IS OUR PROJECT SUCCEEDING?

A Guide to Threat Reduction Assessment for Conservation

Richard Margoluis and Nick Salafsky **BIODIVERSITY SUPPORT PROGRAM**

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Biodiversity Support Program, Washington, DC

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Measuring Project Success

Like any other project, conservation projects are designed to change something, to have an impact on some state or condition. The main goal of this change is to protect biodiversity. One of the major differences we see between conservation projects and other projects, however, is that it is often difficult to define — in clear, operational terms—precisely what it is that conservation projects are trying to achieve. In a business setting, the project goal is usually financial profit and it is usually pretty easy to evaluate how much money a company is making or losing. For a health project, it is relatively easy to measure the health status of a particular population and to track changes over time to measure the success of a given intervention. But for conservation projects, what practical and meaningful measures of project impact are available to us?

This question is all the more difficult to answer because the conservation field is not as well developed as other fields, such as economics and health. In many fields, the cause-and-effect relationships between specific interventions and resulting impacts are easy to see. They are not so apparent in conservation. This makes it difficult for us to determine the specific data needed to measure the impact of a project on the biodiversity in a given area. With conservation outcome poorly defined and causal links poorly understood, it is difficult to figure out which interventions work, which do not work, and— in both cases—why.

Although there has been much effort placed on developing methods of measuring project impact, few have proven useful, practical, or cost-effective. During the last five to ten years, conservation project evaluation has focused heavily on the identification of indicators or measures of a given state or condition. Identification and selection of indicators has often had little to do with measuring project impact. For this reason, an indicator-driven approach often creates data and information demands that are neither feasible nor clearly linked to project activities. Project managers in the field are often obliged to monitor indicators defined by donors or outside "experts." They often see these indicators as useless and, worse, as distracting them from getting the "real" work done. In talking with project managers, we often hear statements such as: "Why should we collect tons of data on indicators that may be interesting to donors or some other outside organization, but not useful to us for project management purposes?"…"Must we even bother with information that we cannot directly link to our project activities and what we are trying to achieve?"…"What do we do if we can't find the experts required to use complex techniques that are supposed to help us measure the impacts of our projects?"…"Aren't there any cost-effective evaluation tools that can help us better manage our conservation projects?"

We agree with the concerns expressed by our colleagues. We believe that conservation project evaluation should *not* require the collection of huge amounts of data, *not* be complicated, and *not* depend on outside researchers. We also believe it should not be indicator-driven. Instead, project managers should first determine what they want to achieve, how they want to achieve it, and what data and information are most relevant to them to make the best management decisions.

To respond to this need for practical and meaningful measures of project impact, we developed the **Threat Reduction Assessment (TRA).** The TRA approach is a low-cost, practical alternative to more cost- and time-intensive approaches. It is based on data that are collected through simple techniques, directly related to project interventions, and readily interpreted by project staff. It is sensitive to changes over short periods of time and throughout a project site. It allows comparisons of performance among projects at different sites. And it can be used either as a completely independent measurement of project success, or as a complement to other methods.

In this publication we first discuss traditional approaches to measuring conservation impact, those that are based on biological indicators. Then we present the **Threat Reduction Assessment,** which produces the **Threat Reduction Assessment Index (TRA Index),** a summary indicator of the degree to which a project has succeeded in reducing the threats to conservation at a particular site. To enable our colleagues to try out the approach themselves, we provide a detailed step-by-step example, a second example—both from actual projects—and the tools required to conduct the assessment. We invite other conservationists to try the approach, test it at their sites, and modify it as they see fit. We hope that those who do will let us know about their results and reactions.

To provide feedback on your interest in and use of the Threat Reduction Assessment, please contact Richard Margoluis at *Richard@FOSonline.org* or Nick Salafsky at *Nick@FOSonline.org,* or write to them at Foundations of Success, 4109 Maryland Avenue, Bethesda, MD 20816, USA.

A Tradition of Biological Indicators

Historically, most approaches to measuring conservation outcome have relied heavily on biological indicators.[1] These approaches have generally involved collecting data on specific biological indicators meant to represent biodiversity across a given landscape. For example, Olson and Dinerstein[2] grouped indicators into three categories based on changes in different aspects of biological features in a site. These categories are:

Habitat Integrity: Area and degree of fragmentation of different habitats at the site.

Habitat Quality: Density of species thought to be sensitive to habit loss, sensitive to habitat degradation, and directly exploited by human activities.

Ecological Processes: Maintenance of vital processes such as water production and the presence of species required for plant pollination.

Other researchers have advocated for measuring indicators such as composition, structure, and function at genetic, population-species, community-ecosystem, and regional landscape scales.[3] While these and other approaches have focused attention on the need for monitoring and evaluation, the conservation community has yet to come up with a practical, low-cost, biologically based approach to assessing project outcome. This is especially a concern for conservation and development project managers in countries where expertise to collect such data does not exist.[4]

Our research and experience tell us that these types of approaches are difficult for community-based project teams to use for several reasons. Some of the reasons relate to the difficulties of implementing a biological-indicator approach. Others have to do with the difficulties of using the results.

Challenges to Implementing Biological Indicator Approaches

Three major challenges must be faced when implementing biological indicator approaches to measuring conservation project success.

Biological indicators are not sufficiently sensitive over the short time frames relevant to project managers.

Many conservation and development projects have only a three- to five-year funding span. Even when a project lasts longer, project managers still need to assess their progress over shorter time intervals in order to make informed management decisions. Most biological indicators, however, change slowly over time. There are often substantial lag times between some destructive activity, such as overhunting of predators, and the cascading biological effects that may show up in bird censuses or tree plots. Furthermore, many biological indicators, such as the population of a given species or the nutrient levels in a stream, have naturally occurring fluctuations that can make it difficult to interpret the causes of short-term changes.

The data required for biological indicator approaches are relatively difficult and expensive to collect.

These approaches to monitoring generally require that complex data sets be collected and analyzed by trained specialists. For example, measurements of species abundance require complex census or survey data. Measurements of changes in habitat area often require landscape data collected through aerial photography or satellite imagery and analyzed by computer-based Geographic Information Systems (GIS). Measurements of changes in habitat condition require careful assessments of populations of indicator species through regular censuses or surveys along with mathematical and statistical analyses of the data. And, changes in ecosystem functioning require careful sampling and sophisticated analyses to assess variables, such as the amount of sediment in stream water or the species composition of different pollinators. All of these techniques require specially trained personnel and equipment resources that tend to be expensive or even unavailable.

Biological indicator approaches are hard to implement as a part of everyday project activities.

As a rule, project teams are overworked merely trying to carry out project activities and maintain relations with community members, donors, and their organizations' constituencies. As a result, even where teams want to do monitoring, it often becomes the "marginal" activity that is abandoned when other, more immediate crises arise.

Challenges to Using the Results of Biological Indicator Approaches

Even if project teams can meet the challenges of implementing biological indicator approaches to measuring project success, more challenges await them when they try to put the results to work for decision making.

Results are difficult to interpret.

The immediate output of biologically based monitoring approaches tends to take the format of complex data analyses couched in scientific terms. For example: "There is a 90% probability that the observed decrease in the population of an indicator species is significantly different from the past trend." Even when efforts are made to interpret the data analyses, it can be difficult for project staff and community members to understand and use them.

Results are difficult to link to project activities.

Many biological monitoring programs collect vast amounts of data on variables that are interesting, but may not be clearly related to major threats or project activities. In fact, much biological monitoring more closely resembles inventory or census work rather than targeted information collection that is designed to provide specific information for decision making. As a result, the utility of this type of monitoring for project management is limited. For example, biological monitoring might be established to measure species population size, distribution, and structure in a situation where the major threat to the project area is actually uncontrolled fires from subsistence agriculture. In this case, results from the biological monitoring would provide little value to measuring the impact of a project to control expansion of the agricultural frontier.

Results are hard to use in assessments after the fact.

Biologically based approaches require the presence of baseline data against which to compare changes in various parameters. As a result, it is difficult or impossible to use these methods in projects where baseline data have not been collected.

Results are hard to use to make meaningful comparisons among sites.

It can be hard to compare success at vastly different sites using biological approaches. For example, consider a project seeking to conserve 500 hectares of regenerating forest in India versus a project seeking to conserve 500,000 hectares of primary forest in Papua New Guinea. The 100-fold difference in scale alone is enough to make comparisons unrealistic, given the relative complexity of the significantly larger site. It is also difficult to combine the various biological parameters into a single index that can be used to make standardized comparisons between these two particular projects.

Resolving These Limitations: A New Approach

Because of these limitations, most project managers fail to collect the data required to measure project outcome. Without an independent measurement of conservation success, project managers cannot determine whether or not their interventions are working: Should they be continued as is or do they need to be modified?

It is clear that our field faces a critical need for an independent measurement of conservation success — one that addresses the limitations outlined above. To address this need, we set out to develop an approach that would overcome some of these obstacles and provide a simple tool for conservation project managers to use in measuring the impacts of their efforts. The result of our work — the **Threat Reduction Assessment** approach—is a measurement tool that provides useful information at an acceptable cost and complements biological indicator approaches to measuring project success.

Seeing Threats in the Broader Context

To effectively evaluate a conservation project, we need to study the project in the broader context in which it was designed to work. The general model shown on page 11 is a way to do just that. Although we use this model here to discuss site-specific conservation projects, the same concepts apply to larger units of biodiversity such as in an ecoregion or a country. There are four basic components of this model: the target condition, threats, intervention tools, and institutions. Understanding the nature of these components and the interplay among them will help you place the **Threat Reduction Assessment** you are doing in the complete context of your project and the unique circumstances that affect it.

