different sites actively engaged in restoration projects. The format changed a bit over the years but it always involved practical exchange of the most up-to-date ideas about what was working and not working in the evolving practice of upland pine habitat restoration among the most active experts with a minor investment in time. The participants became the core dispersal network for important advances in this area of upland habitat restoration.

A venue that has become available for members of the conservation community to use to share information readily and find others interested in and working on projects similar to yours on the internet is http://conserveonline.org. ConserveOnline provides free workspaces for conservation teams to share materials and work in a virtual way with each other. And it also contains a library of conservation information that any user can search and populate with papers, reports, plans and other products of their work. Participating in this on-line conservation commons is one way to share your work and also to find information and others who might inform you ideas.

- **Share Within Your Own Organization** - Most conservation organizations (public and private) have their own newsletters, websites, magazines and other communication venues. These outlets may be specific to the practitioners in your organization, the members, the donors or any number of other groups that together make your organization work. Sharing a great story about what your team did backed up by real data, can be an inspiration to donors or management to further support not just your project but others like it. Figure 1 shows the cover of a summary report that one conservation program regularly compiles when they complete a CAP plan. In this report they extract the key information from their CAP process and display it as an attractive summary of the plan to use as a general communication tool for their project. By providing this summary, with beautiful photographs and colorful tables from their CAP workbook, to their fundraising staff for example, they provide that part of the organization's team with straightforward facts and sound bites that can be easily communicated with current or potential donors in an attractive and assessable format.

Figure 1: The San Miguel report is an example of a useful product for communicating the outcomes of a Conservation Action Plan. This report can be viewed in full at http://conserveonline.org/workspaces/cbdgateway/cap/resources/4/3/San_Miguel_CAP_document.pdf



Whatever or wherever you decide to share, remember that key to successfully having a significant impact is to:

1. Distill the innovation
2. Identify the audience that would benefit from the finding
3. Identify the venue most likely to actually reach that audience
4. Prepare the content in the form appropriate for that venue

Michael Tiemann, a vice president of Red Hat, a successful software company that relies on user innovation to develop new products, asserts that the rapid spread of innovative solutions requires a culture in which everyone commits to "learn it and pass it on." Whether or not you can commit to preparing your findings in the form that a select audience will find useful, we hope that you will consider taking one small step towards being a member of a learning culture and routinely share what you learn with a colleague or friend and urge them to "pass it on."

Opportunities for Innovation

- **Developing Simple Analytical Techniques** - The analysis step seems to present a large barrier to many project teams. All too often, teams collect large quantities of data that then never get analyzed or used. We need to develop simple tools that practitioners can use to conduct meaningful analyses.

- **Sharing Failures** - Although there is a lot of discussion about the need to share lessons about things that don't work, there is still a strong culture of hiding our failures. We need to find ways in which practitioners feel safe in sharing their experiences, both positive and negative.

Resources and Tools

Basic guidance and examples of analyzing, adapting, sharing and learning from conservation projects can be found in the following sources:

Conserveonline.org. Free on-line venue for working, sharing and learning about conservation.
http://conserveonline.org

Conservation Project Database is a searchable and editable web database containing core information from TNC's Conservation Projects worldwide.
http://conpro.tnc.org

Conservation Management Notes. Free online venue for reporting observations, discoveries, lessons, hints, tips, and mistakes to not be repeated for applied conservation project managers working in the Southeastern US.
http://conservationnotes.ifas.ufl.edu/

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Margoluis, R. and N. Salafsky. 1998. Measures of Success: Designing, Managing, and Monitoring Conservation and Development Projects.
www.IslandPress.org (English in hardcopy only)
www.FOSonline.org (Spanish online)

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Annex: Data Management[10]

The Importance of Data Management

One of the most critical aspects of good adaptive management involves managing the data that your project collects. As you design your project, and then especially once you have begun implementing your monitoring plan, your project team will begin generating many different kinds of data. As shown in Table 1 below, these data can include everything from the initial project boundaries sketched out on a map, to measurements of the population size of one of your biodiversity targets, to subjective assessments of stakeholder buy-in, to digital photos of project team members implementing a strategy.

During the Conservation Action Planning process, teams accumulate data to help inform decisions such assessing target viability or determining threat ratings. Additionally, TNC project teams typically invest considerable time and money into monitoring as part of their project work. As a result, we end up with lots of data from many different sources. Unfortunately, all too often these data remain in the project team's notes or on survey forms. And even if these data are transcribed to a central location, these data can quickly become outdated or obsolete, be misinterpreted through poor or inadequate documentation, or can even, at times, go missing entirely, especially if files are not maintained and backed up on a regular basis. The quality of our conservation work is directly related to having reliable, credible, and current information upon which to base our work.

