

5-2011

# EXAMINATION OF QUALITATIVE METHODOLOGY USEFULNESS IN ASSESSING MANAGEMENT EFFECTIVENESS OF PROTECTED AREAS: A CASE STUDY OF MEXICO

Carla Mora-trejos  
Clemson University, cmora@g.clemson.edu

Follow this and additional works at: [https://tigerprints.clemson.edu/all\\_theses](https://tigerprints.clemson.edu/all_theses)

 Part of the [Environmental Sciences Commons](#)

---

## Recommended Citation

Mora-trejos, Carla, "EXAMINATION OF QUALITATIVE METHODOLOGY USEFULNESS IN ASSESSING MANAGEMENT EFFECTIVENESS OF PROTECTED AREAS: A CASE STUDY OF MEXICO" (2011). *All Theses*. 1056.  
[https://tigerprints.clemson.edu/all\\_theses/1056](https://tigerprints.clemson.edu/all_theses/1056)

This Thesis is brought to you for free and open access by the Theses at TigerPrints. It has been accepted for inclusion in All Theses by an authorized administrator of TigerPrints. For more information, please contact [kokeefe@clemson.edu](mailto:kokeefe@clemson.edu).

EXAMINATION OF QUALITATIVE METHODOLOGY USEFULNESS IN  
ASSESSING MANAGEMENT EFFECTIVENESS OF PROTECTED AREAS: A CASE  
STUDY OF MEXICO

---

A Thesis  
Presented to  
The Graduate School of  
Clemson University

---

In Partial Fulfillment  
of the Requirements for the Degree  
Masters of Science  
Parks, Recreation, and Tourism Management

---

by  
Carla Mora-Trejos  
May 2011

---

Accepted by:  
Dr. Elizabeth Baldwin, Chair  
Dr. Brett Wright  
Dr. Robert Baldwin  
Dr. Robert Powell

## ABSTRACT

Parks and Protected Areas (PAs) are an important approach for conservation of cultural and natural diversity worldwide (Bruner 2001; McNeely 1994; Rao & Geisler 1990). Their long term success depends on effective management in relation to the goals set forth for the PA. Measuring this can be complex and challenging and has been done in a variety of ways in order to better get at the answer of how to measure management effectiveness. The purpose of this research was to develop and test qualitative methodology designed to explore management effectiveness using all six elements from the WCPA framework (Hockings et al. 2000), by interviewing experts from a region of interest. Qualitative data has been collected to measure management effectiveness, but not used as an analysis strategy. We were interested in its usefulness for both. Our setting for this research was the Federal PAs of Mexico due to the stated combined goals of managing for conservation of biodiversity and sustainable development. We interviewed a total of eight experts from Mexico whose work is about conservation in Mexico. Experts make decisions based on compiled knowledge (Anderson 1983) and are able to integrate Functional, Structural and Behavioral elements into analyses and representations of complex systems, making the methodology able to assess individual areas as well as systems of PAs. The proposed methodology proves to be useful as a complementary tool to the current management effectiveness systems. It provides an in depth understanding, a larger context, and answers the how and why, other management effectiveness systems have not been able to reach, therefore, helping the discipline of conservation to be more efficient and effective, by providing a better chance for well informed management decision making, and resource allocation.

## PREFACE

Parks and Protected Areas (PA) are an important strategy for the protection of biodiversity, ecosystem services, cultural resources and recreational opportunities (Bruner 2001; Hockings et al. 2006; McNeely 1994; Rao & Geisler 1990). This strategy requires investment supported through management with clear measurable objectives and a transparent system of evaluation of actions, and consequently a guide for future actions (Hockings 2003; Hockings et al. 2006; Valerie Kapos 2008). This is especially true when there are more needs than there are resources to spend, and thus the call for “increased efficiency, effectiveness, and accountability in conservation practice” (O'Neill 2007).

In 2000, the World Commission on Protected Areas (WCPA) published the Management Effectiveness Assessment Framework (Hockings et al. 2000) that evaluates management through six elements. The framework has been measured with quantitative and qualitative data inputs, but always with quantitative analysis. Most studies have focused on one to a few of the six elements of the framework. For the purpose of this research I developed a purely qualitative management effectiveness assessment tool, with the goal of using it to assess all six elements of the WCPA framework. The six elements of the framework are; 1) Context, 2) Planning, 3) Input, 4) Process, 5) Output, and 6) Outcome. The goal of using purely qualitative methods was to provide an in-depth understanding of issues in an individual PA, as well as systems of PAs through the use of expert opinion. The methodology I developed specifically for this research I have named Qualitative – Expert Opinion Methodology and this research tested it in the context of Federal Protected Areas of México.

The study site was determined from interviewing conservation professionals at an international conference for the Society of Conservation Biology in the summer of 2008. Mexico has a similar history of federal land protection to the United States, however resources for parks are less available and therefore, there are a vast array of community models that include people in the design, and thus an interesting area to learn about innovative partnerships for management effectiveness. Also, the federal PA system's in Mexico was a standard management framework for focusing the study. These areas are managed for conservation of natural values such as biodiversity and endangered species, as well as economic and social components. The growing human pressures on PAs worldwide represent an important challenge for PAs; therefore any lessons of management effectiveness coming from Mexico could be reproduced in other settings with similar characteristics.

This thesis is presented as a paper for publication following the guidelines of Conservation Biology, the target journal; with the purpose of communicating with a wide audience. The paper includes an introduction with a literature review, followed by methods that include a description of the study site, and the two different phases of the research process described in more detail in the following paragraphs.

Phase I included interviews with experts in the summer of 2008 at the Society for Conservation Biology Conference in Chattanooga, TN. This was done to refine the study, and verify research questions. The key change that came from this process was to broaden the focus from one region (Chiapas), and focus on one particular system, the

Mexican Federal Protected Areas. This was suggested due to the similar goals and objectives all areas have in this system, and that an exploratory study such as this would benefit from including the diversity of management strategies across the country. The final verification strategy was to take the proposal to a conservation leader for all of Mexico; that is also a native of Mexico, to comment on our research plan. This was done in March of 2009, and the design was supported, and work on Phase II began.

Phase II, which is the central focus of this thesis, was initiated with the development of qualitative tools, designed to assess management effectiveness, and then the testing of those tools in a real world setting. Three tools were developed; a conceptual framework for interviewing, and two types of visual interview aids. The qualitative tools were all used to guide interviews done with Experts on Mexican PAs that were also all from Mexico. Interviews took place in Merida, Mexico at the Wild9 conference with PA professionals in November 2009. Interviews were conducted in Spanish, and then translated and transcribed verbatim. This allowed two researchers to conduct text analysis of the data for reliability of analysis.

The conceptual framework I developed specifically for this Masters research, Appendix A, includes as foundations the WCPA framework for assessing management effectiveness (Hockings et al. 2000), combined with the three part guide for interviewing from (Seidman 2006). The purpose of the framework was to serve as a list of topics to be addressed by the interviewer, suggested approaches for addressing elements of

management effectiveness, and as a guide for the management of the data and its analysis.

The visual interview tools were designed to produce information at different scales. One visual tool was a series of maps of Mexico and North and Central America which allowed for systems level information to come from the interviewee. A second was a personal and professional values map that allowed for personal scale reflection in the interviews. All proved useful, and generated interesting results from each of the participants. The results are presented without identifiers, and are all found in the appendices and include: Conceptual Framework tool, Data collected and organized in the conceptual framework, Visual tools, data collected with the visual tools, as well as a list of abbreviations.

In qualitative methods the role of the researcher is important to clarify. It is customary for one researcher to interview and conduct the first analysis the data because the researcher is the instrument of research. Training in qualitative methods is vital. Having a shared cultural background and speaking the same language as the interviewees makes the data collected and its analysis richer in terms of the depth that can be reached. It can help in terms of the context, as well as making it easier to prompt for further detail and explanation of the context more specific ways. I share a similar cultural background with Mexican citizens being a native of Latin America, speaking the Spanish language, and coming from the same discipline of the biological sciences and protected area management and can understand the culture of the disciplines, as well as the interest for

conservation, and the technical language that comes with it. I believe that Mexico is a place with many effective strategies for conservation that can be replicated or serve as example for PA systems that are struggling with similar challenges as Mexico's PA system and Mexican experts the perfect source of knowledge to elicit all this valuable information.

The data collected suggests that the tools I developed are useful to assess effectiveness of particular PAs as well as PAs Systems through expert opinion. The data collected provides in-depth insight of why and how PAs are dealing with the issues on the ground the way that they are. Insight was also gained with how professional define efforts and systems in their country with lines on a map. For example the interviewees note that the South of Mexico has very particular characteristics that are different from the north that affect conservation planning and decisions. The south has higher diversity, is tropical like Central America, but has higher levels of poverty and unorganized indigenous cultures. The north has very organized indigenous cultures and this knowledge needs to be included for successful conservation strategies. Interviewees shared many stories from experience working in different areas on projects that shed light about the interesting ways these professionals work with the local communities. For one in particular the locals would not speak to him until he had his own land in the area and had cows on the land. Mexico may provide many lessons about the relationships between communities and people promoting conservation strategies to support PA. This qualitative tool has the potential of being a great complement for the current management assessment methodologies, because it provides a different perspective on the issues

currently assessed only in a generalizable way through quantitative methods. Essentially they can work together to complement gaps in understanding the complex nature of what works and how it works in the successful management of PA.

## ACKNOWLEDGEMENTS

Thanks to Dr. Wright for his guidance and for giving me the opportunity to come to Clemson.

Thanks to Betty, my advisor, who with great savvy, patience, and emotional support, taught me about research and researchers, and guided me step by step through this, such an abstract first journey.

Thanks to Dr. Rob Baldwin and Dr. Bob Powell for essential feedback in the design of this research and the writing of this document.

Thanks to Jeremy, my lighthouse, who has been there in the good ones and the bad ones, and is still there.

To my Parents and Dr. Carazo who believed in my capacities and thought I could go further even before I could understand what that meant.

Thanks to all my family and friends who have constantly shared their positive energies and recharged our batteries.

Thanks to my Father, Mother, D. Mary, and D. Freddy, sponsors of this project.

My dream of nature was nurtured by many figures in my life, thanks to all of them.