Target Condition

The target condition is the situation or state on which you are ultimately trying to have an impact with your project. In conservation projects, the target condition is assumed to be the biodiversity of the site where you are working. The biodiversity of the site can be thought of as having three main attributes:

- **Individual Species:** Range or collection of species present.
- **Habitat Area and Condition:** Area of habitat present and degree to which it is intact.
- **Ecosystem Functioning:** Degree to which the habitat is able to maintain target systems and processes.

Threats

Threats are those dynamic influences that cause some degree of deterioration or destruction of the biodiversity in the site. Some writers have called these "pressures," "impacts," "drivers," or "barriers."[5] Threats can be subdivided into several types, as follows:

Internal Direct Threats: Factors that have a direct impact on biodiversity and are caused by the stakeholders living at the project site, such as overhunting of large mammals by community residents.

External Direct Threats: Factors that have a direct impact on biodiversity and are caused by outsiders, such as logging by large multinational companies.

Indirect Threats: Social, political, and economic factors that induce changes in the direct threats, such as threats from poverty or inadequate government policy.

Opportunities—those factors that are the inverse of threats and that have a positive impact on biodiversity—are not shown in this model. One example of an opportunity is a high level of conservation awareness.

Tools

Tools are the project activities designed to counter the threats to biodiversity. These tools are also described as "responses," "approaches," or "projects" by other writers.[6] We have divided tools into the following four general categories:

Direct Protection: Setting aside and protecting habitats or populations of key species; developing publicly or privately owned parks, reserves, and sanctuaries; establishing management regimes such as restrictions on hunting or on collecting certain species in certain locations or at certain times during the year; obtaining legal easements on land; restoring habitats and species; promoting conservation in zoos and botanical gardens.

Policy Development and Advocacy: Working with governments and other institutions at all levels to promote beneficial changes in the legal and regulatory systems, including passing laws and working to ensure that they are implemented and enforced.

Education and Awareness: Providing information to the general public or specific groups about the consequences of different threats and different actions that can be taken to counter these threats.

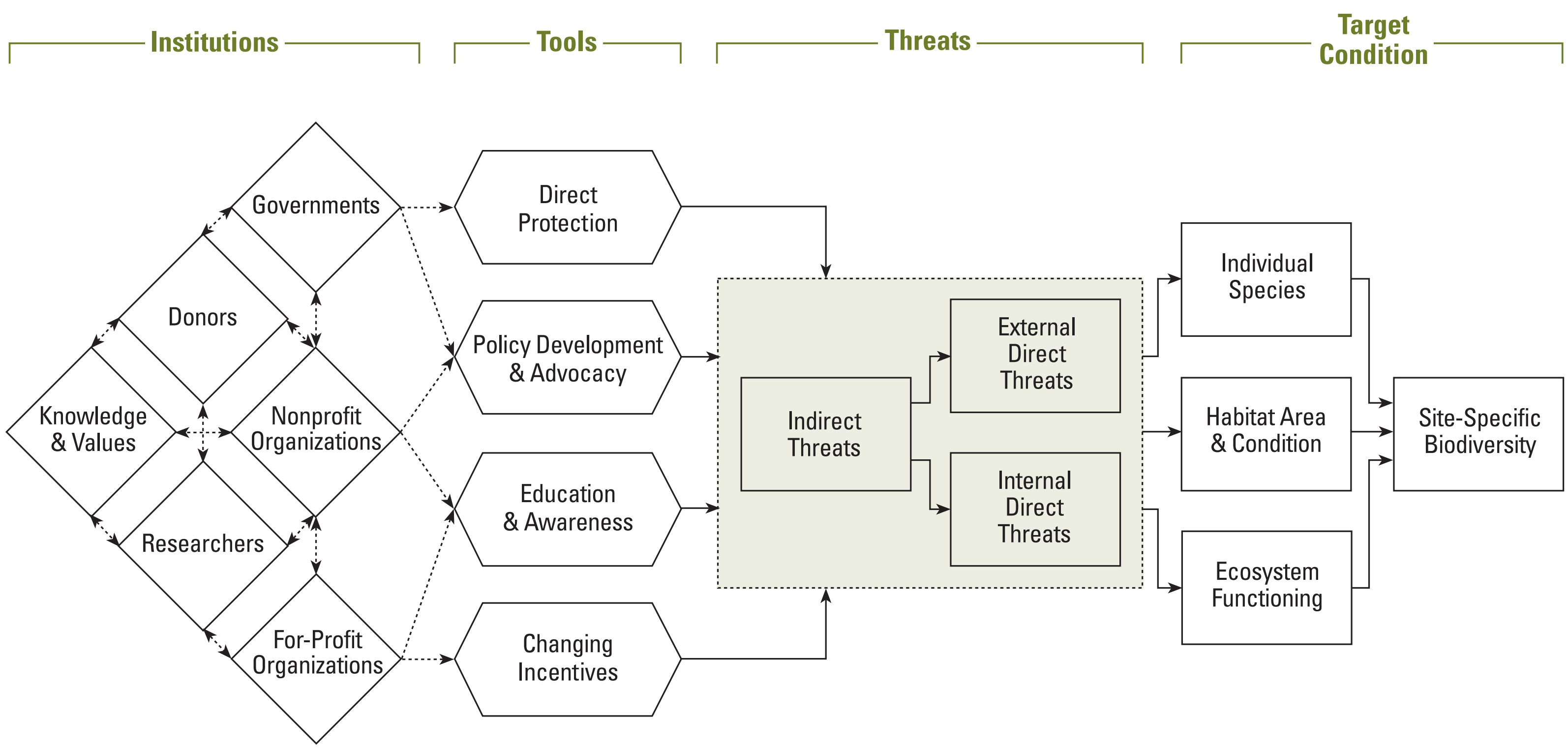
Changing Incentives: Identifying the specific motivations that cause people to behave in a desired fashion and then developing either positive or negative incentives to get them to change their behaviors through enticement, such as providing economic returns through environmentally friendly micro-enterprises; persuasion, such as appealing to spiritual or moral beliefs; or punishment, such as laws that penalize citizens or corporations for illegally harvesting timber.

Institutions

This component of the model includes both tangible and intangible institutions. It includes the many organizations — nonprofit organizations (nongovernmental organizations), for-profit firms, government agencies, donors, and research organizations — that implement conservation project activities. It also includes the knowledge, theory, and values that individuals and organizations rely on to carry out their conservation project interventions.

A General Model of a Conservation Project

This diagram illustrates the complex context within which a typical conservation and development project works. The shaded portion of the diagram highlights the components of the model that relate to the **Threat Reduction Assessment.**



The TRA Approach

Traditional project monitoring efforts focus on the biological state of a particular site, but often ignore all the other factors—including threats—that influence the biology itself. By contrast, most conservation projects are designed to identify threats to the biodiversity at a project site and then develop interventions that explicitly address these threats.[7] The TRA approach to measuring project success identifies threats not only to design projects, but also to monitor their impacts on biodiversity. Rather than monitoring the target condition, as in traditional biological indicator-based monitoring, the TRA approach monitors the threats themselves.

By measuring threats, you get an indirect measurement of conservation success. The basic concept is that if you can identify all the threats to the biodiversity of a region, then you can assess your progress in achieving conservation by monitoring the degree to which these threats are reduced.[8] The TRA approach to measuring project success is based on three key assumptions.

All destruction of biodiversity is human-induced. Losses of species or habitats due to natural processes such as fires from lightning or hurricanes are not considered threats to biodiversity. Human-caused increases in the magnitude or frequency of natural catastrophic events, however, can be considered as threats.

All threats to biodiversity at a given site can be identified. At any given point in time, you can determine all the direct threats to biodiversity that exist at your project site. You can also separate the effects of different threats and rank them in terms of the area they affect, intensity, and urgency.

Changes in all threats can be measured or estimated. You can systematically, either quantitatively or qualitatively, assess the degree of reduction of all threats at any given time.

Calculating the Threat Reduction Assessment Index

When you use the TRA approach, you come up with a **Threat Reduction Assessment Index (TRA Index).**[9] This index is the result of identifying threats, ranking them according to specific criteria, and assessing progress in reducing each of them. You can then use the information to estimate the degree to which the threats were reduced relative to a clear definition of total reduction, or elimination, of the threats.

Implementing the TRA approach and calculating a **TRA Index** involves 10 steps. The TRA is most useful when you do Step 1 through Step 7 at the start of your project to create a baseline dataset before your project begins. If necessary, however, these steps can be done retrospectively during the assessment period and compared to the present.[10] In this case, the key is to think back in time to the start of the assessment period and complete these steps based only on knowledge that was available to your team at that time. When you use the TRA approach more than once during the life cycle of a project, you can then compare your progress in reducing threats…both individually and across the entire set of threats being assessed.

Learning by Example

In this section, we explain the 10 steps to calculating the **TRA Index.** We do this by demonstrating the approach as it was actually used at one of the sites in the Biodiversity Conservation Network.[11] Over the past decade, the Research and Conservation Foundation has worked with the Wildlife Conservation Society to implement research tourism and handicraft enterprises with the communities of the Crater Mountain Wildlife Management Area.[12] The site we use in this example is Haia, in the highlands of Papua New Guinea, where the Research and Conservation Foundation has been working since 1994.