Establishing and using a consistent data management framework will enable more effective use of the data by conservation projects and programs. As a general rule, the more standardized the structure and content of the database, the more effectively it can be used by both humans and machines (FGDC 2006). Properly managed data:

- Enables the project team to explore the source, quality, and details of the underlying data behind decisions and therefore help to explain how and why results were achieved (or not achieved). In other words, it is central to performing adaptive management.
- Facilitates the engagement of stakeholders through easy understanding and sharing of data. When commonly understood information from a variety of sources is employed for decision-making, buy-in may, at times, be achieved more easily.
- Helps the team generate more comprehensive and attractive information products.

Establishing a consistent data management framework will also facilitate more efficient updates as the project evolves. In particular, it provides a clear rationale to project team members, donors, and partners on what data gaps exist and why these need to be addressed. It also helps project teams ingest standardized data from external sources and integrate them with internal data. It improves the transparency, accountability and learning of staff, partners and stakeholders by being able to retrace what data came from where. And finally, it is critical to ensure that data remain useable through time given the inevitable institutional memory loss and staff turnover.

10. Much of this material is adapted from Margoluis and Salafsky (1998) and from WWF (2005).

Elements of Data Management

As discussed above, implementing your action and monitoring plans involves putting your workplan into action and then monitoring your progress over time.

Data management is a process to ensure that diverse data sets can be efficiently collected, integrated, processed, labeled, stored, and easily retrieved through time by people who want to use them. In simple terms it could be taken to mean "a place for everything, and everything in its place".

Table 1. Different Types of Data and Where They Come From and Are Stored

Type of Data	Examples of Sources	Examples of Databases
Quantitative - data that can be represented as numbers including both continuous data measured along a scale & categorical data recorded in intervals or by groups	Biological censuses or transects of species, counts of poaching incidents, household stakeholder opinions recorded on a 4-point scale, numbers of tourists visiting a site	Paper logbooks, simple spreadsheet tables (Excel), relational databases on desktop computers (Access) or online servers
Qualitative - data that are not easily represented in numerical form	Stories from stakeholders or focal group interviews	Word processor documents, relational databases, folders of audio or visual clips
Spatial - data that are linked to specific geographic coordinates (typically quantitative, but could be qualitative)	Locations where animals have been poached recorded on a Global Positioning System (GPS) unit, boundaries of a national park	Paper maps in a file cabinet, Geographic Information (GIS) systems (Arc software products)
Financial - a special form of quantitative data that contain financial information	Business records, project operations	Spreadsheet tables (Excel), accounting software (ACCPAC or QuickBooks software)
Pictures & Images - photos, drawings, and other images	Before & after photos of a specific site, stakeholder drawings, conceptual models	Photo albums, slide files, computer file folders, album software
Video & Audio Clips - film, video, and audio materials	Recordings of stakeholder meetings, film clips of key project events	video library, computer file folders, archive software
Metadata - data about your other data; the documentation that accompanies any dataset	Lists of all your databases, descriptions about fields in a database, information about pictures in a photo album	Paper list, spreadsheet file

Commonly Used Methods for Data Management

Planning for data management should not be left until the moment when your project has already accumulated lots of data. Instead, you need to be doing this planning as you are designing your overall project actions and monitoring plan. For example, you should assign responsibility for data management as you are developing your project team in Step 1: Identify People Involved and you should think about what types of data you will be generating as develop your monitoring plan in Step 7: Measuring Results. Indeed, much of the data that you collect as you plan your overall project - for example information about your targets, threats, or key stakeholders - are data that you will need to manage even during this early phase. Likewise, data management itself needs to occur continuously over the life of your project. Data should be reviewed and transcribed as soon as possible after collection.

There is no one right way to manage the data for any given project. The specific tasks that you undertake will vary greatly depending on how large and complex your project is, how much data you expect to collect and use, and the technical capacity and resources of your project team. Some basic tasks to consider include:

1. Develop a table of the data sets you expect to have

The starting point is to develop a rough sense of what data sets you expect to have and how you will manage them. Much of this can be based on the information in your monitoring plan that you defined in *Step 7: Measuring Results*. Key points to include in your table (Table 2) are:

- **What data the project will collect** - Develop a list of the different sets of data that you expect to collect over the life of your project. You should also note the form that each set of data will be in - for example text-based stories, GIS map layers, or digital photos. This can be done through a written document, a spreadsheet, or a database - you are in effect creating a database of your potential data sets.
- **Who will collect and manage the data** - For each data set, list who will be responsible for collecting the data, who will be responsible for managing them, and who will use them. This can be in text form, or if you want to be very explicit, you could even develop a flow chart showing the process of how each data set will flow through your project. In particular, you should designate a specific individual to be in charge of each data set. In many larger offices, the overall responsibility for data management or at least oversight of data management will typically be given to a part or full-time data manager (see next task).
- **How and where data will be stored** - Determine what type of database you will use for each type of data. For example, you may wish to put quantitative data in a computer-based database, spatial data in a GIS system, and digital photos in a photo archiving software program. You should also determine whether the master copies of these databases will be on a central office computer, on a web-accessible server, or some other location.
- **Who will use the data** - Perhaps the most overlooked - and yet the most important - thing to consider in designing a data management is to think about who will ultimately be using the data. More than anything, your system should be designed so that the users can get the data they need when and where they need it. Otherwise, you are wasting your time.