## TABLE OF CONTENTS

	Page
TITLE PAGE .....	i
ABSTRACT .....	ii
PREFACE .....	iii
ACKNOWLEDGEMENTS .....	ix
TABLE OF CONTENTS .....	x
LIST OF TABLES .....	xi
INTRODUCTION.....	1
METHODS.....	7
Study Site .....	9
Data Collection.....	11
Expert Knowledge and Recruitment .....	11
Qualitative – Expert Opinion Methodology .....	12
Interviews .....	16
Data Analysis .....	17
RESULTS AND DISCUSSION.....	20
CONCLUSIONS .....	35
REFERENCES.....	38
APPENDICES.....	43

## LIST OF TABLES

Table 1. Components and elements of the WCPA Framework for PA Management Effectiveness Assessment (Hockings et al. 2000)	3
Table 2. Methodologies that use the WCPA framework (2000) for assessing management effectiveness	4
Table 3. Kinds of PAs in Mexico and the kind of management entities.	10
Table 4. Interview framework for qualitative research suggested by Seidman (2006)	13

## LIST OF FIGURES

Figure 1: Visual Tools for interviewing—Value Maps.....	15
Figure 2: Visual tools for expert opinion elicitation: Maps of Mexico and Mexico in a regional context. ....	16
Figure 3. Diagram illustrating the process of this research. ....	19
Figure 4. Some features reported in the maps that have to do with divisions of the country and important places. ....	29
Figure 5. Example of what was recorded on one of the participants map.....	30
Figure 6. Participant feedback on modifications to Value Map .....	34
Figure 7 Changes to Values Map .....	34

## INTRODUCTION

Parks and Protected Areas (PA) are an important approach for conservation of cultural and natural diversity worldwide (Bruner 2001; McNeely 1994; Rao & Geisler 1990). Local and national governments and other stakeholders invest in the protection of their biodiversity, environmental services, as well as the cultural and recreational values (Hockings et al. 2006). This investment needs to be supported through management with clear measurable objectives, evaluation, and results communicated with transparency in order to show effectiveness of management actions, and consequently guide future actions (Hockings 2003; Hockings et al. 2006; Valerie Kapos 2008). Management actions are also based often on experience of experts in other areas with similar challenges and opportunities, and can include work with local residents (Meffe 2006).

The legislation and management plans that follow the original US model of national parks historically excluded communities and ignored land uses and values of local communities (McNeely 1994; Meffe 1997; Terborgh 2002; West 1991). This approach is very difficult to follow in places where people live in areas that are deemed to have important values for conservation, while still providing subsistence for local people (Tolisano 2000), such as the developing world (Rao & Geisler 1990; West 1991). Long term success of PA depends on understanding this complex relationship between people and the land. More recent models of PA see local stakeholders and indigenous peoples as necessary planning and management components in designing and implementing strategies for successful conservation (Margolis and Salafsky 1999).

The purpose for a particular PA establishment is an integral measure for its success. Using this in combination with PA values as they change overtime, incorporating new information and science, makes for a more thorough measure of success. Incorporation of natural and cultural values within a social system is very complex. However, successful management depends directly on many social factors; (a) the socio-cultural context where a PA is located, (b) the role of a PA in rural development (Machlis 2000), and (c) the integration of the practices, needs and efforts from the local community (McNeely 1994; Meffe 1997; Moguel & Toledo 1999; Pimentel et al. 1992; West 1991). Such a complex endeavor can only be addressed with a combination of approaches (Salafsky et al. 2001). Managers require rigorous and objective evaluation (Kellert et al. 2000), and monitoring of the effectiveness of actions in order to identify problems and determine where to focus their resources and efforts (Hockings 2003).

In 2000, the World Commission on Protected Areas (WCPA) published the Management Effectiveness Assessment Framework as part of the Best Practice Protected Area Guidelines Series (Hockings et al. 2000). It measures management through 3 components and six elements found in Table 1, (Hockings et al. 2000). This framework provides an opportunity for a system of possible indicators to be included when designing effectiveness evaluation of PAs (Hockings 2003).

Components:	Elements:	Focus of Evaluation:
1. Design issues related to both individual sites and PA systems	1. Context	Status
	2. Planning	Appropriateness
2. Appropriateness of management systems and processes	3. Input	Resources
	4. Process	Efficiency and Appropriateness
3. Delivery of PA objectives	5. Output	Effectiveness
	6. Outcome	Effectiveness and Appropriateness

Table 1. Components and elements of the WCPA Framework for PA Management Effectiveness Assessment (Hockings et al. 2000)Table 1. Components and elements of the WCPA Framework for PA Management Effectiveness Assessment (Hockings et al. 2000)

Different organizations such as the USAID’s Central American Regional Environment Program, The Nature Conservancy (TNC), National Oceanographic and Atmospheric Administration (NOAA), International Union for Conservation of Nature (IUCN) and the World Wildlife Fund (WWF) use this WCPA (2000) framework as a foundation for their programs. Some of these methodologies are listed in Table 2.

Related to Land PA	
Rapid Assessment and Prioritization of PAs Management – RAPPAM	(Ervin 2003)
Management Effectiveness Tracking Tool – METT	(Stolton et al. 2003; Stolton et al. 2006)
Measuring success of management actions in the PAs of Central America – PROARCA/APM USAID Central American Project for Protected Areas and Environmental Marketing (PROARCA/APM)	(Herrera & Corrales 2004)
Related to Marine PA and Heritage Sites	
How is your MPA doing – NOAA/IUCN/WWF	(Pomeroy et al. 2004)
Manual for Rapid evaluation of management effectiveness of MPAs – PROARCA/APM/SAM/USAID/TNC/CCAD	(Corrales 2005)
Enhancing our Heritage – UNESCO	(Hockings et al. 2008)

Table 2. Methodologies that use the WCPA framework (2000) for assessing management effectiveness

An alternative framework developed by The Nature Conservancy (TNC) differs from the WCPA framework by using a model closely tied to adaptive management constructs. Specifically, some of the programs that use it are the following: Parks in Perils Program (Brandon 1998), Measures for Conservation Success, Conservation Action Planning (CAP), and Conservation by Design. These are all based on an Adaptive Management Framework for “planning, implementing and measuring success for conservation projects” (TNC 2007).

Regardless of which of the previously mentioned frameworks is used to assess management effectiveness, literature suggests that strong collaboration between social and biological scientists will more accurately assess impacts of humans and human-dominated landscapes (Nyhus et al. 2002). It also suggests that qualitative and social variables should be included, as well as political, economic, and cultural threats (Stem et al. 2005). These qualitative aspects have been assessed in the past, but generally quantified into numeric values converted to numerical data on scorecards, as rates, or into Likert type scales. In the description of the methodologies, there is a stated intention of including qualitative methods, but no clear procedures for it; suggesting it is rarely used, or at least not in a transparent repeatable manner. These measurement tools used currently focus on the general information allowing conservation scientists to answer the questions related to what is going on and what might be more effective. However, a tool that can focus on particular answers to the questions of how a system works or why it does not work may prove very useful.

Hockings (2003) examined 27 PA management effectiveness methodologies and how they relate to the WCPA framework, and divided them into two groups. Ten of the methodologies were based on data coming from monitoring systems and 17 were based on qualitative data quantified into scores. Only seven of the methodologies considered more than three of the six elements from the WCPA framework (Hockings et al. 2000). Eleven of the methodologies included monitoring data, and were designed as long-term assessments and were site-based; seven methodologies relied on scoring and quantifying qualitative data, and were rapid assessments. Most examined systems instead of particular areas (Hockings 2003). Only one assessed all six elements and was developed from the framework directly. If all six

framework elements are used in a methodology, the framework claims to help assess effectiveness through a complete vision of PA management (Hockings 2003).

Although, Hockings (2003) reported the importance of qualitative data, none of the 17 studies based mainly on qualitative data managed it with a qualitative methodology of analysis. Qualitative data gathered for these studies were converted to scales or used in scoring for rapid assessment. A tool able to manage these qualitative data through qualitative methods will result in more thorough and complete information and consequently managerial decisions with less uncertainty.

The growing human pressures on PA worldwide represent an important challenge for managing PA which will require new strategies. Mexico has a similar history of federal land protection to the United States, however resources for parks are less available and therefore there are a vast array of community models that include people in the design, and thus an interesting area to learn about innovative partnerships for management effectiveness. Also, the federal PA system's in Mexico was a standard management framework for focusing the study. These areas are managed for conservation of natural values such as biodiversity and endangered species, as well as economic and social components. The growing human pressures on PAs worldwide represent an important challenge for PAs; therefore any lessons of management effectiveness coming from Mexico could be reproduced in other settings with similar characteristics.

Literature suggests the need of a methodology that allows in-depth results that could answer why and how management is or is not effective, and why and how the status of a particular PA is in its current state, a task more effectively achieved through the use of qualitative data managed in a qualitative way. Based on this need, the purpose of this research

was to test a purely qualitative methodology designed to assess PA management effectiveness. Specifically we set out to answer how a qualitative methodology is useful in measuring management effectiveness. Further, we were interested in interview tools to elicit information at different scales, and the effectiveness of these tools. The methodology used interviews with experts about a particular place, and from that place. Interviews were conducted in the native language of the experts interviewed, in this case Spanish. The data were then analyzed qualitatively, and considered all six elements from the WCPA framework. The laboratory for this study is Mexico's federal PA system using experts from Mexico whose work is about Mexico, in an effort to reach depth and richness in context, based on their knowledge and experience.

## METHODS

Qualitative methodology was chosen for this research because it facilitates an in depth search for meaning and understanding of phenomena, helping answer questions like how are the processes or phenomena occurring and why. Other characteristics include the use of the researcher as the instrument of data collection and analysis (Merriam 2002), data collected in naturalistic settings, a product that goes beyond just reporting results by providing rich descriptions and context of meaning. The focus is one of understanding the particular nature of how a system works without simplifying to the point of losing the understanding of the complex nature of the system (Stake 2010).

We used expert opinion about conservation in Mexico to assess effectiveness of PA in Mexico. Experts are capable of enhanced recall and forward reasoning by recognizing patterns and domains of expertise; they have the ability to solve fast a problem in the domain of expertise (Hmelo-Silver & Pfeffer 2004). "For the experts, the behavioral and functional levels serves as

the deep principles that organize their knowledge of the system”; they understand the behaviors and functions of a system and have a more elaborate network of concepts and principles representing key phenomena and their interrelationships (Hmelo-Silver & Pfeffer 2004). Also, an expert makes decisions based on “compiled knowledge” instead of separate signs (Anderson 1983) and are able to integrate Functional, Structural and Behavioral elements into analyses and representations of complex systems.

