WOMEN AND CONSERVATION IN

LORETO BAY NATIONAL MARINE PARK, MEXICO

BY

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(UNDER THE DIRECTION OF DR. BENJAMIN BLOUNT)

ABSTRACT

As more and more coastal areas are declared protected around the world it is becoming increasingly important to integrate the local community in conservation decision-making and planning activities in order to increase their effectiveness and equability. In many protected areas, special efforts are being made to include segments of the community that have traditionally been left out of such activities, such as women. Park managers are actively seeking a better understanding of these groups in order to create more effective community outreach programs. The aim of this dissertation is to try to understand differences among women in regards to their knowledge and perceptions of environmental issues. Women who live near Loreto Bay National Marine Park, Baja California Sur, Mexico were interviewed extensively to examine the affects of household livelihood type, age and education on the women's knowledge and perceptions of the environment, parks, and formal conservation efforts. A number of research methods were used to gather information including a free listing technique, belief frame sentences, photo elicitation technique and cultural consensus analysis.

Household livelihood type (defined by the main economic activity of the woman's household - either commercial fishing, recreational fishing, or land-bound tourism such as hotel and restaurant work) was expected to be the most significant variable of those tested in influencing women's knowledge and perceptions of environmental issues. However, it was the *post hoc* analysis by level of formal education that resulted in the most significant differences among the women. This research seems to indicate a strong tie between higher levels of formal education and positive perceptions of formal conservation efforts. Education level is certainly only one of many factors that influence women's perceptions of conservation but due to its significance in this research the connection between the two is examined at length. Various skills associated with formal education are explored and the ways in which they may affect perceptions of formal conservation efforts are examined. Recommendations are included for designing

more effective community outreach programs for target audiences with low levels of formal education.

INDEX WORDS: Women and Conservation, Environmental Anthropology, Marine Protected Areas, Loreto Bay National Park, Baja California Sur, Mexico, Community Outreach Programs

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DEDICATION

To my family for the continued support they have given me on this long journey.

And especially to Jeremy for having had the vision and patience to wait for me.

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CHAPTER 1

INTRODUCTION

In recent years, a number of new protected areas have been designated in the most productive and vulnerable part of the ocean — the coastal zone (Beatley 1991). There are numerous reasons for creating such marine protected areas, including managing the ever increasing amount of tourist activities that take place in these fragile coastal areas around the world (Agardy 1993: 219, Davis and Tisdell 1995: 19, Whelan 1991: 4). The combination of declaring coastal areas protected and the simultaneous rise in tourism to such areas is seriously altering the way of life of the local populations in many small coastal fishing communities. As just one example of change, both the protected area status and the new sources of income provided by tourism are changing the relationships between local people and natural resources (Manspsperger 1995: 94, McGoodwin 1990: 15–16, Stevens 1997: 4). New regulations may alter local resource use patterns and ownership possibilities within the protected area while at the same time tourism introduces new and often lucrative ways to use the local resources.

As tourism increases and protected areas expand, it is becoming increasingly important to understand the local population's actual or potential role in natural resource use and conservation. More and more, the importance of examining the role of marginalized groups, such as women, in conservation efforts is being recognized, as well. For example, many practitioners are realizing that women, who generally make up half the local populations and have great influence on future generations through their *de facto* role as 'first teachers' to their children, are a key component of the local

community. Communities are now understood by many to be heterogeneous in nature and that various segments of the local community need to be included in the creation of conservation management plans in order for the plans to be fair, complete, and effective.

Purpose of the Study

This study addresses specific issues concerning women and conservation in the recently declared Loreto Bay National Park, Baja California Sur, Mexico. The immediate problem is the need for a more advanced understanding of the variety of conservation connections experienced by the women in Loreto Bay. The more general concern is that in any context, local participation in conservation and management is often essential to ensure the long-term sustainable use of local natural resources. It is especially important in communities where subsistence and economic reliance on natural resources is immediate, as is the case in fishing communities and tourism-based communities. Both activities occur in Loreto Bay. The aim of this project is to determine how women's connections to conservation are mediated by socioeconomic factors, the type of environmental knowledge they possess, and their relationship to particular natural resources. The results of this research will provide information to facilitate the integration of women into conservation projects.

Understanding local people's relationships with resources and how it affects their knowledge of the environment and their perceptions of formal conservation efforts is essential for the success of protected areas. Unfortunately, in spite of some growing awareness of women's roles in conservation, these roles tend to be overlooked both theoretically and in actuality. Women's contributions to conservation efforts are critically important, even if women are not the primary users of natural resources. Their

contributions lie in their central positions in informal education and maintenance of knowledge traditions at the household, neighborhood, and community levels (Mishra 1994). They constitute, after all, approximately fifty percent of the population, and they tend to be the keepers and purveyors of traditional knowledge and customs. Therefore, the examination of women's knowledge and perceptions of parks and conservation is a key component in creating successful protected areas.

Even when there is recognition of the need to include women and to identify their current and potential participatory roles in conservation efforts, women are often treated as one unified social group. Women, in fact, are not one monolithic social entity. A single strategy to integrate women as a group into conservation projects is unlikely to be useful considering women have different connections with conservation due to different types of environmental knowledge, socioeconomic factors, and livelihoods strategies. This project addresses this problem by systematically showing the diversity of women within the Loreto Bay community in terms of their knowledge of the environment and related conservation issues.

In coastal communities where fishing and tourism are both present, the whole community may ultimately be dependent upon the health of the local marine resources. Some members of the community, however, are more directly dependent on it than others, e.g. fishermen, and their perceptions of the environment and commitment to conservation are likely to vary accordingly. Likewise, socioeconomic factors such as age and education may influence women's environmental knowledge and their perceptions of conservation. The aim, then, of this project is to understand the position and knowledge of women in Loreto Bay as a differentiated group in regard to conservation efforts that

confront the community as a consequence of the creation of the marine park. With this in mind, this project specifically looks at how the presence of either commercial fishing, recreational fishing, or land-bound tourism activities in household livelihoods strategies as well as differences in age and education affect the amounts and types of women's environmental knowledge and their perceptions of conservation.