Table 2. Example of Table of Data Sets for a Project

Data Set	Collectors & Managers	Storage	End Users
Results from marine transects: largely quantitative information about fish sightings, information about each survey	Collected by marine researchers on a monthly basis. Managed by project data manager.	Transcribed by researchers into Excel-based database at marine lab; should be backed up at project office	Used by project team members to measure health of coral reef target; this info conveyed to donors
Photos of damaged reef areas: photographs of coral reef areas linked to GPS coordinates	Collected by marine researchers once a year. Managed by project data manager.	Photos stored on marine lab computer in folder c://data/reefphotos. GPS coordinates and meta data in linked Excel spread sheet. Should be backed up at project office.	Used by project team members to measure health of coral reef target over time; this information conveyed to donors

2. Designate data managers

All program and project teams can benefit from the support of a data manager, who is able to collect information, perform complex analyses, produce quality maps, and administer all tabular and spatial information in an organized and efficient manner. The lead information manager/data manager would ideally be located in a field office and should be identified as early as possible in the development of the project to answer key information management questions and establish the data management structure.

Ideally data managers should be identified in *Step 1: Identify People Involved* with the definition of the initial team and responsibilities. If this role has not yet been assigned to anyone, someone needs to be assigned responsibility. For many projects or programs, lead responsibility for data management will probably be handled by staff with additional roles, but support in the set up of systems may need to be found from outside sources.

3. Develop codebooks, protocols, and databases for different kinds of data

As noted above, most types of data are only really useful if they are collected and then stored in a standard fashion. For example, if you will be conducting transects to sample the number of certain species of fish on a coral reef over time, you will want to record standard information about each transect such as the number of each species of fish encountered, the time of day the transect was conducted, the degree of turbidity in the water, and who conducted the survey. Likewise, if you will be conducting a household survey to determine attitudes of local stakeholders about a national park, you will want to record standard information from each interview.

Each piece of data that you collect can then be defined and recorded in a standard fashion that is recorded in a codebook for your project. This codebook, which is typically an annotated table or document, needs to specify how you will record each piece of data in a consistent and specific way. For example, you might specify that people use specific names for each fish species, that they record time in 24 hour format, that turbidity be measured on a qualitative 1-5 scale, and that project team members use their initials to record who conducted the survey. These codebooks should be developed by your data manager and monitoring teams and tested as you develop your data collection procedures. Wherever possible, as outline in Box 1, you should try to make use of existing data standards.

Once you have developed your codebook, you should also figure out your protocols for transferring data from collection points to the project's databases and then to the ultimate users. For example, if the person conducting the fish transects records data on an underwater slate, then they may have to take that information and record it on a computer once they have completed the day's survey work. Likewise, the person conducting the survey may have to take answers from their field notebook and transcribe them.

As you develop your codebooks and protocols, you also need to develop your long-term databases. Most conservation projects will use some kind of electronic storage mechanism. There are many different types of databases that are available to accommodate different types of data. For example, quantitative tabular data can be stored in simple spreadsheet programs such as Microsoft Excel, in relational databases such as MS Access, or in custom web-based databases. If you are using the CAP Workbook, then it will be the logical home for your many of the types of data you will use to develop a conservation action plan such as indicator ratings, threat ratings, and other information. Spatial data is typically stored in some sort of Geographic Information System (GIS). (Since nearly all TNC offices employ ESRI software as their main GIS tool, you should consider using ArcCatalog which provides a strong data management interface capable of establishing metadata, organizing the locations of file, and linking to ArcToolbox which in turn, allows for seamless import/export of files.) Financial data are typically stored in a spreadsheet or in accounting software. Photos and other images can be stored in an album program that allows you to catalogue each entry with custom, searchable data tags that contain information about each photo. Or they can be stored in a computer directory, using a pre-established convention for file names. Here again, as outlined in Box 1, you should make use of common standards in developing your databases wherever possible.

4. Develop metadata for all data products

Metadata is the documentation that accompanies any data set whether tabular or spatial. Metadata records information such as the source, reliability and scale of the data, the citation, appropriate uses of the data, and a contact person or agency. Metadata also documents the accuracy, projection and derivation of spatial data. The production of a metadata report for each data product is a vital step in data management. Tools for developing metadata are available online at http://conserveonline.org/workspaces/metadata/metadata_tools.