This research took place in two different phases. The first exploratory phase involved interviews and interaction between experts and the researchers in order to choose a study site and refine the research questions. The second phase, the focus of this research, consisted of the development of the purely qualitative methodology that uses expert opinion, its testing, the reposting of the results, and the analysis of improvements needed.

In the first phase, we interviewed 16 professionals from, and knowledgeable about PA in Mexico. Twelve from the Society for Conservation Biology Conference in Chattanooga, TN, July 11-18, 2008; three from the George Wright Society Biannual Meeting in Portland, March 2-6, 2009, and one international leader from a meeting on PA at Clemson University, March 4-6, 2009. The interviews were non-structured interviews, intended to get professional opinions about effectiveness of PA management in Mexico, and general context of conservation and natural resources policies and stakeholders. In addition to the interviews, we attended presentations related to Mexico’s Protected Areas at the two conferences.

This was done to refine the study, and verify research questions. The key change that came from this process was to broaden the focus from one region (Chiapas), and focus one particular system, the Mexican Federal Protected Areas. This was suggested due to the similar

goals and objectives all areas have in this system, and that an exploratory study such as this would benefit from including the diversity of management strategies across the country. The final verification strategy was to take the proposal to a conservation leader for all of Mexico; that is also a native of Mexico, to comment on our research plan. This was done in March of 2009, and the design was supported, and work on the central research project (Phase II) began. We expected the tool to provide lessons of PA management that could be of use in other places dealing with challenges such as Mexico's. These special characteristics will be described in detail in the next section.

### Study Site

The Reserve systems in Mexico are comprised of parks, reserves, and monuments which mostly fit in four main groups: (1) federal PAs which are managed by the National Commission on Natural Protected Areas (CONANP); (2) state PAs which are managed by the state government; (3) municipal or local PAs which are accordingly managed by the municipalities or small local governments; and (4) private PAs which are managed by different entities such as legal personae, Ejidal governments, NGOs, and associations, to name a few.

Kind of PA: (Parks, reserves, and monuments)	Managed by:
Federal areas	<ul style="list-style-type: none"> <li>• CONANP (National Commission on Natural Protected Areas)</li> </ul>
State areas	<ul style="list-style-type: none"> <li>• State government</li> </ul>
Private	<ul style="list-style-type: none"> <li>• Legal personae</li> <li>• Ejidal governments</li> <li>• NGO's</li> <li>• Associations</li> <li>• etc...</li> </ul>
Other	<ul style="list-style-type: none"> <li>• Municipalities</li> <li>• Local governments</li> </ul>

Table 3. Kinds of PAs in Mexico and the kind of management entities.

A significant number of PA contain human populations including indigenous and non-indigenous groups; which in some cases owned the lands prior to Protected Areas been designated (SEMARNAP 1995; World Bank 2002) and great part of these stay in this land tenure regimen called Ejidos, which is a kind of collective land tenure system exclusive to Mexico (SEMARNAP 1995).

Conservation approaches in Mexico pursue goals related to indigenous groups' cultural-religious significance and land uses, economic values of lumber resources, values of recreational resources, biodiversity conservation, endangered species habitat conservation, and sustainable development (SEMARNAP 1995) while struggling with the need to address rural poverty and promote rural development, which could potentially prevent the protection of many species not yet protected in the reserve system (Brandon et al. 2005).

Decisions about establishment of new conservation sites are commonly made along political rather than natural boundaries and some are known to have been selected in an ad hoc manner, without in depth consideration of maximum species protection per area (Cantú et al. 2004; Fuller et al. 2007; Justus & Sarkar 2002; Pressey 1994; Villaseñor 1998). According to Cantú et al. (2004), the existing system of federal nature reserves in Mexico, with at least 12% of the area adequately protected, is located with elevations higher than 3000m, and they only represent less than 1% of land area in the country. Interestingly, “most of the reserves are located in high elevation regions on steep slopes and on the poorest soils that are arguably of lowest economic value” (Cantú et al. 2004).

The growing human pressures on PAs worldwide represent an important challenge for PA. Mexico as the study site represents a great opportunity to test the tool, due to the human dimensions of the PA system and the complexity of its Federal PAs managing for natural values as well as economical and social components.

### Data Collection

The primary data for Phase II of this study came from interviews with experts from Mexico. The data collection tools developed specifically for this study used the interviews as a means of assessing the usefulness of this qualitative methodology for evaluating PA.

### Expert Knowledge and Recruitment

Expert knowledge is a resource that has been used as a basis for problem solving in business, management, policy and decision-making, grounded knowledge of conditions, assessment of best practices for conservation, evolution of habitats with climate change, species population projections, (Hylko 2005; Larichev 2002; Regan et al. 2000; Saffron J. O'Neill 2008;

Walton & Meidinger 2006). In natural resources management and conservation, it has been used to provide information for development of models because of a lack of, or low availability of useful reference data on the ground, such as surveying or monitoring systems (Walton & Meidinger 2006), due to time constraints, high cost, or the data is too difficult to retrieve from the field (Clevenger 2002; Lambeck 1997; Pearce 2001).

Experts were chosen based on their knowledge about conditions of the PAs in Mexico, managerial systems, conservation politics, and at the same time important insight about the interaction of all the mentioned components and components unknown to the researchers at the time of the study.

The participants were selected by talking to people in the WILD 9 conference and choosing experts based on their time working with protected areas in Mexico, and that they were Mexican citizens. The interviews lasted from 25 to 70 minutes. Each interviewee was asked for consent to be recorded with an electronic device, and for personal information. Each interviewee was also asked if they would mind future contact in case more comments were needed from them. In all cases, those asked to participate accepted and were eager to participate.

#### Qualitative – Expert Opinion Methodology

We developed a set of tools specifically for this study we call Qualitative-Expert Opinion Methodology, which is comprised of two components. The first component is a framework for inquiry, that brings together all the elements from the WCPA framework by (Hockings et al. 2000) Table 1., and the interview framework for qualitative research suggested by (Seidman 2006) and questions as examples of how to address elements and criteria to assess Sideman (2006). Sideman uses a three step framework for an interview in qualitative methods that builds

trust and retrieves insight from the data. These are (1) asking questions about the life history of the participant (2) asking factual questions about the topic of interest, and finally (3) asking participants to reflect on the meaning of the facts. This framework was designed for building a relationship between the interviewer and participant, with the goal retrieving more complex information that builds on the factual information and serves as context.

Phases of the Interview:	Examples of questions to address the assessed criteria and/or focus of inquiry:
1. Life History description	<ul style="list-style-type: none"> <li>• Personal and professional background</li> <li>• How long working with PAs, in what capacity</li> <li>• Where did they work before and now</li> </ul>
2. Fact description	<ul style="list-style-type: none"> <li>• Do PAs work as individual areas or systems?</li> <li>• What are the main threats for PAs?</li> <li>• How prepared is the management to deal with these threats?</li> </ul>
3. Reflection of the meaning	<ul style="list-style-type: none"> <li>• Why are the PAs not working as a system?</li> <li>• Where are these threats coming from and why?</li> <li>• How have the PAs dealt with the constraints or challenges related to achieve the objectives?</li> </ul>

Table 4. Interview framework for qualitative research suggested by (Seidman 2006).

The new framework developed for this research was essentially used as a guide for the interviewer to keep track of what was addressed and what still needed to be covered with more questions. It was very useful since the participants addressed many themes without prompts. These could be noted as the interviewee talked and then gaps could be covered during the later part of the interview. This flexibility was important in allowing the expert to drive the interview based on expertise, while maintaining a standard set of questions covered in each interview. This was used instead of an orally answered open ended questionnaire, due to the expertise of

participants, and in an effort for them to maintain control over the interview, and thus allow for richer sharing of information, and often storytelling.

The second component of the methodology was the use of two visual tools designed to allow the participants to think about answers easily without having to visualize in their heads, and then trying to explain. Writing and/or drawing on each visual tool was encouraged by the interviewer. Visual tools such as maps, drawings and most often photos have been used as an interview tool for a variety of reasons for research. The first is that the interviewee becomes the authority in the interview, showing the interviewer information visually, and explaining and teaching. It has also been found that interviews using visual aids are less tedious, and that including the more ancient visual part of the human brain encourages a more enjoyable experience and thus a richer source of data (Harper, 2002).

The first tool developed and used was a Values Map in which the expert could express their philosophy and values are in terms of PA management and conservation. The visual is a continuum in which the extreme left represents a philosophy based a 100% on Eco-biological values, and the extreme right represents the opposite, a philosophy based a 100% on Socio-economical value (Figure 1). As you move towards the center from either side, the philosophy is not as extreme and finally in the middle of both there is an area in which the philosophy values not only eco-biological components but also socio-economical components. This gray area where both philosophies merge represents the proposed idea of inter-disciplinary work between social and biological scientists. We expected this tool to open the discussion about management systems, and provide a chance for the participants to reflect on the meaning of information to them at a personal and professional scale. The participants were asked to mark (on a blank map) with one color their personal beliefs and with another one their organization's stance.