Principle Hypotheses

In regard to the types of household activities described above, I hypothesized that 1) the knowledge that women in Loreto have of environmental topics and issues and the need for conservation would be greater in households in which the livelihoods depend directly on utilization of marine resources, be it either commercial or recreational fishing, than in those households involved in land-bound tourism activities, 2) perceptions of conservation efforts would be more positive in the households involved in tourism, be it recreational fishing or land-bound tourism activities, than in households where commercial fishing is present, and 3) women in Loreto would possess a local environmental knowledge that was qualitatively different than western "park service" knowledge. By "park service" knowledge I mean a western science-based understanding of marine resources and ecosystem functions.

I proposed these hypotheses on the basis of observations made during my earlier field experience in Loreto in 1998. Preliminary research revealed that members of households involved in fishing activities exchanged information about daily experiences. Therefore, while it is extremely rare for women in Loreto themselves to be employed in fishing, they do have access to knowledge about the marine environment and resources

through contact and conversation with other household members, as well as through recreational boat trips with their families.

These hypotheses are meant to illuminate through testing the very different positions occupied by each of these types of households in relation to formal conservation programs. They highlight the dilemma of commercial fishing households. Though they are cognizant of environmental problems (i.e. decline of fisheries) through direct interactions with the marine resources, commercial fishing households may have negative views of formal conservation efforts because these efforts traditionally involve regulations that are seen as impinging on their livelihood. It becomes evident that households involved in recreational fishing hold the more fortunate position. While they are also forced to face environmental problems each day, these households have the benefit that the formal conservation efforts in their community are viewed as supportive of their primary occupation. The interesting position of land-bound tourism households also comes to light. Though they are not daily witnesses to environmental problems, they view formal conservation efforts favorably due to the strong ties between 'conservation' and 'parks' in western ideology and their understanding that the presence of the park helps sustain their jobs.

The goal of this research is essentially, then, to determine two things. What are the characteristics of women that have knowledge of the environment, parks, and conservation that coincides with that of the local park personnel (i.e. the park's models and understanding of these issues)? And, subsequently, what are the characteristics of women that have positive, supportive perceptions of these models of parks and conservation? This information would be quite useful for the park service. Not only to

find out which types of women are supportive of parks and formal conservation efforts but, perhaps more importantly, to understand what types of women may not be so supportive of these efforts. This would help the park to target certain groups with more effective community outreach efforts.

In light of the hypotheses listed above it is clear that I expected the primary economic activity of the woman's household to be the main variable in determining a woman's experience with and therefore her knowledge of the environment, parks, and formal conservation efforts. I also expected that the interests of the woman's household (also determined by the main economic activity) would have a significant impact on her perceptions of parks and formal conservation efforts.

After analysis, the data did not seem to support these hypotheses. This may simply mean that household type is not, in fact, associated with women's knowledge and perceptions of the environment, parks, and formal conservation efforts. However, it may also indicate that household type was not an appropriate variable for determining a woman's experience with the environment, parks, or formal conservation efforts. A third possibility is that the methods used were not appropriate for determining a relationship between a woman's household type and her knowledge and perceptions of the environment, parks, or formal conservation efforts.

While analysis by the women's household type and age did not produce many significant results, a *post hoc* analysis by the women's level of formal education did produce many interesting, significant differences. These results seem to indicate that a woman's level of education influences her perceptions of formal conservation efforts more so than does her household type or age. Understanding, after the fact, the

importance of educational differences among the women in this study may also help to explain why one of the main methods used in this project, the belief frame sentences technique, did not work out as planned. In hindsight it is clear that in order for this technique to be effective, a certain level of formal education on the part of the participants is necessary. The problems encountered using this technique are discussed in detail in chapters five and six, the chapters concerned with methods and results.

Because this research indicates that education level is an important variable, in the discussion chapter I examine at length why levels of formal education may have such an influence on women's perceptions of formal conservation efforts. It is important to keep in mind that I chose to examine the connections between education levels and perceptions of formal conservation efforts because it turned out to be the most significant variable of the variables I chose to look at in this research. An individual's perceptions of formal conservation efforts are complex and are most certainly influenced by a number of factors. There are likely to be other variables that were not explored in this project that are also quite important in the formation of an individual's perceptions of formal conservation efforts.

It is also important to keep in mind that while I do, in the end, offer recommendations for the park service to tailor its message for target populations with lower levels of education, the issue is really more complex than that. Understanding what some of the characteristics are of the women that share or at least understand the park services' mental models of parks and conservation and support them as such is really only the first step. The next important step would be to try to learn what the cognitive models of parks and conservation are for the women who do not seem to

understand these topics in the same way the park service does. In other words, if some women do not perceive of parks and conservation the way the park service does, how do they perceive of them? While this was not within the scope of the research done here as it is a large task to understand these cognitive models with some level of confidence, this type of understanding would clearly be helpful for the park service in their efforts to make effective and equitable management plans.

Field Site

Loreto Bay is located seven hundred miles south of San Diego on the eastern coast of Mexico's Baja Peninsula. It is home to the recently declared Loreto Bay National Marine Park. The municipality of Loreto, which includes the town of Loreto and a number of very small villages, has a population of almost 12,000 people. While the town has much historical importance, it is the combination of fishing and tourism activities that take place there and its new protected area status that make it an appropriate field site for this project.

In this desert town that rests on the edge of the bountiful Sea of Cortez, the locals depend heavily on both fishing and tourism activities, each being quite important to the local economy. Both of these activities rely on healthy marine resources yet the pressures on these resources increase every day. The national marine park was created in order to try to manage activities taking place in Loreto Bay. Creating an effective and equitable management plan, however, has not been easy due to the number of stakeholders involved, each with very different needs and expectations of the park. The dynamic nature of the situation in Loreto makes it a worthwhile place to conduct this project since park managers and local leaders are actively looking for information about

various segments of the community in order to help them in conservation planning and decision-making activities.

Contributions of This Project to the Field of Anthropology

This project is unique in its focus on women's relationships with the local natural resources as mediated by tourism and fishing activities as a key factor in determining the type of environmental knowledge they possess and their perceptions of conservation. Consequently, the results of this study will make contributions to at least three groups of literature: anthropology of gender/women and environment, community-based conservation, and coastal/maritime anthropology.

This project contributes to the anthropology of gender/women and environment literature by systematically exploring the differences within gender, specifically in terms of women's relationship with the local environment. This is done through examining the socioeconomic factors that may influence the amount and type of environmental knowledge women possess and, in turn, looking at how this affects their perceptions of conservation. What is particularly original about this project, however, is its focus on the degree to which the household depends on the local marine resources as a key factor in creating access to this knowledge and forming these perceptions.