We use the **TRA Worksheet** throughout this section to illustrate the steps for the Haia site assessment. You'll see the progression of completing the worksheets as you go through the 10 steps. A blank form and instructions are included in the back of the workbook *(pages 44-46)* for your own use and adaptation.

TRA Worksheet / Side A

SITE NAME: Crater Mountain Wildlife Management Area Project, Papua New Guinea

SITE DESCRIPTION: Haia: forest area owned by the traditional clans in the village of Haia

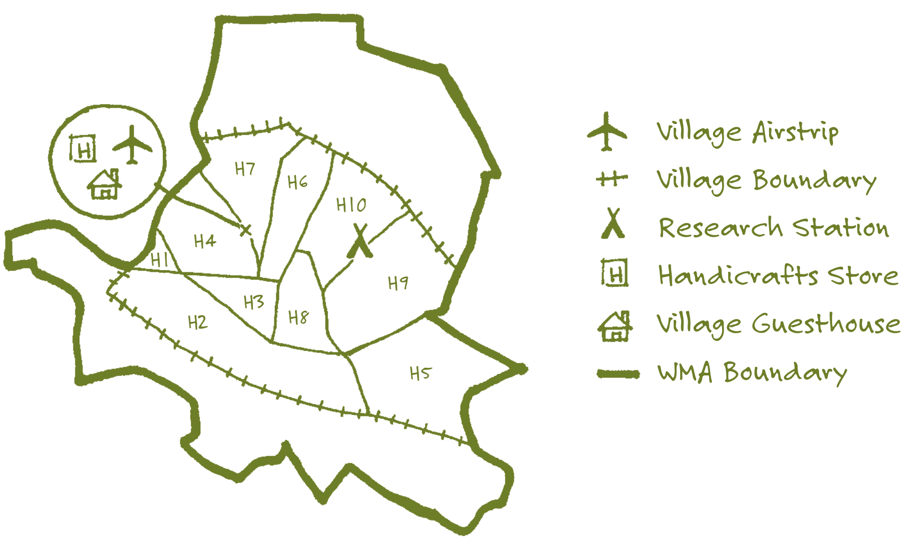
ASSESSMENT PERIOD: June 1994 **TO** July 1997 **COMPLETED ON:** July 10, 1997

COMPLETED BY: Paul, Arlene and Nick

THREATS		CRITERIA RANKINGS			TOTAL RANKING	% THREAT REDUCED	RAW SCORE
		AREA	INTENSITY	URGENCY			
A							
B							
C							
D							
E							
F							
G							
TOTAL							

TRA INDEX FORMULA	TOTAL RAW SCORE		TOTAL RANKING		CONVERT TO PERCENTAGE				TRA INDEX
TRA INDEX CALCULATION		÷		=		x	100	=	%

SITE MAP



STEP 1

Define the Project Area in Space and Time

You begin the assessment by defining the exact area where you are implementing your conservation project. It is important also to define the specific biodiversity that the project is targeting for conservation because these initial measurements will create a baseline. You should define the biodiversity in terms of area, species, or both. Using these parameters will assist you when you have to draw sharp lines on gray areas.[13] Furthermore, you need to establish the specific start and end dates for the assessment period. In our example, the specific biodiversity that the project is targeting is the forest area owned by the traditional clans in the village of Haia. The project assessment period begins when the Research and Conservation Foundation first came to the site in June 1994 and ends in June 1997, when the project team analyzed their progress prior to their annual staff meeting. This information goes in the top section of the worksheet, along with the date and by whom the worksheet was completed. At the bottom of the worksheet, you should include a sketch map of the site to complete the description, as we have done in our example.

TRA Worksheet/Side A

SITE NAME:	Crater Mountain Wildlife Management Area Project, Papua New Guinea
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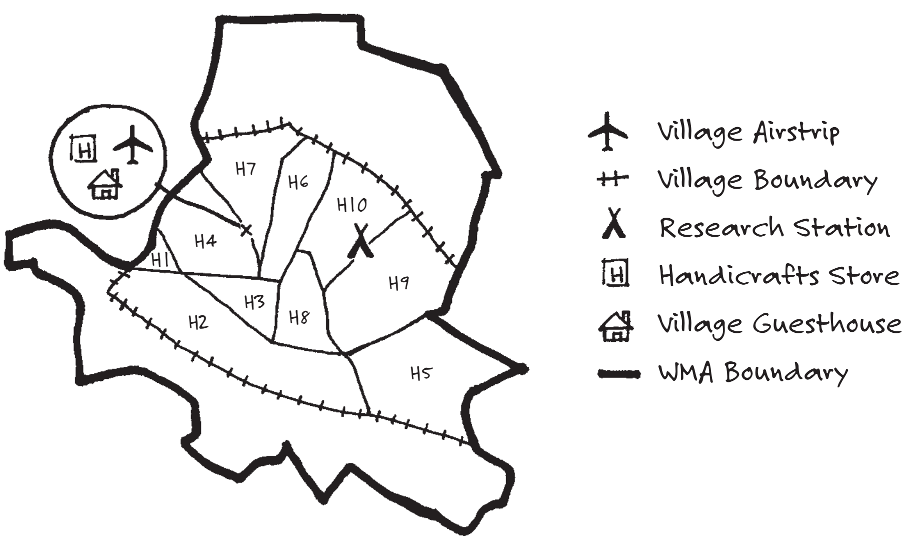
ASSESSMENT PERIOD:	June 1994 **TO** July 1997
COMPLETED ON:	July 10, 1997
COMPLETED BY:	Paul, Arlene and Nick

	THREATS	CRITERIA RANKINGS: AREA	INTENSITY	URGENCY	TOTAL RANKING	% THREAT REDUCED	RAW SCORE
A	Hunting (subsistence)						
B	Hunting (market)						
C	Logging (commercial)						
D	Expansion of gardens						
E	Mining (commercial)						
F							
G							
	TOTAL						

TRA INDEX FORMULA	TOTAL RAW SCORE		TOTAL RANKING		CONVERT TO PERCENTAGE				TRA INDEX
TRA INDEX CALCULATION		÷		=		x	100	=	%

SITE MAP



STEP 2

Develop a List of All Direct Threats

The next step involves identifying all the direct threats to biodiversity existing at the site as of the start date of the assessment period. As we discussed earlier, there are several types of threats. *Direct threats* are those threats that immediately affect the biodiversity of the site; these are the threats to be assessed. *Indirect threats* are those forces that cause direct threats; they should not be included in the list. For completeness, where a direct threat results from different indirect threats, list it once for each indirect threat you identify. For example, at the Haia site, hunting is a significant direct threat, but we distinguish between *hunting* caused by the indirect threat of the necessity to fill family needs *(subsistence)* and *hunting* driven by the indirect threat of market demand for game meat *(commercial).* Similarly, you should list separately a direct threat that is undertaken by different actors. For example, we distinguish between local people clearing forest to expand agricultural gardens *(subsistence)* and external logging companies clearing forest to harvest timber for commercial sale *(commercial).* This list goes under the column headed **THREATS** in the worksheet.

One of the most difficult aspects of accurately calculating a **TRA INDEX** lies in identifying all the threats to biodiversity at the site, and in evaluating the extent to which each threat has been addressed. Identifying the threats can best be accomplished during project design.[14] Identify all the important threats, but avoid including every conceivable threat. As an absurd case, we point out to teams that a project can artificially inflate its **TRA INDEX** by declaring "Invasions by Martians" as the most critical threat and then claiming success in eliminating this threat when no Martians have appeared by the end of the evaluation period. This "index padding" will not, however, help you achieve your conservation goals.

For an in-depth discussion of threat identification, refer to "Chapter 3: Design a Conceptual Model Based on Local Site Conditions," in *Measures of Success: Designing, Managing, and Monitoring Conservation and Development Projects.*[15] Of particular relevance is the section titled "Identify and Rank Threats at Your Project Site."

TRA Worksheet / Side B

EXPLANATION OF THREATS	
A	THREAT Hunting (subsistence) – harvesting of birds and mammals by local people for their own consumption
	100% REDUCTION = Harvesting animals on a sustainable basis through setting up and implementing community monitored hunting regulations
B	THREAT Hunting (market) – harvesting of selected bird and mammal species that are commercial commodities
	100% REDUCTION = Harvesting animals on a sustainable basis through setting up and implementing hunting regulations
C	THREAT Logging (commercial) – timber harvesting conducted by large multination firms
	100% REDUCTION = No logging and no plans for logging in the boundaries of the Wildlife Management Area
D	THREAT Expansion of gardens – cutting primary forest to make subsistence agricultural plots
	100% REDUCTION = No expansion of gardens into areas of primary forest
E	THREAT Mining (commercial) – mineral extraction conducted by large multinational firms
	100% REDUCTION = No mining and no plans for mining in the boundaries of the Wildlife Management Area
F	THREAT
	100% REDUCTION =
G	THREAT
	100% REDUCTION =

Photocopy this form or draw your own. Note that your project may have as few as 2 or 3 threats or as many as 10. If so, adapt this worksheet to your needs.