5. Review and transcribe data on a regular basis

The key step in managing incoming data is to implement the data review and transcription protocols that you have developed as soon as possible and as a part of normal operating routine. As a general rule, your project team members should try to transcribe their data as soon as possible after collecting it - all too often people allow data to pile up until it becomes overwhelming and then it never gets used. As you transcribe your data, it's also good practice to review and clean it up.

6. Clean and backup data

Cleaning data involves going through your data to catch any errors that were introduced during the collection, coding, or transcription processes. In particular, you should look for any gaps that may indicate missing date or for obvious outliers that signal some error. If possible, you should go back to the original data source to see if you can find the missing data or correct the errors.

Not backing up data on a regular basis is a mistake that almost everyone has to make for themselves before they truly appreciate the importance. Data managers should develop regular protocols for backing up data by making multiple copies and ideally, putting these copies in different physical locations.

7. Use and share data!

Data do no good if they just sit in a database. You thus need to make sure that your project analyzes data and puts them to use to inform adaptive management. In addition, you should contribute your data to larger data sets as outlined in Box 1. For example, you should upload your project data to the TNC Conservation Project database (http://conpro.tnc.org).

Box 1. Standards That Enable You to Contribute Your Data to Larger Data Sets

One of the most important places you can contribute your data are to the growing number of databases that are developing at national, regional, and global levels around the world. If you contribute your data, then other practitioners can make use of your findings and learn from your experiences. In order to make your data accessible to outside parties, they need to conform to international data standards that provide the basis for open sharing of data. These standards need to occur on several levels:

Standard Software Formats - Your data need to be in an electronic format that other users can either directly read or at least import. For example, because of their dominant market position, most people can read files generated by Microsoft programs that use the *.doc, *.xls and *.mdb formats for documents, spreadsheets and databases respectively. Non-proprietary formats include HyperText Markup Language (HTML) used for web-pages or, in more recent years, various flavours of eXtensible Mark-up Language (XML). For example, in the world of spatial data, ESRI's Geography Markup Language (GML) is becoming the standard XML encoding for geospatial information.

Standard Data - Your data also need to fit the structure of the databases that you will be contributing to. As a simple example, if you are reporting numbers of birds of different species in a census and your data are in the form of nesting pairs whereas the database wants to know individual adult birds, your data will not be compatible unless they are converted. Most databases will outline the format that data need to be in.

Standard Terms - A particularly important aspect of the need for standard data is the need to have standard terminology. If you have recorded bird names in the local language, chances are they won't be useful at a global level. To this end, it's important to use scientific (latin) names. Similarly, if you call a threat “cattle grazing” and another project terms it “livestock” then there will be no way to compare results. Specific resources that you may wish to consult for terminology include:

- **Geographic Place Names** - GeoNet Names Server (GNS): http://gnswww.nga.mil/geonames/GNS/index.jsp
- **Biological Species and Other Taxonomic Information** - Integrated Taxonomic Information System (ITIS): http://www.itis.usda.gov/
- **Habitats, Threats, and Conservation Actions** - IUCN/CMP Classifications & Authority Files: http://www.conservationmeasures.org
- **General Terms** - California Environmental Resources Evaluation System (CERES): http://gis.ca.gov/catalog/thesaurus.epl?mode=browse or GEneral Multilingual Environmental Thesaurus (GEMET): http://www.eionet.eu.int/gemet

Standard Metadata - In addition to contributing your data themselves, you should also contribute meta information about your dataset. Typical metadata include identification of the data being described, the source of the data and a contact person/organization, the quality of the data, entity ,or attribute information (if in a database or spreadsheet), its publication date, distribution information (including rights/liabilities), and the name of the individual completing the metadata. Metadata are typically recorded in a separate file (often using HTML or XML) that accompanies the main data file. The US Federal Geographic Data Committee has created a metadata standard that is fairly widely accepted throughout the world and is suggested to all TNC staff as a good metadata reference to employ. For more information on this standard, please go to: http://www.fgdc.gov/metadata/geospatial-metadata-standards.

If you employ the various standards described above in designing your own data management systems for your project from the outset, there will be three large benefits:

1. Your project will benefit from the considerable thinking that has gone into building these standards
2. It will be relatively easy and seamless for you to upload your data to broader databases, and
3. Your project will be able to download and make use of data from other sources.

Opportunities for Innovation

- **Finding a Way to Develop Common Databases** - Although each project needs to develop its own data, much of this data will be very similar to data collected by other projects. If we can develop common codebooks and databases, we will greatly facilitate both data collection and storage - and more importantly, the ability to share information and learn from one another.

Resources and tools

Some key references for data management can be found in the following sources:

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