Additionally, the project will contribute to community-based conservation literature by helping to unravel the basis for the diversity of local women's perceptions of and support for conservation projects. This is done by analyzing the relationships between the directness of women's interaction with the local resources, the amount and types of environmental knowledge the women have, and their perceptions of formal

conservation efforts. Also examined at length is the influence of formal education on perceptions of formal conservation efforts.

Finally, this project contributes to coastal/maritime anthropology by examining one aspect of the fishing/tourism relationship in coastal communities; how the type of involvement in each may influence the quality and quantity of environmental knowledge possessed by women and their perceptions of formal conservation efforts. A stronger understanding of the knowledge, perceptions, and behavior that may result from participation in fishing and/or tourism is important for informing resource management and conservation project design in the numerous places around the world where fishing and tourism activities take place side by side.

Chapter Overviews

In chapter two, the contributions to various sub-fields of anthropology will be discussed in more detail in relation to relevant literature and theory. Classic characterizations of coastal fishing communities are summarized in this chapter and research about tourism impacts on local communities and the interaction of tourism and fishing activities in coastal areas is reviewed.

Chapter two also examines the importance of community involvement in environmental management projects. Research is summarized that argues that community involvement is crucial for the long-term success of conservation efforts. Literature concerning women and the environment is reviewed, as well, highlighting the theories of feminist political ecology and feminist environmentalism since they influenced the development of this Loreto project. Finally, the last section of chapter two examines factors that influence environmental knowledge, attitudes and advocacy. This

section reviews research that has tried to answer the question, what make some people environmentalists and others not?

Chapter three brings the discussion to the specific geographic location of Baja, Mexico. This chapter includes a brief review of the history of natural resource protection in Mexico, highlighting Mexico's interesting integration of social welfare issues into its environmental management strategies. The chapter goes on to discuss the history of the state of Baja California Sur, reviewing how this remote peninsula was populated and evolved into one of Mexico's major tourist destinations. Chapter three ends with a brief history of environmental protection in the state of Baja California Sur.

Chapter four further focuses the discussion on the town of Loreto itself. After a short summary of the history of Loreto, the town as it is today is examined including demographic, occupational, and quality of life information. This chapter includes an examination of the fishing and tourism industries in Loreto, their development and their importance as the top two economic activities in town. Women's traditional activities in Loreto are also explored.

The remainder of the chapter focuses on the creation of Loreto Bay National Marine Park. This section highlights the park's attempts to specifically involve women in conservation activities and the obstacles they face in doing so. Both chapters three and four should help to create a context for the research project presented here.

Chapter five discusses in detail the methods used in this project and then presents the results of these methods including a description of the socio-economic characteristics of the sample population. The first part of the chapter discusses the women's descriptive characteristics in detail and highlights the considerable variety among the women in the

study sample in terms of age, economic level, and education level, among other variables. The next part of the chapter describes the free listing technique, the use of belief frame sentences, the photo elicitation technique, and the cultural consensus analysis. All of these were used to understand differences among the women in terms of their knowledge and perceptions of the environment, parks, and formal conservation efforts.

The following chapter, chapter six, discusses the analysis of the results by household type, age, and level of education to determine if there is any link between these socioeconomic characteristics and the women's level of environmental knowledge and perceptions of parks and conservation. Analysis by education level resulted in the most differences in general perceptions of conservation and indicated a strong tie between higher education levels and positive perceptions of conservation for the women in this study.

Chapter seven, the final chapter, discusses what the analysis revealed; it examines how formal education may affect people’s perceptions of conservation by exploring the types of skills that are learned in school that affect cognitive development. These include strategies for acquiring the depth and breadth of knowledge needed to construct effective mental models and evaluation skills that are necessary in order to think critically. This chapter also discusses the implications of these results for protected area outreach programs and suggests that traditional theories and strategies that have not taken into account the possibility of very low levels of education in target audiences may not be as effective as they could be. And finally, this chapter concludes with recommendations for further study that would add to the research done here.

CHAPTER 2

LITERATURE REVIEW AND THEORY

Maritime/Coastal Anthropology

The characterization of maritime or coastal communities, as in any way inherently different than any other peasant or agricultural community, did not really come about until 1946 with Raymond Firth's ethnography of Malaysian coastal communities. Subsequent works in maritime anthropology have continued to contribute to a detailed characterization of fishing communities. Most of the following characteristics can be used to describe Loreto, either currently or sometime in its past.

Coastal/fishing peoples have been found to often be both geographically and socially isolated from the rest of society (Firth 1946, Pollnac 1988, M.E. Smith 1977) and perhaps, consequently, are held in low esteem by non-fishing groups (Christensen 1977, Davis and Nadel-Klein 1988, McGoodwin 1990, Poggie and Gersuny 1974,). Fishermen are individualistic and their jobs are characterized by risk, danger, and uncertainty (Acheson 1988, Orbach 1977, Pollnac 1988). To deal with this risk, and because they usually make up the poorest strata of the larger society, they often create long-term relationships of debt peonage which can be seen as socioeconomic safety-nets (Firth 1946, McGoodwin 1990) and practice occupational multiplicity (Cole 1988, Middleton 1977, Pi-Sunyer 1977, M.E. Smith 1977).

Also characteristic of maritime communities around the world is an extreme sexual division of labor (Blake 1977, Davis and Nadel-Klein 1988, Gladwin 1970, Johannes 1981). This may be due, in part, to the fact that in many fishing societies the

men may be absent from the land community for long periods of time. Appreciating this, it seems surprising that most of these early ethnographic descriptions of maritime communities failed to take time to fully consider the roles of women. It was often noted that women did not usually go to sea (Firth 1946, Middleton 1977) and, because of this, fishing was seen as a male occupation which perhaps led to the exclusion of women from inquiry (Allison 1988, Davis 1986, Davis and Nadel-Klein 1988). It may also simply have been a function of the times since throughout anthropology there was a conspicuous absence of research that focused on women.