STEP 3

Define the Threats and What 100% Reduction Means for Each

On the second page of the worksheet **(SIDE B),** write a clear and precise definition of each threat and explain what 100% reduction (elimination) means. For example, 100% reduction for a logging threat might be: *No commercial logging whatsoever in the Reserve at the end of the assessment period and no plans for logging in the future.* For a fishing threat it might be: *No fishing of grouper in the community no-take zone.*

TRA Worksheet / Side A

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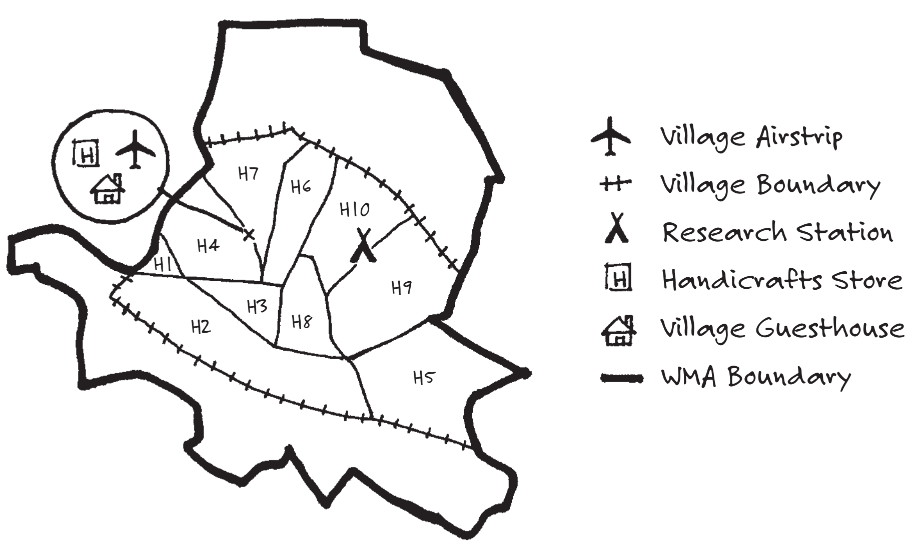
	THREATS	CRITERIA RANKINGS			TOTAL RANKING	% THREAT REDUCED	RAW SCORE
		AREA	INTENSITY	URGENCY			
A	Hunting (subsistence)	5					
B	Hunting (market)	3					
C	Logging (commercial)	2					
D	Expansion of gardens	4					
E	Mining (commercial)	1					
F							
G							
	TOTAL	15					

TRA INDEX FORMULA	TOTAL RAW SCORE		TOTAL RANKING		CONVERT TO PERCENTAGE				TRA INDEX
TRA INDEX CALCULATION		÷		=		x	100	=	%

SITE MAP



STEP 4

Rank Each Threat for Area

Once you have identified all of the threats to the biodiversity at the project site, you need to rank them based on three criteria—area, intensity, and urgency. First, rank the threats based on **AREA,** which we define as follows: *Area—the portion of habitat(s) in the site that the threat will affect. Will it affect all of the habitat(s) at the site or just a small part?*

Review the list of threats and rank them in order of the amount of the habitat(s) affected. Assign the highest number to the threat that affects the greatest area and assign the lowest number, always #1, to the threat that affects the smallest area. In our example we have listed five threats and have ranked them for area from #5 down to #1. Subsistence hunting, which affects the greatest area at the site, ranks at #5 and mining, which affects the smallest area, ranks at #1.

When you are doing the three rankings for your site, avoid ranking two threats equally. This procedure works best when you rank threats as precisely and cleanly as possible, giving each a distinct whole number. If you have trouble deciding how to rank the threats just by thinking about them, try writing each one on a separate piece of paper, rearranging the pieces in ranking order until you are satisfied with the results.

When you have settled on the ranking for this criterion, write in the numbers under the column headed **AREA** on the worksheet. Then, total the column.

TRA Worksheet / Side A

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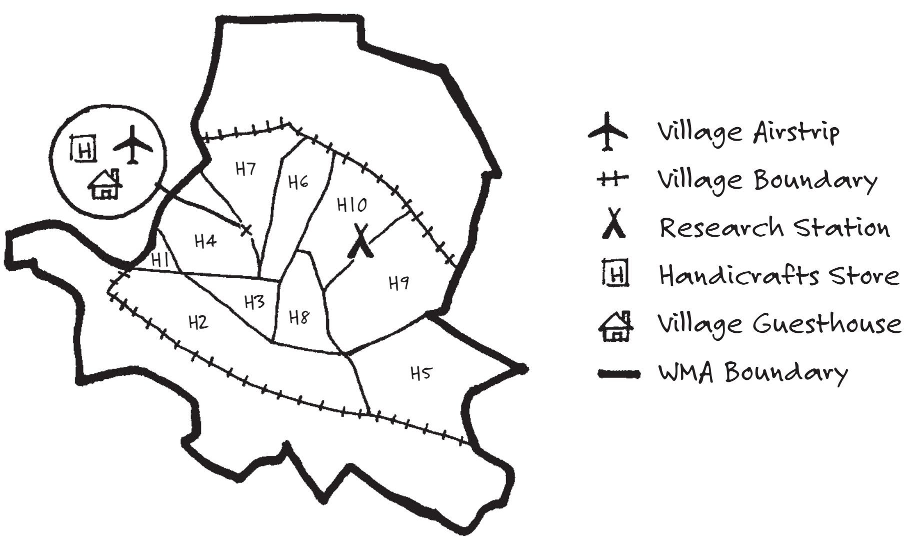
	THREATS	CRITERIA RANKINGS			TOTAL RANKING	% THREAT REDUCED	RAW SCORE
		AREA	INTENSITY	URGENCY			
A	Hunting (subsistence)	5	3				
B	Hunting (market)	3	2				
C	Logging (commercial)	2	5				
D	Expansion of gardens	4	1				
E	Mining (commercial)	1	4				
F							
G							
	TOTAL	15	15				

TRA INDEX FORMULA	TOTAL RAW SCORE		TOTAL RANKING		CONVERT TO PERCENTAGE				TRA INDEX
TRA INDEX CALCULATION		÷		=		x	100	=	%

SITE MAP



STEP 5

Rank Each Threat for Intensity

For this step, follow the instructions in Step 4, but rank the threats for the second criterion, **INTENSITY,** which is defined as follows: *Intensity—the impact or severity of destruction caused by the threat. Within the overall area, will the threat completely destroy the habitat(s) or will it cause only minor changes?*

When ranking the threats at your own site, assign the largest number to the most intense threat and continue on down through the ranking to #1 for the least intense threat. Again, avoid assigning the same number to more than one threat.

Note that in our example from Haia, commercial logging is ranked highest (#5) for intensity even though it was ranked relatively low (#2) for area. This is because even though the area affected by commercial logging is smaller than the area affected by market hunting, expansion of gardens, and subsistence hunting, the impact of commercial logging is significant in terms of intensity. The Haia project team assessed this threat as being the one of greatest intensity.

When you have finished ranking the threats, record the numbers under the column headed **INTENSITY** and add up the total for the column. It should match the total for the column headed **AREA.**

TRA Worksheet / Side A

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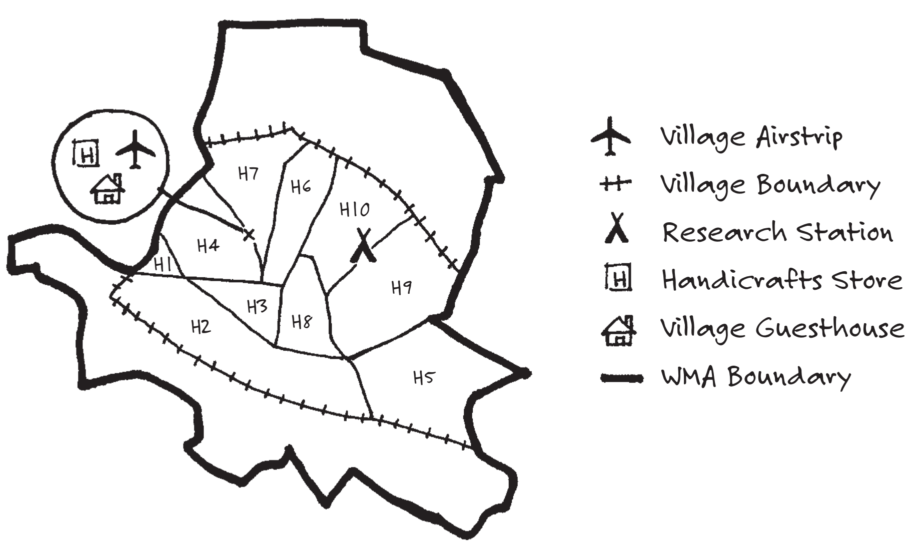
	THREATS	CRITERIA RANKINGS: AREA	INTENSITY	URGENCY	TOTAL RANKING	% THREAT REDUCED	RAW SCORE
A	Hunting (subsistence)	5	3	4			
B	Hunting (market)	3	2	3			
C	Logging (commercial)	2	5	1			
D	Expansion of gardens	4	1	5			
E	Mining (commercial)	1	4	2			
F							
G							
	TOTAL	15	15	15			

TRA INDEX FORMULA	TOTAL RAW SCORE		TOTAL RANKING		CONVERT TO PERCENTAGE				TRA INDEX
TRA INDEX CALCULATION		÷		=		x	100	=	%

SITE MAP



STEP 6

Rank Each Threat for Urgency

Again, for this step, follow the instructions in Step 4, but rank the threats for the third and last criterion, **URGENCY,** defined as follows: *Urgency—the immediacy of the threat. Is it a current threat? Will it occur only 25 years from now?*

When assessing your own site, assign the highest number to the threat that you consider to be most urgent and continue on down to a ranking of #1 for the least urgent threat. Again, avoid assigning the same number to more than one threat.