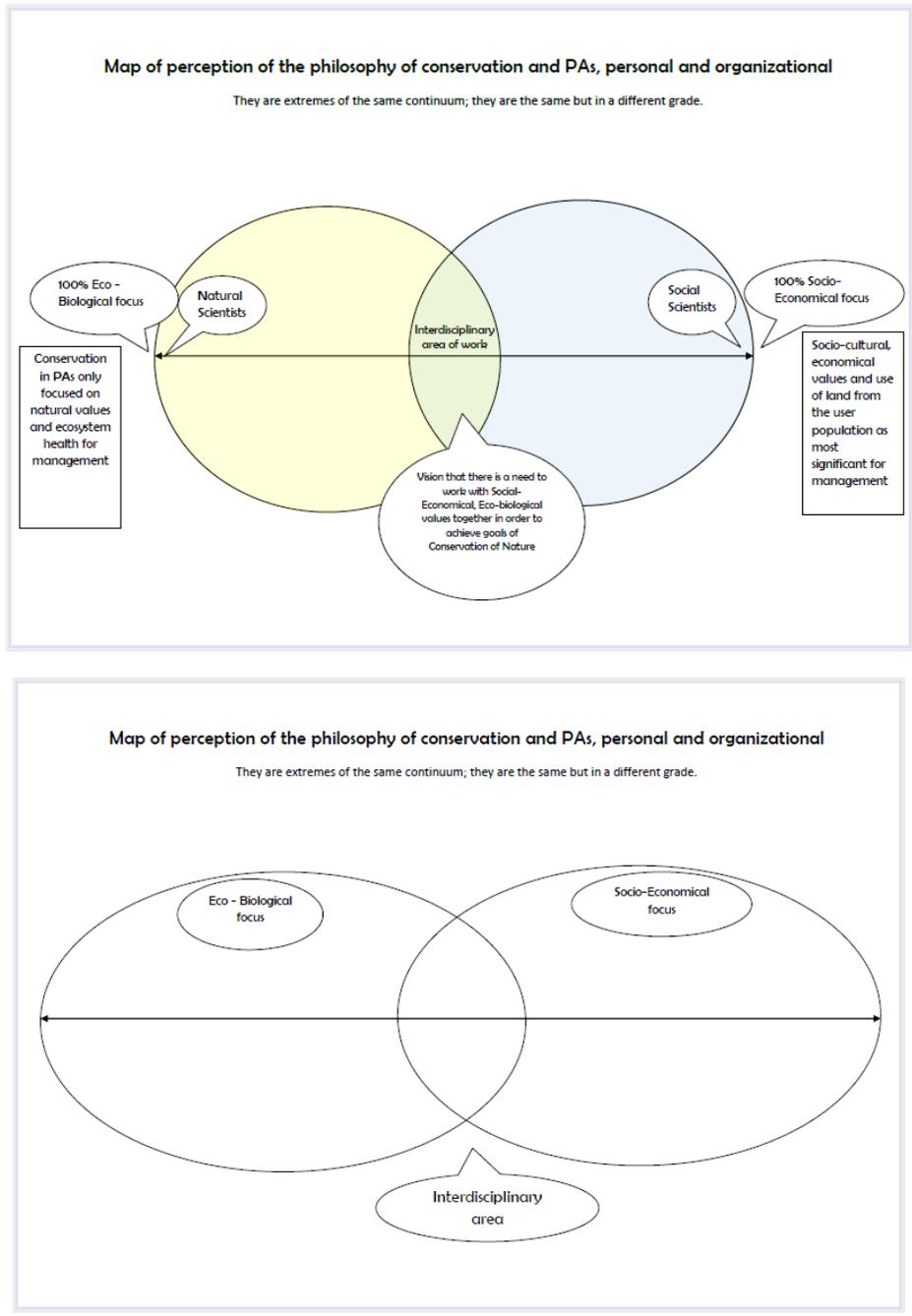


Figure 1: Visual Tools for interviewing—Value Maps

The second visual tools used were actual maps. The first was of Mexico with political state limits. This map was designed to help the participant visualize Mexico in terms of the

States or regions and to provide a geographical context when the participant would talk about a specific area, they could mark it down and would be registered in the interview (Figure 2).

The second map used was of North and Central America. This map shows the political borders between the countries but not the names of the countries. The purpose of the map was to help the participant visualize Mexico and its roles in conservation in an international context. The names were not marked down; because we assumed that the participants would know the countries and could be a diversion, for the insight about Mexico and its context in general with its neighbors. This map was used to remind or introduce the theme of the Mesoamerican Biological Corridor, in case it was not mentioned before during the interview.

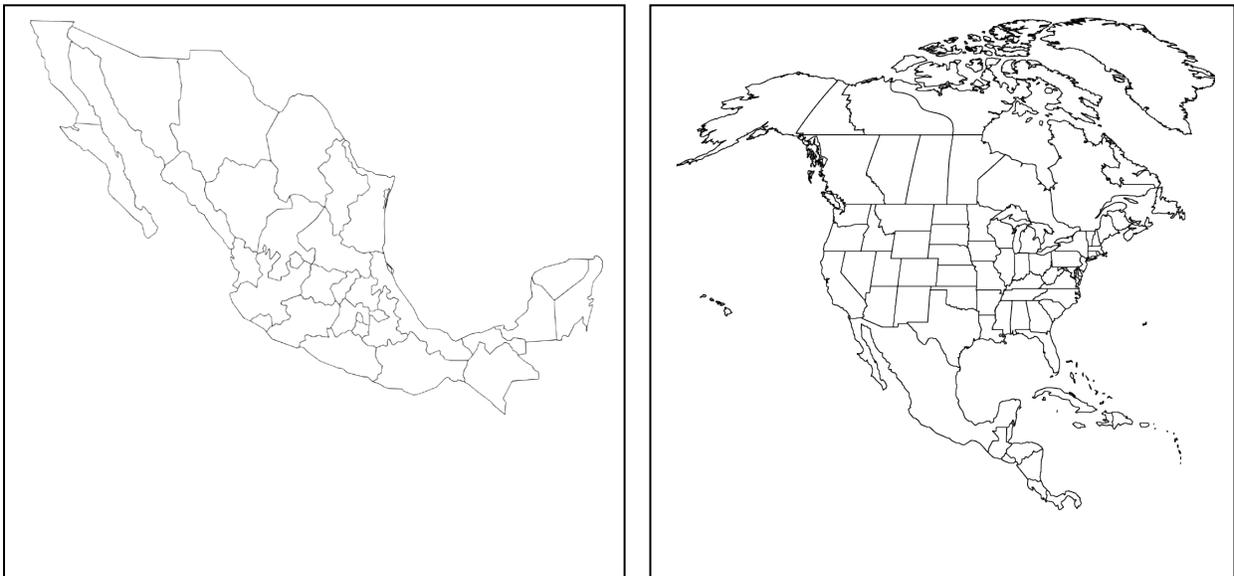


Figure 2: Visual tools for expert opinion elicitation: Maps of Mexico and Mexico in a regional context.

## Interviews

The Qualitative-Expert Opinion Methodology was tested in the context of Federal protected areas. Approximately 25% of the PAs in Mexico are managed under one main Federal

entity, CONANP, and under common purposes, ideologies, and management systems; providing a relative consistency within the general complexity of conservation initiatives in Mexico.

The first author conducted interviews during the World Wilderness Congress - Wild 9 in Mérida, Mexico during November 6-13, of 2009. The participants were experts involved with conservation and PA management in Mexico.

In total for phase II, eight experts were interviewed and their comments were used in the results of this paper. Each participant was provided with all three visual tools as well as different color markers, and they were told to be free and write or draw whatever they felt would be useful for the interpretation of their comments.

In the first two interviews, the Seidman (2006) framework proved to be inefficient when coming to the second and third phase of the interviews where according to the framework there is a “description of facts” and then a “reflection of the meaning”. With these participants, the two phases merged and right after a description of facts in a theme, there was an insight about them. For the later interviews the interview methodology was adjusted by not following exactly the framework, because each interview had to be adjusted to how the expert worked with the ideas.

### Data Analysis

Interviews were conducted in Spanish and transcribed and translated into English. A database was set up in Microsoft Excel; in order manage the data in a convenient and organized way. The interviews’ content was separated into independent ideas and then matched to a corresponding theme or element of assessment from the modified WCPA framework described previously.

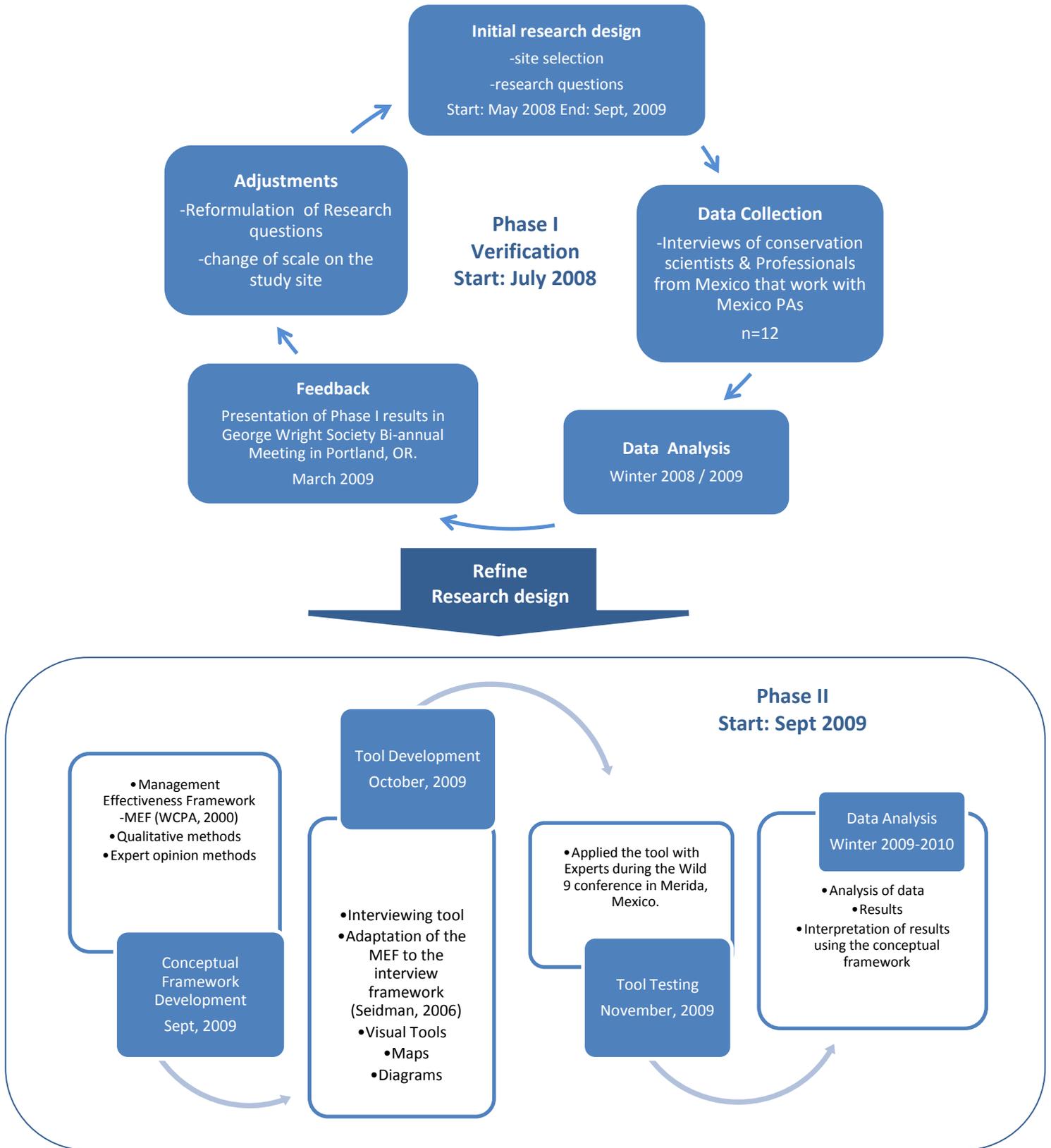
The visual tools were used to evoke ideas in the participants, so whatever was said during their use was included in the transcriptions. Any drawings made in the visual tools or maps were described using words, to complement what was communicated orally.