Where women were mentioned in these early ethnographies and in later works they were often described as taking part in reef gleaning (Carrier 1987, Firth 1946, Johannes 1981) as well as the processing, marketing, and distribution end of fishery production activities (Acheson 1988, Cole 1988, Davis and Nadel-Klein 1988). It follows, then, that they were also commonly noted to be in control of family finances (Christensen 1977, Cole 1988). Occasionally, however, women were found to have no role at all in fishing activities, aside from being customers (Starr 1977).

More recent research has shown that while commonalties are evident in women's roles in maritime communities around the world, women do, in fact, take on different roles in different places. Women in subsistence societies tend to be more involved in actual fishing activities (Cole 1988, Davis and Nadel-Klein 1988) while only occasionally in commercial fishing can women be found working as independent entrepreneurs, for example in the Pacific Northwest of the United States (Allison 1988). Although the literature on women in maritime communities is growing, most contributors to the field as a whole feel that women's roles have to be explored much more thoroughly

in order to create a more complete understanding of coastal/fishing peoples (Davis and Nadel-Klein 1988, Gulatti 1988, McGoodwin 1990).

One area that has received quite a bit of attention from maritime anthropologists is fishery knowledge. Compared with other occupational communities, fishing groups usually have low levels of formal education but often possess a very detailed ethnoscientific knowledge of the marine resources and ecosystems they exploit (McGoodwin 1990, Ruddle 1994). This knowledge is often found to be very different in many respects than the Western science-based knowledge concerning the same species and ecosystems and, because of this, many scholars feel that it can make an important contribution to local resource management plans (Dyer and McGoodwin 1994, Johannes 1981).

Alongside this knowledge some anthropologists have found what they call a conservation ethic. It may be due, perhaps, to a complex understanding of the environment derived from this knowledge (Johannes 1981, Stoffle et al. 1994) or simply be a result of religious prescriptions (Anderson 1994, Zerner 1994) either of which may contribute to both passive and active means of conservation (conservation as the intended or unintended outcome of action) (McGoodwin 1990). But the same behavior that some might call a conservation ethic could also be described as a "subsistence ethic" (Nietschmann 1997), which is the behavior a group exhibits when they take what they need to survive and no more. This is perhaps why so many cases of "traditional marine conservation ethic" have been shown to break down once the market is introduced (Berkes and Farvar 1989, Durrenberger and Palsson 1987, Epple 1977, Johannes 1981, McGoodwin 1989, Nietchmann 1973, Starr 1977, M.E. Smith 1977, Zerner 1994).

Alternatively, some maritime anthropologists explain that what appears to be a conservation ethic may simply be the result of striving for efficiency (Carrier 1987, McCay and Acheson 1987, Polunin 1991). And still others describe maritime communities that seem to have no conservation ethic at all, be it intended or unintended. They are production maximizers that have only succeeded in not completely depleting stocks because of their low population densities and inefficient technology (Lieber and Lieber 1994, Carrier 1987, McGoodwin 1990).

Understanding the local conservation ethic and the manner in which coastal/fishing communities deal with the allocation of resource use privileges is especially interesting since fisheries are viewed as the quintessential common property resource. After the difficulties in managing these types of resources were thrown into debate with Hardin's very influential article entitled "The Tragedy of the Commons" (1968). Many anthropologists jumped into the fray to critique his conclusion that only private or government ownership could protect the commons from degradation (Berkes 1985, Cordell 1989, Feeney et al. 1990, McCay and Acheson 1987, McGoodwin 1990, Ostrom 1990, Ruddle 1989). They asserted that Hardin was confusing common property with open access and that, in reality, it is rare for valuable resources to have open access (Berkes 1985). This is because local resource management regimes are prevalent in inshore fisheries and function to create at least temporary exclusive use rights (Acheson 1988, McGoodwin 1994, Ruddle 1989).

Unfortunately, most local resource management regimes are not designed to deal with a steadily increasing demand from a variety of users. With seventy percent of the world's population now living in coastal zones (Agardy 1997), coastal/fishing

communities are quickly becoming coastal/fishing/tourism communities around the world (Greenberg and Velez-Ibanez 1993, McGoodwin 1990, Pi-Sunyer 1977) and the complexity of resource use issues in the fragile coastal and marine environment has simultaneously multiplied. Anthropologists now need to understand the relationship between tourism and fishing in these communities in order to discern what the implications may be for the implementation of resource management and conservation programs.

Tourism, as one of the fastest growing industries in the world (Ceballos-Lascurain 1996), is an especially potent force in changing people's relationships with their environment. Nature-based tourism is being promoted by many governmental and non-governmental development agencies because it is viewed as a way to provide a new source of income to many third world economies while simultaneously giving an incentive to conserve particular natural resources. Tourism in all of its forms, however, has been shown to affect the local economic, social, cultural, and ecological systems in a variety of ways, both positive and negative (Boo 1990, Kottak 1992, Mathieson and Wall 1982, Whelan 1991).

According to Mansperger (1995:94), the negative impacts of tourism result from its "tendency to disrupt indigenous peoples' relationships to their lands." Although none of his case studies are fishing societies, I feel his conclusion would be applicable to them as well, since the circumstances are similar. Additionally, as Momsen showed through her work in the Bahamas (1993), natural resource use, direct or indirect, influences people's perceptions of environmental problems. Therefore, the incorporation of tourism into households not only changes people's connection to their resources, but in doing so

likely changes how they view environmental problems and the subsequent conservation efforts introduced to mitigate those problems.

The increasing concentration of human activities in coastal zone areas has created a number of problems that threaten our marine and coastal ecosystems. These systems are characterized by exaggerated connectivity and are affected not only by marine activities but terrestrial ones as well, causing managers to look to integrated management approaches for solutions. One tool in this new approach is marine protected areas (MPAs).

Anything from small marine parks designated to protect individual species or habitats to large biosphere reserves with a number of economic, social, political, and environmental goals can be considered an MPA (Agardy 1993). If they are not simply paper parks they all have the ability to control, to some extent, human activities that take place in marine areas. One of the most effective means of achieving the multiple objectives that many MPAs are designated to accomplish is to incorporate thoughtful multiple-use zoning. With multiple-use zoning an MPA can accommodate not only strict no-take zones, but also non-extractive educational and scientific activity zones, tourism activity zones, and a zone that allows for the exploitation of resources (i.e., commercial fishing, oil drilling). This is, of course, an ideal. Though MPAs came on to the conservation scene much more recently than terrestrial protected areas, they have experienced a similar type of development and encountered similar problems, as well.