As we have already seen, the Haia project team found that subsistence hunting was the greatest threat in terms of area affected and commercial logging was the greatest in terms of intensity, or the impact and severity of the resulting destruction. On the final criterion of **URGENCY,** the project team found expansion of gardens to be the greatest threat because it is a clear and present danger to the biodiversity at the site. So, expansion of gardens was ranked highest for urgency, at #5.

When ranking the threats at your own site, assign the largest number to the most urgent threat and continue on down through the ranking to #1 for the least urgent threat.

TRA Worksheet/Side A

SITE NAME: Crater Mountain Wildlife Management Area Project, Papua New Guinea

SITE DESCRIPTION: Haia: forest area owned by the traditional clans in the village of Haia

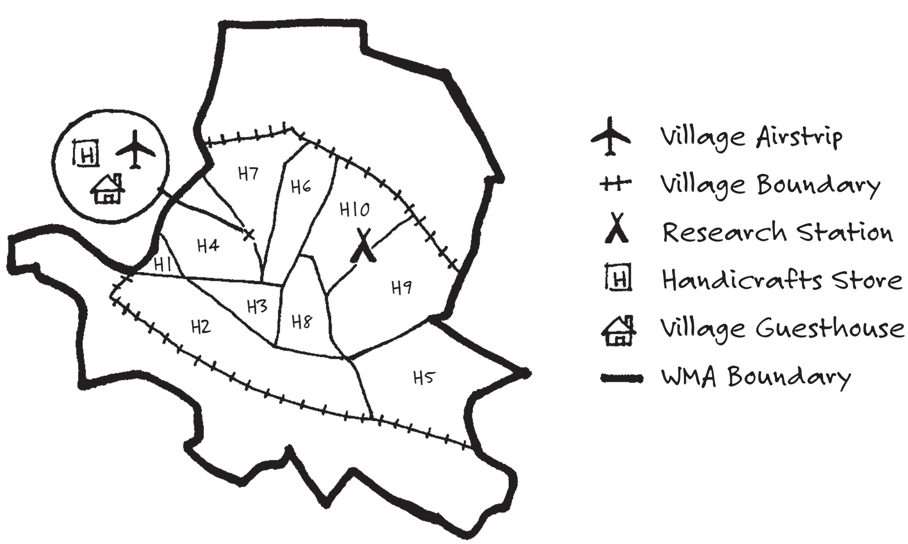
ASSESSMENT PERIOD: June 1994 **TO** July 1997 **COMPLETED ON:** July 10, 1997

COMPLETED BY: Paul, Arlene and Nick

	THREATS	CRITERIA RANKINGS: AREA	CRITERIA RANKINGS: INTENSITY	CRITERIA RANKINGS: URGENCY	TOTAL RANKING	% THREAT REDUCED	RAW SCORE
A	Hunting (subsistence)	5	3	4	12		
B	Hunting (market)	3	2	3	8		
C	Logging (commercial)	2	5	1	8		
D	Expansion of gardens	4	1	5	10		
E	Mining (commercial)	1	4	2	7		
F							
G							
	TOTAL	15	15	15	45		

TRA INDEX FORMULA	TOTAL RAW SCORE		TOTAL RANKING		CONVERT TO PERCENTAGE				TRA INDEX
TRA INDEX CALCULATION		÷		=		x	100	=	%

SITE MAP



STEP 7

Add Up the Ranking Scores

In this step, you add the three rankings (**AREA** + **INTENSITY** + **URGENCY**) across the columns to arrive at a total ranking for each of the threats you identified. Write these total rankings in the column headed **TOTAL RANKING.** Note that in the TRA approach, we do not weight the columns differently—that is, we do not consider any one of our three criteria to be more important than the others.

Next, add up the numbers in the **TOTAL RANKING** column to determine the combined total ranking. Make sure that this number is the same as the number you get if you add up the three column totals for **AREA, INTENSITY** and **URGENCY.**

Actually, it's a good idea at this step to check all your addition for Steps 4 through 7 before proceeding to the next step. In our example, the ranking columns for the three criteria each total 15 and the total ranking is 45. The arithmetic is correct and we can go on to Step 8.

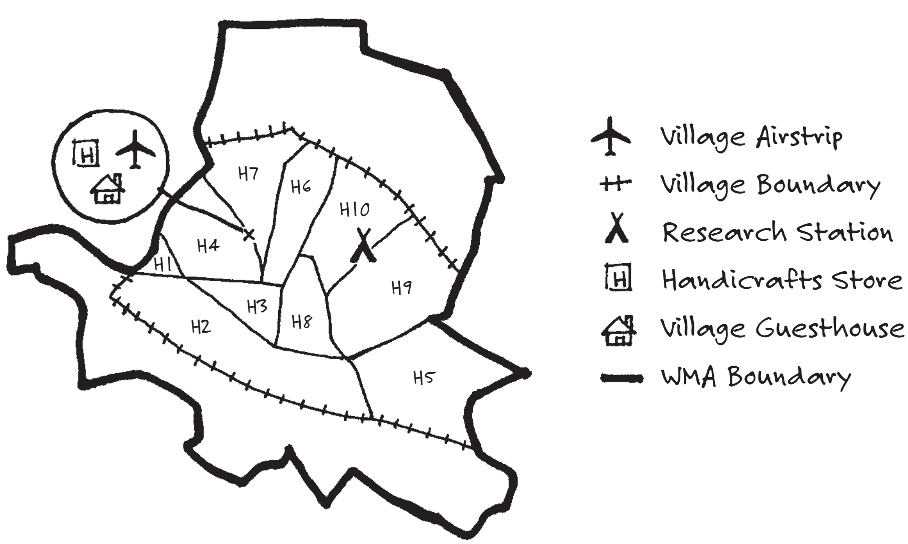
TRA Worksheet / Side A

SITE NAME:	Crater Mountain Wildlife Management Area Project, Papua New Guinea
SITE DESCRIPTION:	Haia: forest area owned by the traditional clans in the village of Haia
ASSESSMENT PERIOD:	June 1994 TO July 1997 — **COMPLETED ON:** July 10, 1997
COMPLETED BY:	Paul, Arlene and Nick

	THREATS	CRITERIA RANKINGS: AREA	INTENSITY	URGENCY	TOTAL RANKING	% THREAT REDUCED	RAW SCORE
A	Hunting (subsistence)	5	3	4	12	15	
B	Hunting (market)	3	2	3	8	0	
C	Logging (commercial)	2	5	1	8	50	
D	Expansion of gardens	4	1	5	10	5	
E	Mining (commercial)	1	4	2	7	100	
F							
G							
	TOTAL	15	15	15	45		

TRA INDEX FORMULA	TOTAL RAW SCORE		TOTAL RANKING		CONVERT TO PERCENTAGE				TRA INDEX
TRA INDEX CALCULATION		÷		=		x	100	=	%

SITE MAP



Determine the Degree to Which Each Threat Has Been Reduced

As of the end date of the assessment period, determine the degree to which each threat has been reduced, based on your definition of 100% threat reduction from Step 3. Just as determining which threats to include is a difficult but critical step, so is evaluating threat reduction. There are many ways that you can do this, using either quantitative or qualitative methods. What matters most is that you choose the most accurate, reliable, cost-effective, feasible, and appropriate method given your time and resource constraints. The information you come up with should be as measurable, precise, consistent, and sensitive as possible. For an explanation of methods and indicators, refer to "Chapter 5: Developing a Monitoring Plan," in *Measures of Success: Designing, Managing, and Monitoring Conservation and Development Projects.*[16] Of particular relevance are the sections titled "Develop One or More Indicators for Each Information Need" and "Select Appropriate Method According to the Criteria."

To take one example, a **quantitative measurement** of success in reducing the threat of conversion of forest to agricultural lands might involve technologically sophisticated approaches such as using satellite or aerial photography images in conjunction with a computer-based GIS to measure the movement of the agricultural frontier over time. This method would be useful for this type of threat, providing that you have the GIS tools available. In other situations, less elaborate quantitative measurements would suffice, such as measuring the increase in the size of garden plots in an area where expansion of gardens is a threat, such as in the Haia example we are using here.

A **qualitative measurement** might consist of interviewing residents and estimating the amount of land they have cleared. Or, to measure your success in reducing the threat of cyanide fishing on a coral reef, you could use transects to quantitatively survey reefs for evidence of cyanide damage, or you could use a qualitative measurement to assess the amount of cyanide bought in the region, assuming that there is no underground market, cyanide is used only for fishing, and fishermen use it as soon as they buy it. Regardless of the way you calculate the degree to which each threat has been reduced, it should always be expressed as a percentage that represents the portion of the original threat, as identified at the start of the project, that has been eliminated.

In our example, the project team qualitatively determined the degree to which the five threats were reduced since the beginning of the project. For example, they gave commercial logging a score of 50 because, although no new commercial logging had taken place during the project, there were still government-approved plans for logging companies to extract timber. Similarly, expansion of gardens was reduced by only 5% because the project was successful in convincing only a small handful of residents not to cut down more forests for agriculture.

When you have completed your determination of the degree of threat reduced, record these percentages in the column headed **% THREAT REDUCED.** Because each threat is assessed independently, there is no total for this column.