Text data was analyzed for information generated as well as depth of information gained by the use of each tool, as well as notes on confusion related to each tool. Interview transcripts were segmented into the WCPA framework and were coded for thought unit by two researchers familiar with qualitative analysis. Although the effort was on the refinement of the tools for data collection, the content from the interviews was important to determine the type of information and its usefulness in measuring management effectiveness.

The visual tools, both Values Maps and actual Maps, were combined onto one transparent sheet and then this compilation was analyzed by both researchers in conjunction with text to clarify meanings associated with drawings.

An illustration of the entire research methodology is represented in Figure 3. The first phase, verification started in July, 2008 with the initial research design, followed by the data collection, data analysis, feedback, adjustments coming from the feedback for a final refinement of the initial research design. The Second phase follows a linear process that start right after the end of phase I, in September 2009 with the development of the conceptual framework, followed by the tool development, tool testing, data analysis, and finally the writing of the paper.

Figure 3. Diagram illustrating the process of this research.



## RESULTS AND DISCUSSION

The research results include how the Qualitative-Expert Opinion methodology worked, how it could be improved in order to retrieve better information from the experts, and how to make it easier for the participants and researchers to use. The results will also include some data collected in order to illustrate what kind of information can be retrieved using this tool. The results will be presented by addressing each component of the methodology followed by general observations regarding methodology. Participants were from a variety of professions which allows for diverse perspectives to examine the methodology. Some work with and in the federal system, others with NGO's, and two from academic institutions.

The data are presented for each of the two main components of the methodology. The conceptual framework tool designed for this project provides a guide for addressing the six elements of the WCPA framework, but leaves enough freedom for the participant to put the ideas in their own words, talk about them in a sequence that makes sense for them, (describing facts within a context, what they mean, why he or she thinks it is like this, who are the stakeholders and why, what are the policies behind these, what are the historical reasons for attitudes, policies, etc...). It would not work as a linear guide of questions.

The participants communicated topics in different orders, according to the connections and meanings they assigned to them. The use of experts also yielded the expected synthesis of responses that took a different form for each interview. This did require much flexibility on the part of the interviewer.

The response to the three part framework for interviewing, included in the conceptual framework, by Seidman (2006) did not hold up with experts as suggested. The experts in this

study communicated the information as facts, opinions, and at the same time provided insight regarding its meaning, context, and the connections within and with other information. This capacity of reflect on meaning is defined in the literature as a characteristic of being an expert. For this reason, Seidman's (2006) second and third stages of the interview which correspond to description of facts and reflection of the meaning were merged into one only stage in which the facts and their meaning or insight about them were communicated at the same time, in one only stage and not in different stages as Seidman suggests. Therefore the participants had the characteristics of an expert as supported by the literature. This also suggests that professionals that are experts do not need the long lead time in an interview to reflect on meanings in a substantive way, and that they are ready to do this instantly. It may mean more effort may need to be placed on the early stages suggested by Seidman to force clarity of points only.

Participants with more experience on the ground, had to think less about the meaning of the information they would give, or how it related to other themes in the interview. Sometimes they would go straight to the why and how without addressing the what. For example, instead of saying what the management in PA is not achieving; they would go straight into describing how or why it is not being effective, how it should be, and at the same time linking it to different concepts and contexts. See the following quote as an example.

*“The solution should come from the ground, from the farmers, but I am not saying that they have the perfect recipe for an appropriate living. What I am trying to say is that these are the people that we need to convince. The levels of education and culture are totally different from the people in the cities or academic settings; the campaigns coming from the TV or radio are ineffective because the people have different visions of nature. For them (the farmers) what is valuable is the land,*

*not the forest. If you come to the rural areas with these awareness programs showing the gorgeous forests and then cleared deforested land, who is been touched is the people from the cities. The farmers take the forest for granted, their vision of this is one of wasted lands. Land is valued in terms of agricultural use and profitable for the banks as assets or capital. On the other hand a deforested area means for them something pretty, ready for agricultural use, an asset. You have to come to the community and look for what is meaningful for them, for their moral values. This way you can make them understand in their way of thinking, philosophical language why conservation is important, they are very sensitive, they can perfectly understand the main reason for conservation and get really involved in conservation.”*

This expert was talking about who was responsible for the effectiveness of PA. So he starts suggesting who should be involved, why it has not been effective, then based on the description he makes of the values and characteristics of the communities in rural areas, he suggests how awareness needs to be targeted, and why. This expert is stating his opinion, as well as how, why, and now what.

The following is another example of how rich the results generated from this methodology. The following quote relates to this persons experience with the federal protected area system, and difficulties with communication a consistent theme with the experts.

*CONANP have been very intensively training the people in their organization internationally for their Organization to grow. -I can tell you about what happens in the South East. But, in the other regions I can't really tell you because it is not what I have witnessed personally, about CONANP. Only what I have heard, so I really*

*don't know how it works there - .There is no direct communication between the management of other states, we don't have contact with them, we don't know what is going on. The idea is to work regionally as ANPs, but right now, we don't have direct communication. I talk to them we exchange ideas and experiences, but we are not the decision makers, so we can't really do anything about working together. What is lacking is a way of working together as a region.*

This expert is addressing capacity building efforts in the organization of the management at a federal level, as well as addressing constraints for management at a state level, where he works. There is a lack of communication as a region. Something could be successful in one region but it is not possible for them to address issues regionally or support areas with knowledge from other areas, unless they know other people personally.

The next example talks about financial constraints, role of universities in monitoring and measuring effectiveness, culture of conservation, some history, as well as conservationists culture.

*“Is there an evaluation system emplaced on effectiveness of ANPs? No, first many of the ANPs don't even have a management plan. Many of the ANPs were declared mostly in the 90's with this Secretary of Environment, Julia Carabias, but it took more than 10 years for them to start having management plans, then many years passed by after them having a director, forest rangers and some managerial structure and offices. So, the evaluation of these management plans and the effectiveness of the areas is inexistent. They can tell if the areas have been invaded by cattle or so, but besides that there is no way of evaluation of effectiveness. They allow Universities to do research in their areas*

*as a way of these universities to do what should be their job, and that is why the civil associations have grown so much. They can get private funds that the ANPs can not get. The problem with this is that some NGOs start to own the ANPs and they develop politics that are very particular of their interests and they could be influenced openly by the economical interests of the corporations that finance them. - There are big corporations, highly polluting in their practices, owned by the bourgeoisie, they are the ones that own huge latifunds (extensions of land) and they want to get their green label by supporting conservation. Governmental agencies that have very limited funds, they have no choice than embracing them, their support. This doesn't mean that there are not legitimate intentions in their support for conservation, never the less there are very strong economical interests. They become an elite, they won't go to Guatemala to interact with the peoples, they provide from the comfort of a conference that has the air conditioning to its maximum, it is an elite of corporations - supporters, photographers, conservationists... The problem is that from here is that the policies are dictating but are not grounded to the farming populations in Guatemala, for example. It is the labor of others to go and ground their policies on the field. (This is the main reason why this expert is biased towards the people in his philosophy of work as an NGO). We are the ones that go get in touch with the poverty of the peoples surrounding the PAs. If we get a Million Dollars and we work from above and looking down, we would be lost. Conservation should happen from the low levels, on the ground, towards the upper levels such as policy makers from the comfort of the air conditioning”.*

There were eight major themes found in the interview text following the use of the framework. These are presented below.

1) Including local people is the only way to truly sustainable long-term management effectiveness, it has to be relevant. This means you need to identify what local people need, and value as well as how they see the land.

2) No standard measures for evaluating the federal protected areas means there is no clear understanding of how they are doing in a systematic way.

3) Mexico has two distinctive regions the north and south and these need different strategies for conservation of PA in order to be successful.

4) Tourism needs to be linked with damage that it creates and a system for it to support the natural systems it markets needs to be in place.

5) Difficulties with communication among professionals come from offices spread out, and an inability to work together regionally to share expertise and resources. This was echoed in terms of being able to share in international support.

6) The major problem with communication to local people is that economic benefits of parks are proposed and then local people don't understand why they don't make money right away from parklands. This is especially true if the services from the land, the resources were used by the people and are now are off limits. They need education and a realistic timeline for when and how the parks can benefit the communities.

7) In Mexico Parks are islands surrounded by agriculture. Any successful management of park resources has to engage with the practice of agriculture adjacent to the park. Also, without a

clear management plan for the park, the resources are at risk from agricultural practices and encroachment.

8) Recreation is seen as communication to society, as is certain types of tourism, about the value of protected natural areas.

The set of visual tools, the values maps and the maps of Mexico, and Mexico with its neighbors, allowed the participant to think about answers easily without having to visualize in their heads, and then trying to explain. According to Harper (2000), photo or image elicitation techniques collect information different from other techniques or interviewing. These tools demonstrated the ability to collect data abundant in facts, as well as insight, and in depth meaning. There are several things that need to be adjusted and will be discussed in detail in this section.

The visual tools provided participants with ideas of what they could communicate. They were helpful to introduce questions and guide the interview towards relevant themes without interrupting the flow of the conversation, and left enough unstructured space for the experts to communicate ideas from their particular perspective. They proved useful as a focusing element on the relevant issues to be discussed.

The values map opened a space for the participant to express what values they hold with as a person and which values are based on the culture of their organization. According to (Harper 2002) with photo or image elicitation techniques, the brain uses more of its capacity and evokes elements from the “core or definition of the self to society culture and history”, it matches the objectives of this part of the interview about the participants’ core values and philosophies. They were asked to think about the different motivations and reasons for their opinions, both personal

and professional. This tool seemed to help them feel comfortable expressing their opinions, and also set the tone for the interview, getting the facts as well as their insight about them, allowing the researcher to gain insight into the motivations related to PA professionals and to understand more fully the complex relationship between PA and the people that manage and study them, and the foundations for their opinion as an expert.

The participants were looking at the visual tools while talking about them, instead of looking at the interviewer. This means that the tools were useful for them to think about the things to say, according to Harper (2002), this is characteristic of the image elicitation techniques.