Conventional parks, where no residency and no resource exploitation is allowed, are going by the wayside as managers realize how inappropriate they are for most of the world (Brechin 1991, Brandon 1998, Little 1994). Especially in third world countries, it

is rarely the case that areas being put aside for protection purposes are not actually inhabited or, at the very least, used for subsistence purposes by nearby local residents. When protected areas are created in these situations, managers are not only managing biological resources but are also managing people since they are asking people to change their behavior. Without a clear understanding of this, management goals are not likely to be achieved (Brandon 1998, Fiske 1992).

When the needs of local residents enter the picture, it becomes clear that there are important trade-offs to make between environmental conservation and rural development (Agardy 1997, Brechin 1991, Fiske 1992, Gilman 1997, Little 1994). Since a number of activities simply cannot take place in the same area, multiple-use protected areas can only function properly and reduce user conflict and accommodate conservation goals with informed zoning (Agardy 1997, Alder 1996, Fiske 1992). User input in the creation of different use zones is essential not only for the traditional knowledge that will be instrumental to managers but also so that the results of zoning are equitable and supported by the community.

Currently, the vast majority of marine protected areas in the world are truly only paper parks — areas that have been declared on paper to be protected, but with no real, effective environmental management taking place. In trying to understand what factors are important in the success of marine protected areas, scholars have discovered that the presence of an individual or group that is dedicated to the park's progress is at the top of the list (Agardy 1997). Therefore, efforts aimed at creating a knowledgeable and supportive local resident community are likely to contribute to the long-term success of any marine protected area.

Community Involvement in Environmental Management

Though today it may seem rather obvious that is useful and fair to involve members of the local community in management decisions and activities concerning the natural resources on which they depend, this has not always been the case. In fact, local participation in conservation efforts is a relatively new phenomenon, though it has been used in development programs since the 1970s (Little 1994). It is, however, an important goal since local involvement in the management of natural resources is now known to be necessary for effective, long-term conservation (Margoluis and Salafsky 1998, Meffe and Carroll 1997, Stevens 1997, Western 1994).

One reason community involvement is now understood by most scholars and project directors to be essential to the success of environmental management programs is due to the wealth of local knowledge that is often possessed by community members (Stevens 1997). In the past there were countless stories of aid organizations, especially international groups, trying to use the same environmental management projects in significantly different environmental and social settings. Not surprisingly, many of these centrally planned projects failed, wasting valuable monetary and technical support (Western 1994). From these failures came the impetus to integrate the knowledge, ideas, and opinions of local communities into various phases of management planning in order to create more informed programs tailored to local situations. The international 'experts' on environmental management had come to realize that the local residents are often the true 'experts' about the natural resources on which they depend.

Initially, community participation consisted of consulting perhaps only one or two local residents who ostensibly acted as spokespeople for the community's interests. It

has become clear, however, that while striving for community involvement in environmental management the misapplication of the word 'community' to the town as a whole can actually impede conservation efforts. This is because the word 'community' can "invoke a false sense of 'tradition', homogeneity, and consensus....[therefore] it is important to use a realistic notion of community, one that acknowledges different interests, competing groups, and negotiated consensus (Little 1994:357)."

The reality of the wide variety of socioeconomic conditions experienced by the members of any one community presents one of the main challenges that environmental managers face as they attempt to include local residents in conservation activities. By taking these socioeconomic differences into account, political ecology theory addresses this problem, thereby providing realistic and useful insights for approaching community studies. According to political ecology theory, people will have differing perceptions and levels of knowledge, as well as distinct sets of opportunities available to them, due to their specific position in society (Blaikie and Brookfield 1987, Nazarea-Sandoval 1995). This position is a result of a number of characteristics including age, gender, class, and ethnicity (Fernandez 1994, Simpson 1994). This is not only due to a more formal differential access to knowledge but also because varying daily routines simply put some people in more intimate contact with natural resources than others.

Additionally, each person's position in society contributes to differences in the quality and quantity of value each person ascribes to the natural resources (Douma et al. 1994, Momsen 1993). This is what some researchers call the "political ecology of cognition" (Nazarea et al. 1998). For example, the depletion of local shellfish stocks in one community may mean the loss of revenue for a wealthy seafood buyer and the loss of

food for a poor subsistence fisherman, while a local middle-class farmer may not consider it much of a personal loss at all. Because of their individual socioeconomic situations, each of these community members is likely to possess different amounts of knowledge of the shellfish stocks and have varying opinions of how they should be managed, if asked.

Research done by Ferguson in Malawi shows an example of a conservation project that was in danger of not being successful because certain segments of the community were not consulted about project design or implementation (1994). Since men, who were the only ones consulted, were not knowledgeable about bean varieties, it was felt that there was not a significant amount of human decision-making involved in the continuation of bean biodiversity. In fact, women were in charge of beans and actively selected them for specific characteristics, and yet that was completely overlooked in the research. The entire design of biodiversity conservation projects can be affected by this type of oversight, making them ineffective. Typically, as in this case, the segment of the community most commonly overlooked is women (Awa 1989; Rocheleau et al. 1995).

The importance of involving the local community in environmental management efforts does not only rest on their abundance of specialized local knowledge but also on the fact that their understanding and support of the management plan is crucial to its success (Margoluis and Salafsky 1998). Especially where the local people are directly dependent on local natural resources for their survival, their behavior is likely to have to change in some way as a result of conservation efforts. If the change is not feasible because it simply leaves them without the means to survive, they will not support the

management plan. Likewise, if they do not understand why they have to change their behavior, either because they do not see the implications of their behavior or because they do not see that the resources are in danger, they will also not be supportive of the management plan. Local stakeholder participation in management efforts leads to sustainability by giving them more control over "how project activities affect their lives" and fostering a better understanding of conservation goals both of which can generate a critical sense of ownership (Margoluis and Salafsky 1998: 23).

The community-based conservation literature has shown that it is, in fact, quite difficult to promote conservation efforts when the local people themselves do not perceive a threat to their resources (Kottack and Costa 1993, Little 1994). The differences cited above which lead to variations in local knowledge among the community members also can contribute to varying perceptions of the degree to which resources are danger. The community members that are most dependent on specific resources have been shown to be the ones that are most aware of the threats to those resources (Momsen 1993).