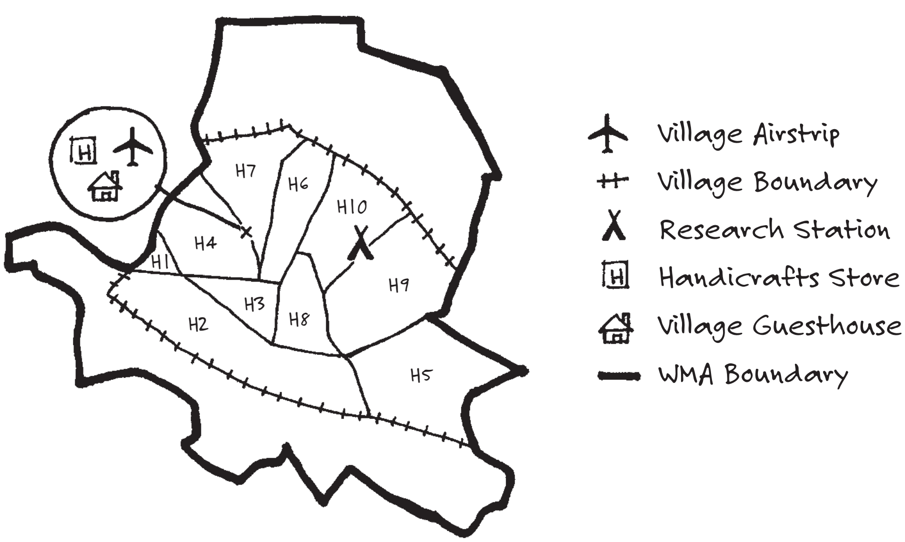
TRA Worksheet / Side A

SITE NAME:	Crater Mountain Wildlife Management Area Project, Papua New Guinea
SITE DESCRIPTION:	Haia: forest area owned by the traditional clans in the village of Haia
ASSESSMENT PERIOD:	June 1994 **TO** July 1997 — **COMPLETED ON:** July 10, 1997
COMPLETED BY:	Paul, Arlene and Nick

	THREATS	CRITERIA RANKINGS: AREA	INTENSITY	URGENCY	TOTAL RANKING	% THREAT REDUCED	RAW SCORE
A	Hunting (subsistence)	5	3	4	12	15	1.8
B	Hunting (market)	3	2	3	8	0	0.0
C	Logging (commercial)	2	5	1	8	50	4.0
D	Expansion of gardens	4	1	5	10	5	0.5
E	Mining (commercial)	1	4	2	7	100	7.0
F							
G							
	TOTAL	15	15	15	45		13.3

TRA INDEX FORMULA	TOTAL RAW SCORE		TOTAL RANKING		CONVERT TO PERCENTAGE				TRA INDEX
TRA INDEX CALCULATION		÷		=		x	100	=	%

SITE MAP



STEP 9

Calculate Raw Scores

The next step is to calculate the raw score for each threat. To do this, multiply the **TOTAL RANKING** for each threat by the **% THREAT REDUCED** determined in Step 8. Remember to use the percentage in decimal form when you do this calculation. For example, convert 15% to 0.15 before multiplying it by 12 to get the **RAW SCORE** of 1.8 for subsistence hunting. When you have done this calculation for all of the threats listed, record the results in the column headed **RAW SCORE.** Then add the numbers in the column to determine the **TOTAL RAW SCORE,** which, in this example, is 13.3. While this raw score does not carry any specific significance on its own, it is critical to the final calculation of the **TRA INDEX,** which you will complete in Step 10.

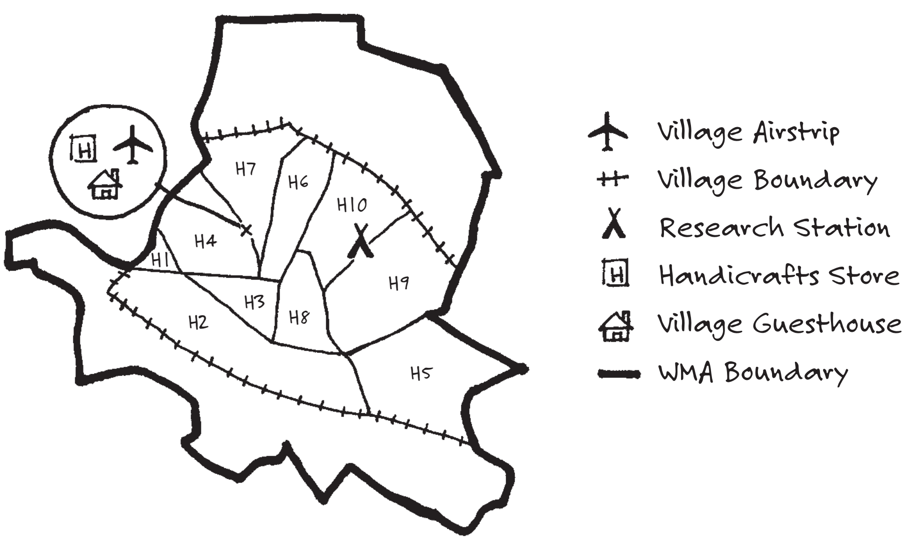
TRA Worksheet/Side A

SITE NAME:	Crater Mountain Wildlife Management Area Project, Papua New Guinea
SITE DESCRIPTION:	Haia: forest area owned by the traditional clans in the village of Haia
ASSESSMENT PERIOD:	June 1994 TO July 1997 — **COMPLETED ON:** July 10, 1997
COMPLETED BY:	Paul, Arlene and Nick

	THREATS	CRITERIA RANKINGS: AREA	INTENSITY	URGENCY	TOTAL RANKING	% THREAT REDUCED	RAW SCORE
A	Hunting (subsistence)	5	3	4	12	15	1.8
B	Hunting (market)	3	2	3	8	0	0.0
C	Logging (commercial)	2	5	1	8	50	4.0
D	Expansion of gardens	4	1	5	10	5	0.5
E	Mining (commercial)	1	4	2	7	100	7.0
F							
G							
	TOTAL	15	15	15	45		13.3

TRA INDEX FORMULA	TOTAL RAW SCORE		TOTAL RANKING		CONVERT TO PERCENTAGE				TRA INDEX
TRA INDEX CALCULATION	13.3	÷	45	=	0.30	x	100	=	30 %

SITE MAP



STEP 10

Calculate the TRA Index

Using two of the totals you determined in previous steps, you can complete the assessment by calculating the final **TRA INDEX.** To do this, you divide the **TOTAL RAW SCORE** (from Step 9) by the **TOTAL RANKING** (from Step 7).

Follow the arrows in the worksheet to transfer your **TOTAL RANKING** and **TOTAL RAW SCORE** into the indicated spaces in the area for calculating the formula. Then complete the calculations and write in your **TRA INDEX.** Remember to convert your decimal back into a percentage. In our example, 0.3 is expressed as 30%.

Commentary on the Haia Example

By conducting the Threat Reduction Assessment, the project team was able to determine that, overall, they had reduced by 30% the collective threats in the three-year period from June 1994 to June 1997. While market hunting was not reduced at all, and expansion of gardens only a very small amount, the threat of commercial logging was cut in half and the threat of commercial mining was eliminated completely. These results provide a valuable mid-course evaluation of project success.

While working on calculating the **TRA Index** for the Haia site of Crater Mountain in Papua New Guinea, the project team made a number of observations. They found that it was fairly easy to define and assess success in reducing external threats such as corporate logging or mining because either the companies are operating in the Crater Mountain Wildlife Management Area or they are not. It was much more difficult, however, to define and assess success in reducing internal threats such as overhunting or expansion of subsistence food gardens, especially because the information for evaluating the threat came from the actors responsible for the threats, namely, the local people.

Another Example of a TRA Index

We have included one other example of **TRA Index** calculations from another Biodiversity Conservation Network project.[17] This one is a mid-term assessment of a butterfly-farming and honey-harvesting project in Sulawesi, Indonesia. In the description of the project, we include some of the lessons that were learned about the TRA approach by the project staff.

The Nature Conservancy has been working with residents of several small villages bordering Lore Lindu National Park in Sulawesi, Indonesia, to conserve the resources of the Park. The intervention selected was the establishment of small businesses to harvest non-timber forest products in an effort to provide residents with incentives for conservation.[18]

For this project, the team assessed the threats of illegal rattan harvesting, dam construction, coffee cash crops, and subsistence agriculture. Once the project team had ranked the threats for the three criteria (area, intensity, and urgency) they then determined the degree to which each threat had been reduced. They determined that the threat of dam construction had been reduced by 80%, but the other three threats had been reduced by only 10%, 5% and, in one case, not at all. By determining the individual threat and total raw scores, the project team calculated a **TRA Index** of 25%. This gave the project team an indirect measurement of project impact to date. The TRA approach also provided the team with an indication of where they had been relatively more or less successful.

In conducting the assessment, the project team learned some useful lessons, one of which was that it was important not to treat the entire National Park as one uniform site. They found, specifically, that it made no sense to judge the effectiveness of a business on the southwest side of the park based on a threat occurring many kilometers away on the northeast side of the park. Instead, it made more sense to break the area into three separate sites, based on the area over which each community group has influence. The worksheet presented here (*pages 36-37)* is for one of those three separate sites, the Napu Valley Site.