The following quote describes the link between the professional and the organization in terms of philosophy. This organization has very clear values with which they work and promote, and this expert was very confident about the values he followed as a professional in the organization and as a person. He grew along with the organization and his values shifted with the reality of the projects he has worked.

*“The organization’s philosophy is the same as mine, because the persons that work in this organization have grown along with the organization itself. In 2002, when the NGO started they were focused on conservation and restoration projects, exclusively biological values, then they realized that the biological richness potential was in the hands of the communities, you can’t see them as separated entities. So their vision (NGO’s) shifted towards a*

*conservation philosophy of also culture, society, and community in the framework of communitarian development”.*

The following quote shows how professionals hold multiple values sometimes diverging from work and personal interests and projects.

*“Because of my work on the ground dealing with people and PA’s, as a person and in the NGO I founded, I am right in the middle of the continuum; but in the university where I work my values are strongly shifted towards the eco-biological side of the continuum due to what is expected in my work and teaching from the University”.*

The geographical visual tools worked as a guideline for the interviewee to address the conservation differences between the different regions of the country as well as Mexico in terms of its neighbors. Participants could use the visual tools to draw and write on while talking, for example, record on the map where the geographical separation point was between the regions of Mexico, instead of just describing it with words.

The geographical maps revealed that the experts interviewed for this study all divided Mexico in regions most of the time by North and South, but each participant had a different delimitation in the map for them. The participants also located on the map where they worked, touristic places that influence the economy, among other. Figure 4 shows some features reported in the maps that have to do with divisions of the country and important places.

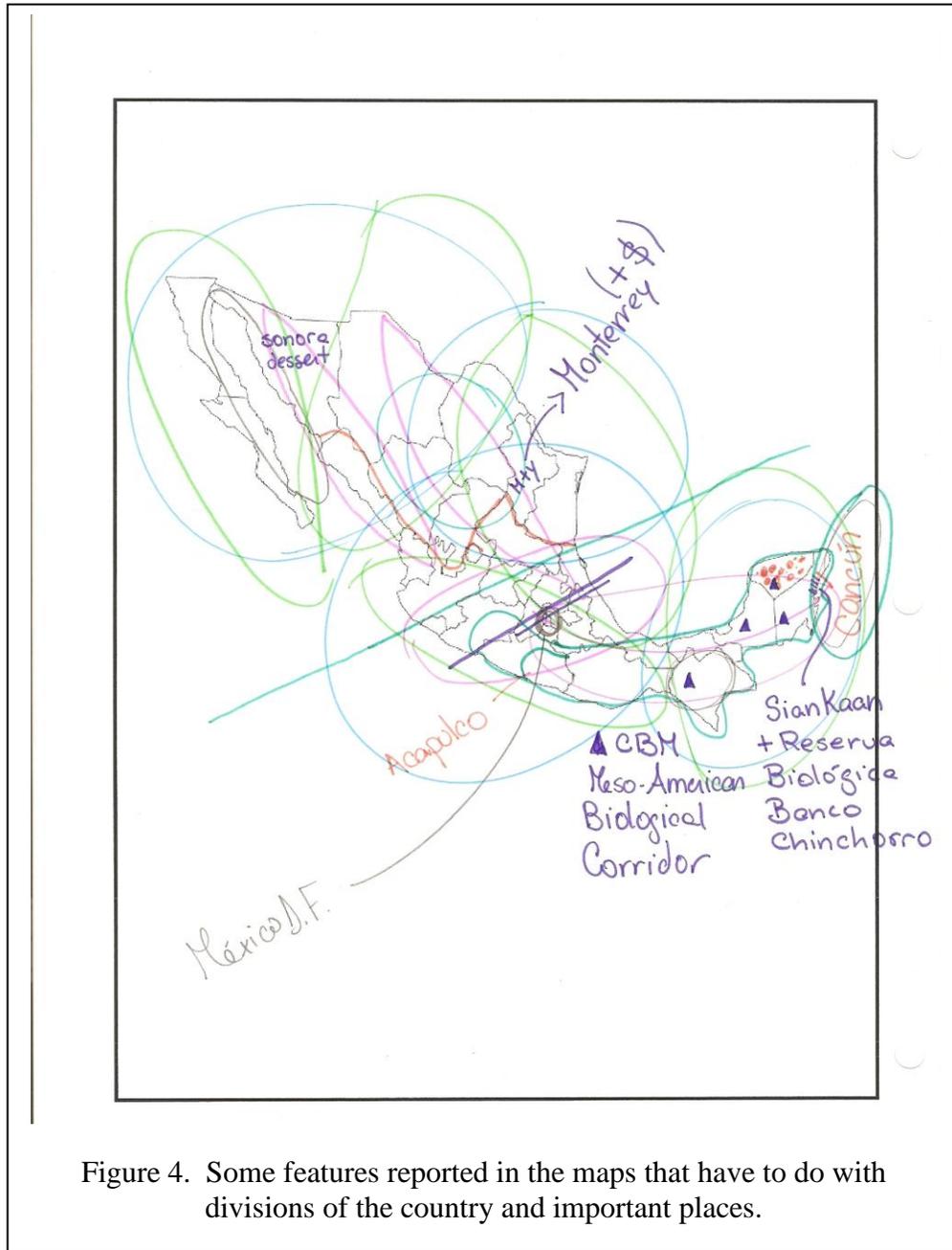
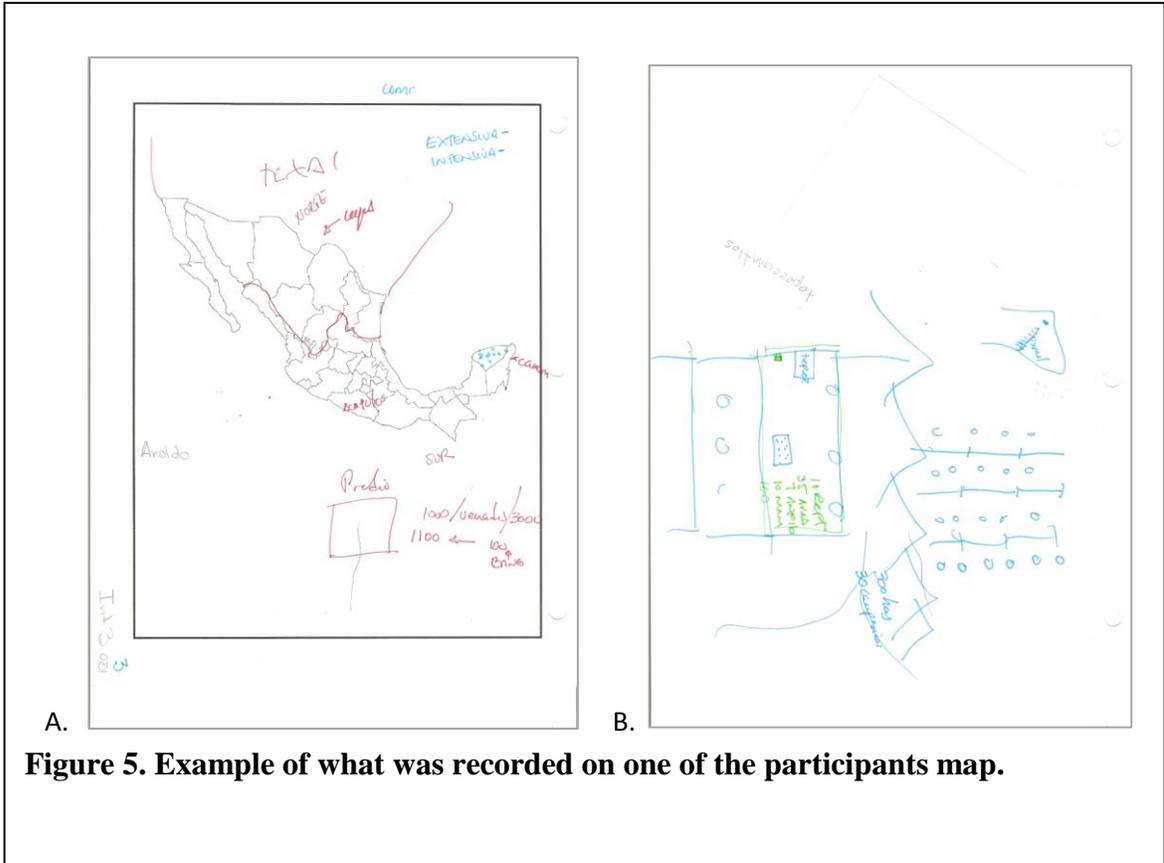


Figure 5 is an example of what was recorded on one of the participants map. The participant drew different things on the map and found it very useful for him to explain things during the interview.



**Figure 5. Example of what was recorded on one of the participants map.**

The following quote is linked to Figure 5, and is a story of this participant’s project.

*“The best thing is for you to become friends of the people in the rural areas. As an outsider from the city, you are not accepted as one of them. In the rural areas, the people that own the properties for cattle ranching and so are very wealthy and they are separated from the common people that work for them. So, his story is that this very special owner of a farm that was very appreciated by the community bought him this land for management and gave it to him as a*

*way of showing appreciation for his work. So once he was a farmer, he started to learn and to get involved with the community as one of them. Every weekend he went to the land to spend time there and the people taught him. There is a community irrigation system, and they have to set up schedules for all the farmers to get water fairly. So, he started to be one of them. They have 6 months of water and 6 months of no precipitation. They have a public well, and then he recently has one well in his land. This land is a calcarean layer, the soil is rock. That is why there is a community well, because there are not any other wells, very hard to build. So his land was abandoned for a very long period. The land was naturally restored to the kind of jungle of the area, and he keeps just a little area for oranges, so he can keep this relationship of acceptance from the community”.*

This story is a lesson learned from the real experience of a personal genuine interest on how to understand and build trust from the community. It is a lesson relevant for conservation, as a strategy proved to work on the ground which could be replicated in other places.

Stories like the one from Figure 7, is information that can expand on context of how things really work on the ground and why this specific area is effective or not, and what are the strategies been used to improve management, is easier to elicit with the Qualitative-Expert Opinion Methodology rather than with surveys, scales, or rapid assessment tools that rely on quantification of qualitative data.

Clear differences between regions were defined, not only ecological and geographical characteristics, but also in terms of culture, communities, land tenure systems, attachment to the land, agricultural practices, among many other.