However, being aware that resources are threatened may not translate into a positive perception of conserving those resources (Kottack and Costa 1993). Research done by Jacobson in Malaysia discovered that the socioeconomic backgrounds among villagers accounted for some of the variations in their attitudes towards a local national park (1991). But while gender and age revealed no differences in attitude, the residents' occupation did. Government workers and students scored more favorable responses on the need to preserve resources than farmers did, though it would seem that farmers would have been the group that had more contact with these resources. The researcher felt that

the results could be attributed to the fact that the government employees and the students had a better understanding than the farmers of the scientific and economic value of the park. We can probably assume that this is linked to differences in education levels.

Jacobson also pointed out that the farmers were the ones competing with the park for land which may have resulted in a less favorable perception of conservation (1991). Research that Kottack and Costa (1993) have done in Brazil has led them to conclude that people's values have a large influence over how they perceive threats to natural resources. With this in mind we can view Jacobson's work and see that, in fact, it may not just be that the farmers had *less* of an understanding of the scientific and economic value of the park than the students and government workers but a *different* understanding of their value. Alternative uses of resources, other than to conserve them, may be seen in their eyes as being more valuable. If this is the case, it would certainly affect their perceptions about the park over all.

Participation in conservation efforts has been viewed not only as a means to an end but also as an end in itself. It can contribute to the empowerment of the local community, allowing them to declare their rights to make decisions concerning the use of their local resources (Agardy 1997, Jentoft and McCay 1995, Little 1994, Nietschmann 1997, Ruddle 1994). Participation such as this can be a valuable learning experience (Margoluis and Salafsky 1998). It is likely that as various members of the community become involved in the management of their local resources and learn more about how meetings are conducted, information is collected, and decisions are made, etc., the more likely they will be to continue participating in the future because they will be more comfortable with the whole process.

In order to attain true community participation in environmental programs, it is clearly necessary to seek out the knowledge and concerns of various sectors of the community (Awa 1989, Ferguson 1994, Margoluis and Salafsky 1998, Western 1994). Though trying to achieve true community participation in both the design and implementation of environmental management plans can be quite difficult, it can obviously be a very effective strategy due to its ability to enhance the local understanding and support for the plan as well as contribute to local empowerment.

Connections Between Women and Environment

As the heterogeneous nature of communities has received more attention, gender has been shown to be one of the key factors in determining various opportunities, goals, and interests of community members (Beneria and Roldan 1987, Richards 1980, Thomas-Slayter et al. 1993). These differences, in turn, lead to gendered differences in the community members' connections with the environment (Duoma et al. 1994). Literature concerning women and environment explicitly addresses the theoretical connections between women and nature, be they essential or constructed connections, and the consequences of this linkage for both the women's status and the health of our natural resources.

The subfield of women and environment grew out of the fields of development and feminism so it may be helpful to briefly review the relationship between the two fields. As a whole, feminist literature never seemed to be content with development programs and has repeatedly critiqued them for not valuing women's work (Grown and Sebstad 1989, Jiggens 1989), not recognizing the (primarily female) informal sector as an avenue for change (March and Taqque 1986), or seeing that development affects even

different women differently (Beneria and Roldan 1987). More importantly they felt that it was not simply that women had been ignored but that women have been hurt by development (Gallin and Ferguson 1992). This was first shown by Boserup (1970) but later it was demonstrated further by showing that women and men even within the same household have different goals (Bruce 1989). Households are not unified and women have ended up with more responsibilities and fewer rights of management or decision-making and ownership.

As commons areas have been brought into commodity/export production, the poor (women) who depended on the resources have become poorer. Women's work is not visible (Curtin 1997, Grown and Sebstad 1989) so development has tended to add to women's work burdens making them bear the costs of development while not receiving the benefits. Development has been seen as leading to the decline in women's control of resources, their further subordination, and also to degradation of the environment. Due to a universally recognized sexual division of labor, women are often hardest hit by this resource degradation due to the reproductive nature of their tasks such as collecting water and firewood and also because in many countries they are the primary agricultural producers (Curtin 1997). Many scholars feel both women and nature have been hurt by development and that the environmental movement and the women's movement have the same agenda.

The women and environment literature evolved from this background and began to inform development programs in the early 1980s. Understanding the universal division of labor meant that people had different domains of knowledge that were often patterned along gender lines (Richards 1980, Simpson 1994). Many studies were done

showing the need to understand gendered indigenous knowledge and gendered perceptions of the environment for development and environmental management plans to work (Awa 1989, Duoma et al. 1994, Ferguson 1994, Fernandez 1994, Kellert and Berry 1987, Mishra 1994, Momsen 1993). Because of this, gender analysis began to be integrated (at least in theory) into development and conservation programs.

The main debate in women and environment, however, has really been concerned with the nature of the women/environment connection. Ecofeminism has received the most press of all the theoretical approaches. Ecofeminists agree that the women/nature link is at the root of women's subordination, they oppose the domination of nature by culture, and they believe that nonhierarchical paradigms should be used instead of dualisms (Mies 1993, Shiva 1989). What ecofeminists do not agree on is how women are linked to the environment. The "essentialists" camp feels that there is an essential link between women and nature. This might be best described by Vandana Shiva's "feminist principle" — a living, creative process from which all life arises that is found in both nature and women (1989). The others are labeled "constructivists." They believe that the link has been constructed socially due to capitalist/patriarchal hegemony.

Another split in ecofeminism is between cultural ecofeminists and social ecofeminists (Plumwood 1992, van den Homberg 1993). Cultural ecofeminism emphasizes the woman/nature bond with their joint oppression due to male domination. They feel the need to create an alternative women's culture because they believe women have superior relations with nature. Spiritual activities are central to cultural ecofeminism. Social ecofeminism tries harder to reject dualisms and recognize the historic and social processes involved in determining women's relation with nature. The

interconnection between social domination and the domination of nature is emphasized and leads to the need for a less oppositional culture. Social ecofeminism is more politically oriented.

The theory of ecofeminism as a whole paints a rather "romantic" picture of women's roles and the "golden age" before capitalism and creates the image of one monolithic woman. The fact that some types of women dominate other women and that women's relationships with nature are different depending on their socioeconomic position is never addressed.