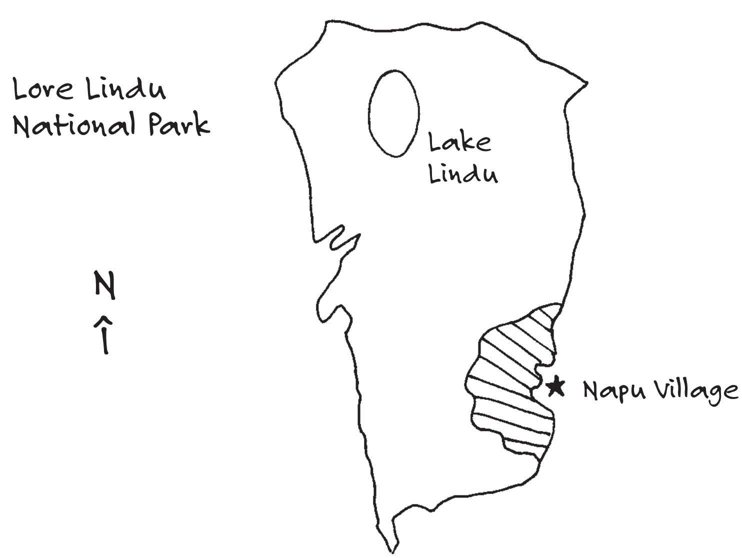
TRA Worksheet / Side A

SITE NAME: TNC Butterfly and Honey Enterprise Project, Sulawesi, Indonesia	
SITE DESCRIPTION: Napu Valley Site	
ASSESSMENT PERIOD: January 1994 **TO** September 1997	**COMPLETED ON:** October 14, 1997
COMPLETED BY: Duncan, Agung, and Nick	

	THREATS	CRITERIA RANKINGS			TOTAL RANKING	% THREAT REDUCED	RAW SCORE
		AREA	INTENSITY	URGENCY			
A	Illegal rattan harvesting	4	1	2	7	10	0.7
B	Dam construction	3	4	1	8	80	6.4
C	Coffee cash crops	2	2	4	8	5	0.4
D	Subsistence agriculture	1	3	3	7	0	0.0
E							
F							
G							
	TOTAL	10	10	10	30		7.5

TRA INDEX FORMULA	TOTAL RAW SCORE		TOTAL RANKING		CONVERT TO PERCENTAGE				TRA INDEX
TRA INDEX CALCULATION	7.5	÷	30	=	0.25	x	100	=	25 %

SITE MAP



TRA Worksheet / Side B

EXPLANATION OF THREATS	
A	**Threat** Illegal rattan harvesting – harvesting rattan from the National Park
	100% Reduction = Eliminating any illegal and/or unsustainable harvesting
B	**Threat** Dam construction – construction of a dam on a major river by the
	government
	100% Reduction = Stopping construction and plans for construction
C	**Threat** Coffee cash crops – conversion of primary forest land to plantation crops
	100% Reduction = Eliminating conversion of primary forest for purposes of plantation
	crops
D	**Threat** Subsistence agriculture – clearing of land to plant subsistence crops
	100% Reduction = Eliminating conversion of primary forest for purposes of
	subsistence crops
E	**Threat**
	100% Reduction =
F	**Threat**
	100% Reduction =
G	**Threat**
	100% Reduction =

Photocopy this form or draw your own. Note that your project may have as few as 2 or 3 threats or as many as 10. If so, adapt this worksheet to your needs.

Comparing the Approaches

As is the case with all research methods, the final results of the TRA approach will only be as reliable as what goes into the process of using the approach. Results can easily be biased by invalid assumptions, inaccurate estimates, or inadequate or erroneous data. We have summed up a comparison of the TRA and biological indicator-based approaches to measuring conservation project success in the table on the next page. As you can see, each type of approach has advantages and disadvantages of both a theoretical and a practical nature. When it comes to using monitoring and evaluation as an effective management tool for conservation practitioners in the field, we believe that the TRA approach has some real advantages over the biological indicator-based approach. These are discussed in more detail following the table.

The TRA Approach vs. the Biological Approach*

	CRITERION	TRA APPROACH	BIOLOGICAL APPROACH
THEORETICAL ASPECTS	**Directness of measurement**	− a more indirect measurement of biodiversity	+ a more direct measurement of biodiversity
	Consistency and unambiguity	− qualitative measurements are more open to subjectivity	+ less subjective and thus less likely to bias
	Sensitivity to temporal changes	+ sensitive to changes in shorter time periods (1-5 years)	− difficult to measure change over short time frames, especially given natural variation
	Sensitivity to spatial changes	+ sensitive to changes in entire project site	− vulnerable to bias based on choice of sampling sites
	Analytical uses	+ allows direct comparisons between different types of projects	− difficult to create standardized indices across different types of projects
PRACTICAL ASPECTS	**Ease and cost of data collection**	+ based on data obtained through simple biological and social techniques; can be done by most project teams + data can be collected as part of routine project activities	− based on data collected through complex biological techniques; difficult for many project teams − data must be collected outside of project activities
	Ease in data interpretation	+ readily interpreted by project staff − score not directly linked to specific biodiversity	− can be difficult to interpret, especially by project staff + directly linked to biodiversity
	Retrofitability	+ can be done in retrospect	− requires baseline data to have been collected

*Minus and plus signs indicate disadvantages (−) and advantages (+) based on each criterion.

Advantages of the TRA Approach

As we have stressed throughout this guide, there are several significant advantages to the TRA approach. This section elaborates on each of them with specific comments and examples.

The TRA approach can measure changes over short time periods.

One advantage of the TRA approach is that it is more sensitive to changes over short time periods. For example, in a forest area under threat from selective logging, the TRA approach directly measures whether the logging is continuing or has been halted. The biological approach, however, is not useful in measuring changes over brief periods, especially in relation to naturally occurring fluctuations in populations of indicator species. For instance, significant changes in the density of an indicator bird species in a forest may not be apparent for years after the onset of logging activities. Furthermore, it may be difficult to determine whether an observed reduction in the bird species is due to the effects of the logging or is a part of normal population fluctuations.

The TRA approach can measure changes throughout the project site.

The TRA approach also reflects changes that occur throughout the project site. Biological indicators may focus on one part of a site and may, therefore, not reflect changes occurring in other parts. For example, a research plot left undisturbed would not reflect the impact of logging occurring in the forest just beyond the boundaries of the plot or throughout the forest. However, the TRA approach considers changes throughout the project site by addressing the area, intensity, and urgency of the threats.

The TRA approach can be used to compare different project sites.

The TRA approach can be used to create a standardized index that compares different project sites occurring in vastly different biological and socioeconomic contexts. In large part, this is because the **TRA Index** is "unit-less" in that it calculates the percentage of threat reduction at each site. It is generally more difficult to create unit-less and yet meaningful indices with biological data, especially across different ecosystem types. Given the somewhat inexact and subjective nature of the TRA approach, it would be hard to claim that there is a truly significant difference between projects that differ in their TRA ranking by a few percentage points. However, we believe that there is a meaningful difference between a project that scores 25% and one that scores 75%. And, as is the case for any assessment, the reliability of the results improves if the TRA approach is applied in a standardized fashion and on a regular basis.

The TRA approach can use both social and biological data collection methods and types of data.

Unlike the biological approach, which is restricted in the data it can use, the TRA approach can use data collected through biological techniques and/or social science techniques, such as key informant interviews and inspection of project records. Social research techniques tend to be less expensive and easier to use, especially because they are linked to the interventions being undertaken and can thus typically be done by project staff or community members as part of their routine work.

The TRA approach produces results readily interpreted by practitioners and community members.

Data from the TRA approach can also be readily analyzed and interpreted by project staff and community members. In every case in which we have applied the TRA approach, the process of reviewing the project has catalyzed long and involved discussions among project members regarding both the impact of the project to date and adjustments that need to be made. One problem we found, however, is that it can be difficult at times to establish the linkage between threats and the biodiversity of the target condition of the site. It is thus important to tie these discussions to a conceptual model of the project so that all project team members can see how the threats affect the target condition.[19]

The TRA approach can be done retrospectively to assess projects in progress.

The TRA approach can be used to analyze ongoing projects. It is much easier to retrospectively "re-create" baseline data for threats than it is for land-use or populations of indicator species. This is often necessary as the vast majority of conservation projects are launched without collecting baseline data for use in evaluating future interventions.

Some Closing Words

The TRA approach to measuring conservation success is not without its limitations. As we have discussed, for example, it is not a completely direct and precise measurement of the state of the biodiversity at a project site. It is, however, a practical and cost-effective method for getting some sense of whether or not a project is meeting its conservation goals. We believe that the TRA approach can overcome many of the constraints that are currently keeping projects from monitoring the impacts of their efforts. It also has the potential to make the monitoring data available and understandable to the people who make decisions about conservation at the site—the project teams and community members.

Any successful assessment of a project's conservation impact must not completely abandon the traditional biological approach to measuring project success. Instead, the TRA approach can complement the biological approach. Wherever possible, you should attempt to use both approaches, as well as *process approaches* that assess the degree to which the project has implemented its planned activities.[20] In effect, all four parts of a project should be monitored: the state of the target condition, the success in reducing threats, the process of implementing interventions, and the health of the institutions responsible for these interventions *(pages 8-11).* Using multiple approaches will ensure that you are able to more reliably measure success and that you can compare the different approaches and use them to test, cross-check, and calibrate one another. This process will also help you test assumptions about your project and change your project activities as necessary—a process that is the foundation of adaptive management.[21]

The TRA Worksheet

In this section of the guide, you will find a blank **TRA Worksheet,** which you can use as is or modify to meet your needs. The one we include provides space for seven threats to be assessed; however, your project may have as many as ten or as few as two. You may decide to create a large version of the worksheet, perhaps on a flip chart, to use in facilitating a group effort to conduct the assessment. Keep in mind that you can and, most likely, will want to conduct this assessment at least a couple of times in the course of a project. Having on hand the series of your completed worksheets for the various assessments can provide a valuable history of your team's progress. It can be useful in briefing new project team members and in presenting progress toward goals and desired results to donors, partners, community members, and others who have a stake in the success of your project.