*“The indigenous populations from the North are closer to the North, but the ones from the South are more related to the rest of Meso-America”*

*“Politically the work is done differently in the North from the South. Big institutions from the North make decisions for the rest of the country. They tell the government how to develop policy. What they think is what gets done everywhere in the country. The regions of the North are very different, commonly arid areas, in the South since it is Tropical then there should be a different approach, what applies for the North should not apply for the South.”*

This tool could be useful in assessing social boundaries used for natural regions that might lead to more locally relevant conservation planning.

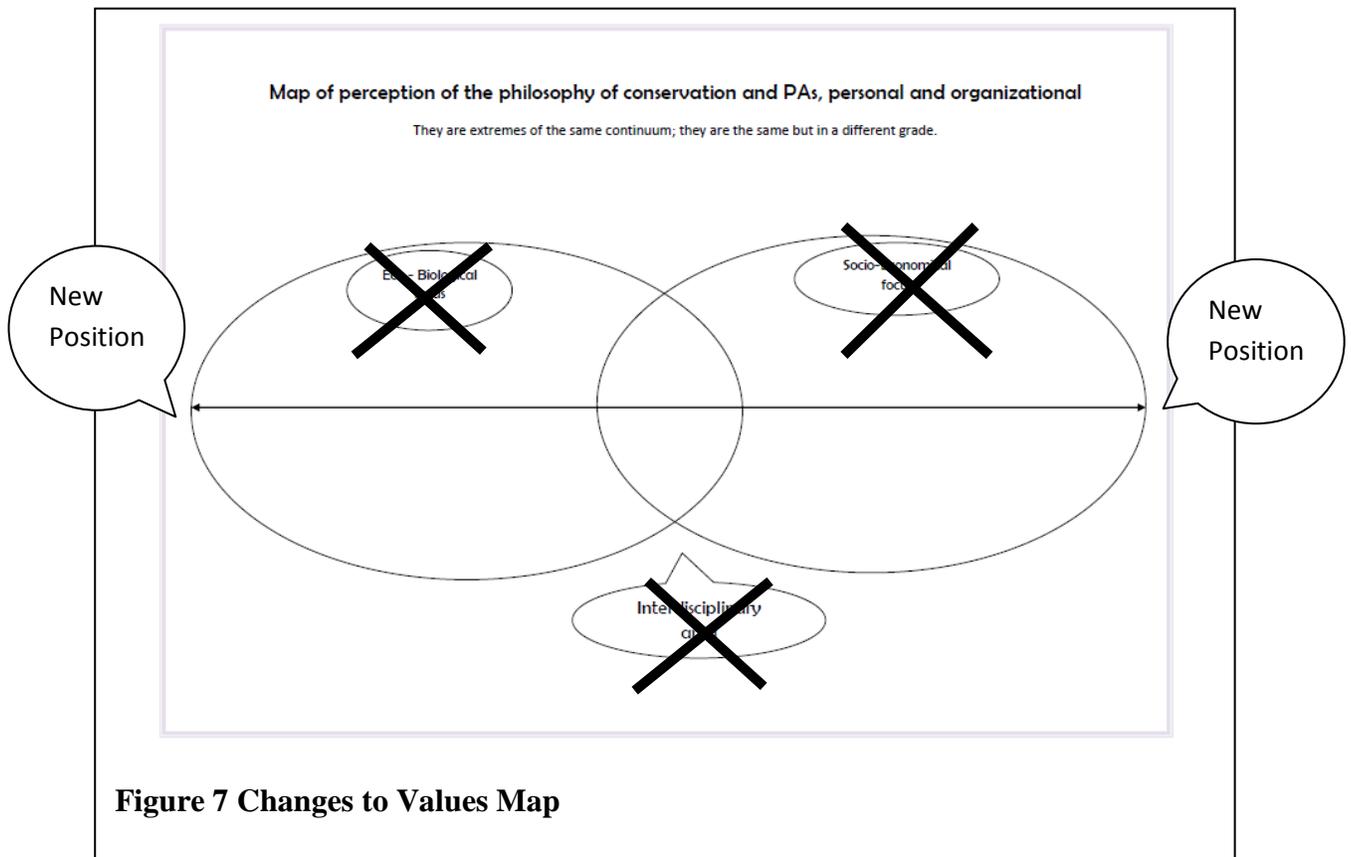
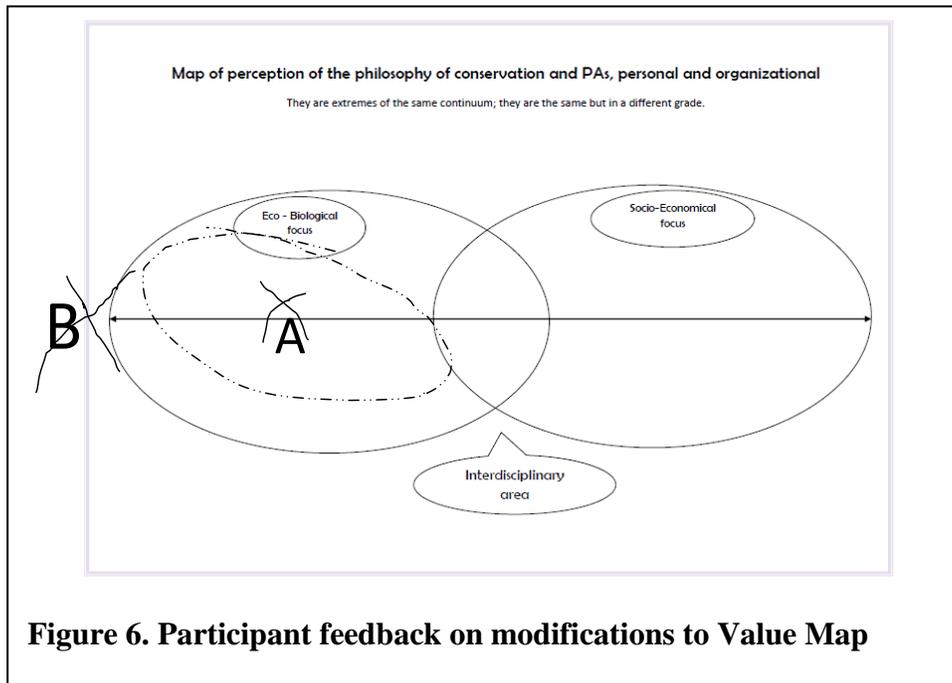
Experts for this study were often very region specific. They can be very well informed on what is going on around their region, but would not know in detail about other regions. If there is an analysis that involves different regions, these geographical differences should be addressed interviewing experts from each of the different regions, North, South, Central, East, and/or West.

The methodology revealed that participants who dealt with conservation issues on the ground, compared to the participants whose work is more academic or laboratory based,

responded faster, and provided deeper insight about the conflicts between biological and social values. The more academic ones usually talked about it in terms of how the literature addresses it, rather than what they think from their own experience.

The National Commission on Natural Protected Areas (CONANP), the federal entity that manages the federal PAs system, plays a huge role in conservation of land in Mexico; not only at a federal level but in the State and Municipal Levels. CONANP works with these other entities in order to get the PA system to work as one entity in terms natural systems, even if they work through different political systems.

The Value Maps should be clearer as to the location of the extremes on the continuum. Participants would locate their extremes right underneath the name of the general area, but with their words they would imply it is the extreme that would be in the map as section B in figure 8. Therefore there was confusion with the design of the value map, and hoping to be more consistent in its interpretation, it is suggested to locate the names of the foci at the extremes of the continuum instead of the middle of the bubble. There was also discussion about the usefulness of the bubble that says interdisciplinary area, so we may experiment with leaving the word off of future Values Maps.



## CONCLUSIONS

The WILD9 Conference setting for the interviews was a facilitator for finding experts, but also a limitation because the participants were either presenting, had displays to take care of, were participating in meetings, workshops, and or other of the activities of the conference. Many people were asked to help, accepted and showed great interest and willing to help but for the reasons mentioned before, getting the time to sit and actually get the interview was difficult.

Another limitation is that all the experts interviewed were from the South of Mexico and working in the South of Mexico. This limits the data collected to assess the federal protected areas in a general context; it limits it to the South; never the less, regardless of where the experts were, they fulfilled the requisites of the recruiting method, being from the South doesn't not interfere with the main purpose of the research which is to test the tool.

The methodology allows for building a relationship between the participant and the interviewer and prompting for further insight about what is been said. The clarity of the ideas can be improved if at first is not enough, and these explanations come with rich personal, cultural, and professional context of what is going on, on the ground. Being from a different country, asking Mexican conservationists about conservation, helped me not assume things, but rather ask for clarification of the ideas on how Mexico is doing conservation and what is the context in which these actions happen, how and why.

The participants communicated how pleased they were to be useful, and happy to share their knowledge and help me understand the issues we were talking about. They showed their

passion for conservation. They do conservation; they deal with conservation challenges and successes every day on the ground. These experts have valuable knowledge that needs to be communicated as lessons to replicate in other areas, for the common interest of the conservation discipline. This can be done in both ways that generalize their information in scales and measures, but also to get the most out of this valuable information and expertise; attention must be paid to the particular experience, lessons and information that can come from more complex data. Providing clear methods for analysis of this complex data can help provide more answers to the intricate nature of measuring management effectiveness.

The conceptual framework proved useful as a checklist of themes to address in the interview and as a means for data analysis. Although there was not one park we were measuring in terms of management effectiveness, we were able to gain insight into the whole system in terms of struggles, and lessons. The lessons usually came in the form of a story and in one case, as a diagram. The visual tools elicited data related to geographical differences and helped the experts illustrate what they were explaining. The methodology in general proved useful to provide a picture of protected areas in particular and in a systems way, at multiple scales, and was able to provide context of conservation in the form of protected areas in Mexico.

The Qualitative-Expert Opinion methodology developed and tested in this research revealed important insight, and demonstrates the usefulness of a qualitative approach to elicit information on how and why things in PAs may work or not based on the complexity of the particular settings.

This methodology allows for the valuable data collected on the field that instead of losing its meaning when converted into numbers, will keep its deep meaning, and provide connections

to how and why management actions can improve PA management effectiveness. The methodology requires training in qualitative research related specifically to using interviews as a data collection tool, and knowledge about how to analyze qualitative data qualitatively, which is time consuming and complex with or without the use of software to assist in the process. The analysis and interpretation of this data must also use the strength of qualitative methodology to assess specific projects as well as systems, not only at the individual scale but also in context to the whole, for this case a PA management framework.

Management of PAs must consider natural phenomena as well as the pressures coming from the fast growing human population. Such a complex endeavor requires the measurement of its effectiveness through a general view, provided by the current systems that rely on primarily quantitative data; but also needs a particular-in depth understanding of its different effectiveness components.