Three other approaches to the women and environment connection that I feel are more realistic in their views are feminist environmentalism, social feminism, and feminist political ecology. Feminist environmentalism believes that interests in resources are gendered due to different daily tasks and responsibilities (Rocheleau et al. 1996). Social feminists also look at a division of men's and women's tasks, but more specifically along the lines of men's productive roles and women's reproductive roles in the economic system (Collins 1992, Jackson 1993b). Feminist political ecology, championed by Rocheleau and Thomas-Slayter, look at gender along with class and ethnicity as a critical variable in the uneven distribution of access to and rights over resources. They answer the critique to ecofeminism by showing that women's relationships with nature, their rights, responsibilities and exposure to risk, is influenced by other socioeconomic variables as well as their gender — women are not one monolithic entity (Rocheleau et al. 1996, Thomas-Slayter et al. 1996). These last three approaches make a point of demonstrating that women are not inherently environmentally friendly, that they can degrade the environment — it depends on their position in society and how much

flexibility they have to look beyond short-term goals. This is something that the ecofeminist approach does not seem to allow for (Bhardwaj 1993).

The Loreto project under discussion here is informed by both the feminist political ecology and feminist environmentalism theories. Feminist political ecology takes a constructivist viewpoint but expands it to assert that gender is one of a number of socioeconomic characteristics that determines women's relationships with the environment (Jackson 1993, Rocheleau et al. 1996). Feminist environmentalism takes this to the next step by saying that this, in turn, will influence their interests in natural resources which, I believe, will subsequently lead to varying connections with conservation. Theoretically this is an important step because once gender is incorporated into project designs, it becomes clear that *within* each gender there are major differences in levels of knowledge and perceptions of issues: neither women nor men are homogeneous groups (Bonnard and Scherr 1994, Garcia-Guadilla 1995, Jackson 1993, Nazarea-Sandoval 1995, Sachs 1996, Thomas-Slayter and Rocheleau 1995).

Taking these approaches (as opposed to one based on the theory of one monolithic woman with an essential connection with nature) allows us to examine how women's experiences of environmental degradation are mediated by their livelihoods systems. These approaches also make it possible to investigate how women's connections to conservation may be affected not only by their livelihoods systems but other by factors as well including their environmental knowledge, property relations, gender relations, and various socioeconomic factors (Duoma et al. 1994, Jackson 1993b).

Understanding the diversity of positions women occupy in relation to the environment make it clear that if management planning for natural resources is to be

equitable and successful, women should be involved (Mishra 1994, Molnar 1989, Pandey 1998, Yih and Brower 1994). In many communities around the world the tasks some of the local women perform daily make it likely that they would possess detailed knowledge of the resources that may be useful to management planning. Simply understanding various aspects of the women's use of environmental resources (i.e. what qualities they look for in particular resources, what they may use as alternatives, how far they could possibly travel to obtain resources, etc.) would also be helpful to the resource management planning efforts.

In this same community, however, there may be other women who, due to having a different position in society, do not have the same degree of interaction with the local natural resources. They may be wealthier and have households with amenities that free them from this type of labor or their age or social class may make this type of work inappropriate for them. Likewise, there are entire communities where most of the women have very little direct interaction with local resources. They have running water, electricity, stoves, and grocery stores. This is the situation for most of the women that live in the town of Loreto. Why would it be useful or necessary to involve women such as these in environmental management planning activities?

Though these women may not have detailed knowledge to contribute to management planning efforts nor are their daily routines probably of much interest to resource managers, there are at least two important reasons to encourage them to participate in the various phases involved in resource management. The first is their position of influence in their households and communities. While the women may not be routinely interacting with the local natural resources, the degradation of the local

environment will surely have some impact on their households. Excluding people (either intentionally or unintentionally) from the planning process leaves them ignorant of the various facets of the environmental issues facing their own community. By expanding the women's understanding of the threats to local resources and exposing them to the interests of various groups of stakeholders and possible management strategies, they can become informed and knowledgeable about the complex reality of the situation. This level of comprehension may engender the women's support. This, in turn, may be a key factor in long-term community conservation support since women, as the 'first educators' of children, are in a position that has great influence on future generations (Yih and Brower 1994).

The second reason it is important to involve women in the natural resource management process concerns their empowerment. Women make up 50% of community; it is just to involve them in resource planning issues even if they don't have detailed knowledge to contribute. Even if a greater understanding of the natural resource management process does not create support for particular conservation efforts (perhaps the more they understand of the big picture, the more they may come to believe a particular management strategy is inappropriate for their situation) it will at least put them in a position of knowledge, which is always more powerful than a position of ignorance. The understanding that comes from attending meetings, learning about the bigger picture of what is involved in resource management, and understanding and participating in the decision-making process — this type of knowledge leads to "informational empowerment" (Annis 1992). The power women gain by taking part in these processes — from learning how to inform themselves, combining their efforts with

like-minded stakeholders, and contributing to management activities — can be transferred to other areas of their lives (Yih and Brower 1994). Self-empowerment is another lesson that is important to instill in future generations of resource users.

In Latin America, the traditional patriarchal culture has excluded women from many areas of modern life, especially in official planning and decision-making efforts concerning economic and environmental resources (Stephen 1992, Yudelman 1987). In spite of this, women do participate in numerous social movements in Latin America, finding their traditional domestic roles as wives and mothers to be a powerful organizing force. For example, in 1977 in El Salvador a group formed whose goal was to find information about disappeared relatives (Stephen 1997). This group appealed to women by focusing on their roles as wives and mothers, as the person "responsible" for family cohesion from a cultural viewpoint. The women's activities within this group were acceptable since they were within the realm of their traditional role in society. Even the name of the group CO-MADRES (Committee of Mothers and Relatives of the Political Prisoners, Disappeared, and Assassinated of El Salvador) highlighted their role as mothers (*madres* means mothers in Spanish).

Women's domestic roles have similarly driven their participation in movements aimed at persuading the government to address environmental degradation. Especially in urban areas such as Mexico City where environmental hazards are obvious, women have tended to mobilize around practical issues such as garbage removal and clean sources of water for household use (Bennett 1995, Garcia-Guadilla 1995). Again, they act on and perpetuate their traditional roles as domestic caretakers because they feel the health of their family is at stake. Once organized, shared experiences often come to light and these

women may begin to question their traditional gender roles. This is when the group's practical goals may turn into strategic goals that are concerned with larger issues of power rather than specific environmental problems; this is where change may begin (Bennett 1995, Garcia-Guadilla 1995, Stephen 1992).