TRA Worksheet Step-by-Step

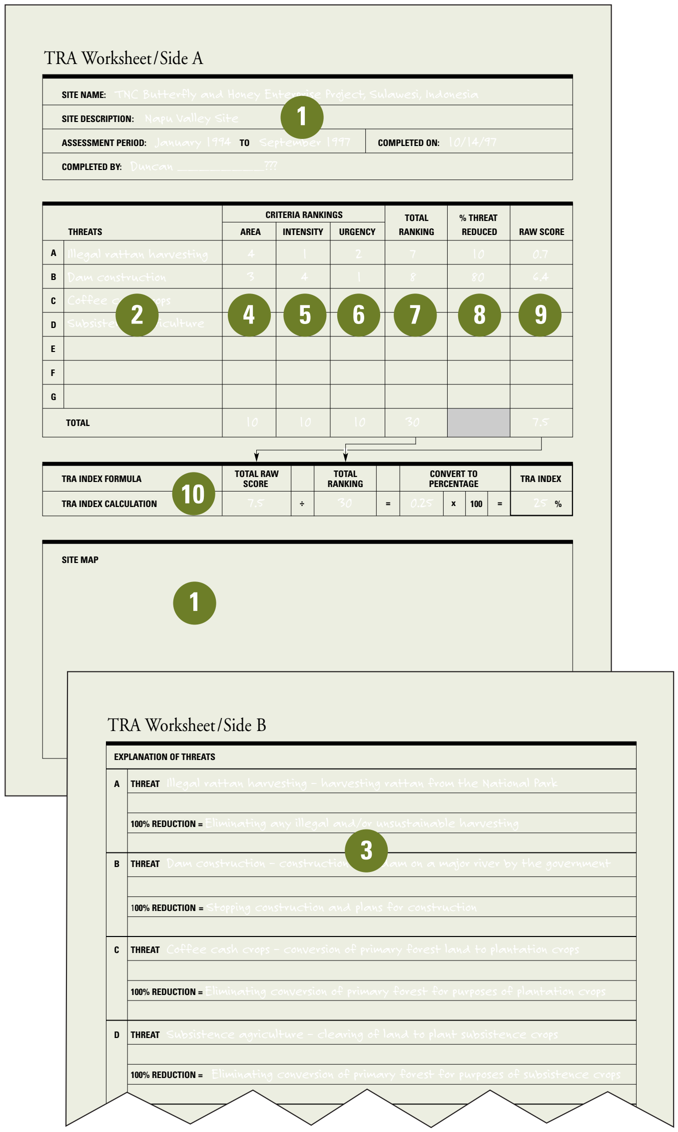
1 Define the Project Area in Space and Time. Fill in the top section of the **TRA WORKSHEET/SIDE A,** recording site name, site description, and assessment period, plus the date the worksheet was completed and by whom. In the site description, define the biodiversity in terms of area, species, or both. At the bottom of the worksheet, draw a site sketch map to complete the documentation of the site being assessed. *(See pages 14-15.)*

2 Develop a List of All Direct Threats. On the worksheet, in the column headed **THREATS,** write the names of the threats you have identified. *(See pages 16-17.)*

3 Define the Threats and What 100% Reduction Means for Each. On **SIDE B** of the worksheet, record your definition of each threat and your explanation of what 100% reduction (elimination) means. *(See pages 18-19.)*

4 Rank Each Threat for Area. In the column headed **AREA,** list your ranking of the threats based on the area affected, with the largest number (equal to the total number of threats) assigned to the threat affecting the largest area and continuing down to a rank of #1 for the smallest area. Add up the total of the ranking numbers and record that total at the bottom of the column. (*See pages 20-21.)*

5 Rank Each Threat for Intensity. In the next column, headed **INTENSITY,** write the rankings you assigned to the threats based on the impact or severity of destruction, again with the largest number (equal to the total number of threats) assigned to the threat of greatest intensity and continuing down to a rank of #1 for the least intense threat. Add up the total of the ranking numbers and record that total at the bottom of the column. *(See pages 22-23.)*



6 Rank Each Threat for Urgency. In the column headed **URGENCY,** list the rank ordering you established for the threats, with the largest number (equal to the total number of threats) assigned to the most immediate threat and continuing down to a rank of #1 for the least immediate or urgent threat. Add up the total of the ranking numbers and record that total at the bottom of the column. Before proceeding to Step 7, be sure that the three column totals add up to the same number, and, if not, correct the numbers. *(See pages 24-25.)*

7 Add Up the Ranking Scores. For each threat, add up the ranking numbers across the three columns, **AREA, INTENSITY,** and **URGENCY.** Write the total in the column headed **TOTAL RANKING.** Add these numbers and write the total at the bottom of the column. Before proceeding to Step 8, make sure that the totals of the **AREA, INTENSITY,** and **URGENCY** columns add up to the same number you wrote at the bottom of the **TOTAL RANKING** column. If not, correct your numbers before doing any further calculations. (*See pages 26-27.)*

8 Determine the Degree to Which Each Threat Has Been Reduced. In the column headed **% THREAT REDUCED,** write down the percentage of reduction accomplished for each of the threats. Note that there is no total for this column, as each number stands by itself as a measurement of the degree to which each threat, assessed individually, has been reduced. *(See pages 28-29.)*

9 Calculate Raw Scores. For each threat, multiply the number in the column headed **TOTAL RANKING** by the percentage you recorded in the column for **% THREAT REDUCED.** When you do this, remember to convert the percentage to a decimal (e.g., 23% becomes 0.23). Either way, you will reach a "raw score" for the threat. Then total the numbers you have written in the column headed **RAW SCORE,** and write that total at the bottom of the column. You will use this **TOTAL RAW SCORE** in Step 10 to determine the final **TRA INDEX.** *(See pages 30-31.)*

10 Calculate the TRA Index. Using the formula on the worksheet, complete the final calculation. To do this, copy the **TOTAL RAW SCORE** into the first space and the **TOTAL RANKING** in the second space. Then perform the calculation indicated to complete the equation. Write the resulting number, expressed as a percentage, (for example, record 0.36 as 36%) in the box below the words **TRA INDEX.** *(See pages 32-33.)*

TRA Worksheet / Side A

SITE NAME:		
SITE DESCRIPTION:		
ASSESSMENT PERIOD:	**TO**	**COMPLETED ON:**
COMPLETED BY:		

THREATS		**CRITERIA RANKINGS**			**TOTAL RANKING**	**% THREAT REDUCED**	**RAW SCORE**
		AREA	**INTENSITY**	**URGENCY**			
A							
B							
C							
D							
E							
F							
G							
TOTAL							

TRA INDEX FORMULA	**TOTAL RAW SCORE**		**TOTAL RANKING**		**CONVERT TO PERCENTAGE**				**TRA INDEX**
TRA INDEX CALCULATION		÷		=		x	100	=	%

SITE MAP

TRA Worksheet / Side B

EXPLANATION OF THREATS	
A	**Threat**
	100% Reduction =
B	**Threat**
	100% Reduction =
C	**Threat**
	100% Reduction =
D	**Threat**
	100% Reduction =
E	**Threat**
	100% Reduction =
F	**Threat**
	100% Reduction =
G	**Threat**
	100% Reduction =

Photocopy this form or draw your own. Note that your project may have as few as 2 or 3 threats or as many as 10. If so, adapt this worksheet to your needs.

ENDNOTES

1 For example: Noss 1990, Spellerberg 1991, Cintrón et al. 1993, Sparrow et al. 1994, The Nature Conservancy 1997, Olson and Dinerstein 1997.

2 See Olson and Dinerstein 1997.

3 See Noss 1990.

4 See Kremen et al. 1994, Salafsky 1994, BCN 1997a, Margoluis and Salafsky 1998.

5 For example: McNeely et al. 1990, Kremen et al. 1994.

6 For example: McNeely et al. 1990, Kremen et al. 1994.

7 For example: The Nature Conservancy 1997, Bryant et al. 1998, Margoluis and Salafsky 1998.

8 See Margoluis and Salafsky 1998.

9 See Margoluis and Salafsky 1998.

10 See Mausner and Bahn, 1974.

11 See BCN 1996, 1997a, 1997b, or www.BCNet.org, accessed October 1998.

12 See BCN 1996, 1997a, 1997b.

13 See BCN 1998.

14 See Margoluis and Salafsky 1998.

15 See Margoluis and Salafsky 1998, p. 39.

16 See Margoluis and Salafsky 1998, pp. 88, 96.

17 For more examples, see Salafsky, N., B. Cordes, J. Parks, and C. Hochman 1999.

18 See BCN 1996, 1997a, 1997b.

19 See Margoluis and Salafsky 1998, p. 27.

20 See Margoluis and Salafsky 1998.

21 See Holling 1978, Lee 1993, Margoluis and Salafsky 1998.

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