The Qualitative-Expert Opinion methodology proposed in this paper proves to be useful as a complementary tool to the current management effectiveness systems. It provides in depth understanding, a larger context, and provides the opportunity for very personal answers and expertise to be shared that other management effectiveness systems have not been able to reach; therefore, helping the discipline of conservation to be more efficient and effective, by providing a better chance for well informed management decision making, and resource allocation.

## REFERENCES

- Anderson, J. R. 1983. *The Architecture of Cognition*. Harvard University, Cambridge.
- Brandon, K., L. J. Gorenflo, A. S. L. Rodrigues, and R. W. Waller. 2005. Reconciling biodiversity conservation, people, protected areas, and agricultural suitability in Mexico. *World Development* **33**:1403-1418.
- Brandon, K. R., Kent., Sanderson, Steven. , editor. 1998. *Parks in Peril: people, politics, and protected areas*. Island Press and The Nature Conservancy, Washington, D.C.
- Bruner, A. G., Gullison, R. E., Rice, R. E., da Fonseca, G. A. 2001. Effectiveness of Parks in Protecting Tropical Biodiversity. *SCIENCE* **291**:125-128.
- Cantú, C., R. Gerald Wright, J. Michael Scott, and E. Strand. 2004. Assessment of current and proposed nature reserves of Mexico based on their capacity to protect geophysical features and biodiversity. *Biological Conservation* **115**:411-417.
- Clevenger, A. P. W., J.; Chruszcz, B.; Gunson, K. 2002. GIS-Generated, Expert-Based Models for Identifying Wildlife Habitat Linkages and Planning Mitigation Passages. *Conservation Biology* **16**:503-514.
- Corrales, L. 2005. *Manual for the rapid evaluation of management effectiveness in marine protected areas of Mesoamerica*. Programa Sistema Arrecifal Mesoamericano (SAM) and Programa Ambiental para Centroamérica en su componente de Áreas Protegidas (PROARCA/APM).
- Ervin, J. 2003. *Rapid Assessment and Prioritization of Protected Area Management (RAPPAM) Methodology* in W. W. F. WWF, editor. WWF Gland, Switzerland.
- Fuller, T., V. Sánchez-Cordero, P. Illoldi-Rangel, M. Linaje, and S. Sarkar. 2007. The cost of postponing biodiversity conservation in Mexico. *Biological Conservation* **134**:593-600.
- Harper, D. 2002. Talking about pictures: a case for photo elicitation. *Visual Studies* **17**:13 - 26.
- Herrera, B., and L. Corrales 2004. *Midiendo el éxito de las acciones en las áreas protegidas de Centroamérica: Evaluación y monitoreo de la integridad ecológica* PROARCA/APM, Guatemala de la Asuncion, Guatemala.

- Hmelo-Silver, C. E., and M. G. Pfeffer. 2004. Comparing expert and novice understanding of a complex system from the perspective of structures, behaviors, and functions. *Cognitive Science* **28**:127-138.
- Hockings, M. 2003. Systems for Assessing the Effectiveness of Management in Protected Areas. *BioScience* **53**:823-831.
- Hockings, M., R. James, S. Stolton, N. Dudley, V. Mathur, J. Makombo, J. Courrau, and J. Parrish 2008. Enhancing our heritage toolkit assessing management effectiveness of natural world heritage sites UNESCO World Heritage Centre., Paris, France.
- Hockings, M., S. Stolton, and N. Dudley 2000. Evaluating Effectiveness : A framework for assessing the management of protected areas.
- Hockings, M., S. Stolton, F. Leverington, N. Dudley, and J. Courrau, editors. 2006. Evaluating Effectiveness: A framework for assessing management effectiveness of protected areas. IUCN, Gland, Switzerland and Cambridge, UK., Gland, Switzerland and Cambridge, UK.
- Hylko, J. 2005. Thanks for the memories: Capturing expert knowledge. *Power* **149**:58-62.
- Justus, J., and S. Sarkar. 2002. The principle of complementarity in the design of reserve networks to conserve biodiversity: A preliminary history. *Journal of Biosciences* **27**:421-435.
- Kellert, S. R., J. N. Mehta, S. A. Ebbin, and L. L. Lichtenfeld. 2000. Community Natural Resource Management: Promise, Rhetoric, and Reality. Pages 705-715. *Society & Natural Resources*. Routledge.
- Lambeck, R. J. 1997. Focal Species: A Multi-Species Umbrella for Nature Conservation. *Conservation Biology* **11**:849-856.
- Larichev, O. I. 2002. Close Imitation of Expert Knowledge: The Problem and Methods. *International Journal of Information Technology & Decision Making* **1**:27.
- Machlis, G., Field, Donald., editor. 2000. National Parks and Rural Development: practice and policy in the United States. Island Press, Washington, D.C.

- McNeely, J. 1994. Protected areas for the 21st century: working to provide benefits to society. *Biodiversity and Conservation* **3**:390.
- Meffe, G. 2006. The success - and Challenges - of Conservation Biology. *Conservation Biology* **20**:931-933.
- Meffe, G. K. C., C.R. 1997. Conservation Reserves in Heterogeneous Landscapes. Pages 305 - 344 in G. K. C. Meffe, C.R. and contributors, editor. *Principles of Conservation Biology*. Sinauer Associates, Inc. Publishers, Sunderland, Massachusetts.
- Merriam, S. 2002. *Qualitative research in practice: examples for discussion and analysis*. Jossey-Bass, San Francisco, CA.
- Moguel, P., and V. M. Toledo. 1999. Review: Biodiversity Conservation in Traditional Coffee Systems of Mexico. *Conservation Biology* **13**:11-21.
- Nyhus, P. J., F. R. Westley, R. C. Lacy, and P. S. Miller. 2002. A role for natural resource social science in biodiversity risk assessment. *Society & Natural Resources* **15**:923-932.
- O'Neill, E. 2007. Conservation Audits: Auditing the conservation process. *Conservation Measures Partnership*.
- Pearce, J. L. C., K.; Drielsma M.; Ferrier S.; Whish, G. 2001. Incorporating expert opinion and fine-scale vegetation mapping into statistical models of faunal distribution. *Journal of Applied Ecology* **38**:412-424.
- Pimentel, D., U. Stachow, D. A. Takacs, H. W. Brubaker, A. R. Dumas, J. J. Meaney, J. A. S. O'Neil, D. E. Onsi, and D. B. Corzilius. 1992. Conserving Biological Diversity in Agricultural/Forestry Systems. *BioScience* **42**:354-362.
- Pomeroy, R., J. Parks, and L. Watson 2004. How is your MPA doing? A guidebook of natural and social indicators for evaluating marine protected area management effectiveness. IUCN International Union for Conservation of Nature and Natural Resources, Gland, Switzerland and Cambridge, UK.

- Pressey, R. L. 1994. Ad Hoc Reservations: Forward or Backward Steps in Developing Representative Reserve Systems? *Conservation Biology* **8**:662-668.
- Rao, K., and C. Geisler. 1990. The social consequences of protected areas development for resident populations. *Society & Natural Resources: An International Journal* **3**:19 - 32.
- Regan, H. M., M. Colyvan, and M. A. Burgman. 2000. A proposal for fuzzy International Union for the Conservation of Nature (IUCN) categories and criteria. *Biological Conservation* **92**:101-108.
- Saffron J. O'Neill, T. J. O., Mike Hulme, Irene Lorenzoni, Andrew R. Watkinson,. 2008. Using expert knowledge to assess uncertainties in future polar bear populations under climate change. *Journal of Applied Ecology* **45**:1649-1659.
- Salafsky, N., H. Cauley, G. Balachander, B. Cordes, J. Parks, C. Margoluis, S. Bhatt, C. Encarnacion, D. Russell, and R. Margoluis. 2001. A Systematic Test of an Enterprise Strategy for Community-Based Biodiversity Conservation. *Conservation Biology* **15**:1585-1595.
- Seidman, I., editor. 2006. *Interviewing as Qualitative Research: A guide for reserachers in education and the social sciences*. Teachers College Press, New York.
- SEMARNAP. 1995. Programa de Areas Naturales Protegidas de Mexico 1995 - 2000 in S. d. M. A. R. N. y. Pesca, editor. SEMARNAP, Mexico.
- Stem, C., R. Margoluis, N. Salafsky, and M. Brown. 2005. Monitoring and Evaluation in Conservation: a Review of Trends and Approaches. *Conservation Biology* **19**:295.
- Stolton, S., M. Hockings, N. Dudley, K. MacKinnon, and T. Whitten. 2003. Reporting progress in protected areas A site level management effectiveness tracking tool World Bank/WWF Alliance for Forest Conservation and Sustainable Use.
- Stolton, S., M. Hockings, N. Dudley, K. MacKinnon, T. Whitten, and F. Leverington, editors. 2006. *Management Effectiveness Tracking Tool - Reporting Progress at Protected Area Sites*. WWF International, Gland, Switzerland.

- Terborgh, J. 2002. Overcoming Impediments to Conservation. Pages 243-249 in J. V. S. Terborgh, C.; Davenport, L.; Rao, M., editor. Making Parks Work: Strategies for Preserving Tropical Nature. Island Press, Washington.
- TNC. 2007. Conservation Action Planning Handbook: Developing strategies, Taking action, and Measuring success at any scale. The Nature Conservancy, Arlington, VA.
- Valerie Kapos, A. B., Rosalind Aveling, Philip Bubb, Peter Carey, Abigail Entwistle, John Hopkins, Teresa Mulliken, Roger Safford, Alison Stattersfield, Matt Walpole, Andrea Manica,. 2008. Calibrating conservation: new tools for measuring success. Conservation Letters **1**:155-164.
- Villaseñor, J. L. I., G.; Ocana, D. 1998. Strategies for the Conservation of Asteraceae in Mexico. Conservation Biology **12**:1066-1075.
- Walton, A., and D. Meidinger. 2006. Capturing expert knowledge for ecosystem mapping using Bayesian networks. Pages 3087-3103. Canadian Journal of Forest Research. NRC Research Press.
- West, P. B., Steven, editor. 1991. Resident Peoples and National Parks: Social Dilemmas and Strategies in International Conservation. The University of Arizona Press, Tucson.
- World Bank, T. 2002. Project Appraisal document on a proposed grant from the Global Environment Facility Trust Fund. Page 126. The World Bank, Republic of Mexico.