Participating in these movements does not necessarily lead to changes in traditional power structures, however. Challenging the status quo may come with a price as many women suffer from domestic abuse for becoming involved in these movements (Stephen 1992). Additionally, participation may simply triple their workload making women political and environmental activists as well as wage laborers and domestic workers (Stephen 1992, Yudelman 1987). Meanwhile, economic and environmental movements continue to encourage women to participate in activities that reinforce their traditional roles as homemakers while generally providing little opportunity for them to participate in planning and decision-making activities (Stephen 1997, Yudelman 1987).

For most Latin Americans, concern about environmental issues falls well behind other pressing problems. Nevertheless, women have increasingly been tied to these movements, at least symbolically, as they have arisen throughout Latin America (Price 1994). Unfortunately, it appears that in Latin America, as elsewhere in the world, advancing concerns about the environment does not automatically advance concerns about women's issues (no matter how much 'life-giving' force is contained by each).

Influences on Environmental Knowledge, Attitudes, and Advocacy

As residents of this planet, we are all ultimately dependent on the natural resources provided by the Earth. It is interesting then, for both philosophical and practical reasons, to contemplate the question of why some people seem to have a

heightened concern for the health of our environment while others do not. Literature reviewed earlier in this chapter supports the idea that people's knowledge and perceptions of the environment differ as a result of their particular position in society. Guided by this theory (though perhaps not intentionally), many researchers in anthropology, psychology, and education have attempted to answer the question of disparate environmental concern by investigating the link between various socioeconomic characteristics and differences in levels of environmental knowledge, attitudes about conservation efforts, and involvement in environmental conservation activities and organizations.

A number of these studies have focused particularly on determining the affects of gender, age, income, and education levels on environmental knowledge and attitudes. While studying American attitudes and knowledge about wildlife, Kellert and Berry (1987) found that males had greater knowledge of animals than females but that females had a higher 'moralistic score' meaning they showed less support for exploitation of and domination of animals. Momsen (1993) also investigated the affect of gender on environmental perceptions. Her research in the Eastern Caribbean found that men's and women's perceptions were related to their social and economic roles and that women were more aware of environmental problems that affected their daily domestic routines. She further concluded that the people most dependent on specific resources (e.g. fishermen on marine resources) are more aware of particular environmental problems concerning those resources. In Brazil, Kottack and Costa (1993) discovered that it was generally the upper class that joined conservation organizations. In other studies, age has been found to be associated with significant differences in environmental attitudes (Hsu and Roth 1996, Kellert and Berry 1987). However, in Jacobson's study in Malaysia,

differences in environmental attitudes could be linked to neither gender nor age, but rather to the person's occupation (1991).

Meanwhile, a number of researchers have concluded that education level is one of the most significant predictors of environmental knowledge and attitudes (Hsu and Roth 1996, Kellert and Berry 1987, Kottack and Costa 1993). Among Americans, Kellert and Berry discovered that both men and women with a higher level of education had more knowledge, appreciation and protective feelings for animals while those with less education had limited concern for wildlife in general (1987). Kottack and Costa found that the more highly educated people in their study in Brazil were more aware of environmental hazards and disasters (1993). In Taiwan, as well, Hsu and Roth found that among community leaders, education was significantly associated with a greater level of environmental knowledge and more positive attitudes toward conservation (1996). Even amongst highly educated people however, it has been found that this greater concern for the environment is not evenly distributed to all environmental problems. In situations where people's self interest is threatened they are often found to have negative attitudes toward conservation actions (Cantrill 1992, Hsu and Roth 1996, Kottack and Costa 1993).

Some researchers feel that the link between general education level and environmental knowledge and attitudes implies that education plays a key role in increasing the environmental literacy of the public. They believe it creates a broader understanding of potential environmental problems (Hsu and Roth 1996). Others have attributed this link to an increased exposure to media (Kottack and Costa 1993).

While in many countries around the world people with higher levels of education do indeed have greater access than other community members to information about environmental issues, the same marked difference may not be so obvious in the United States. Our society is so saturated with environmental data that even those people with low levels of education are surrounded by an abundance of information about the environment. More exposure to information may lead to a greater awareness of environmental issues but does not necessarily lead to environmental advocacy (Cantrill 1992, Kottack and Costa 1993).

In trying to understand what makes some people environmental advocates, Cantrill points to varying 'cognitive styles' that process information differently (1992). He states that people generally take in the environmental information with self-interests in mind, not global interests. How they process that information then is related to their 'self-schemas'. If the information is not seen as being relevant to the 'self-schema' then it is ignored. In a society such as ours, he adds, with so much information about the environment, there is very likely to be an 'environmental-self' somewhere in people's 'self-schema'. Still, the view each person has of him/herself that pictures where he/she stands in terms of environmentalism may not be one that fosters environmental advocacy.

D'Andrade defines schema as an "organized framework of objects and relations" (1995:124). He goes on to say that schema are not simply pictures in our minds but "are a kind of mental recognition 'device' which creates a complex interpretation from minimal inputs" (136). One word may trigger a schema and the schema that comes to mind goes on to affect our perceptions and reasoning of the situation or problem at hand.

D'Andrade points to both motivation and emotion as influential factors in the creation of schemas (1995: 124). The type and amount of background knowledge one has about a particular topic also contributes to a person's model or schema about that topic (Cromley 2000). Consequently, both between and within culture differences can influence the schemas each person creates, meaning that schemas are not necessarily widely shared among people even within the same community (D'Andrade 1995).

The presence of diverse schemas concerning one topic within one community may hinder attempts to effectively deliver environmental information. The words used may trigger very different schemas in people's minds which, in turn, affects how they process the information they have received, and, indeed, whether they process it at all. Therefore, any attempt to educate a target group (either formally or informally) about environmental issues, especially with the goal of effectively including them in environmental decision-making activities, would probably be more successful if the first step was to assess the group's environmental knowledge and attitudes (Hsu and Roth 1996:24). By understanding the various types of knowledge and motivating interests that may be influencing members of the target group's schemas concerning conservation and the environment, environmental educators can be more effective in their efforts to disseminate information since they essentially will have created a baseline data set from which to work.

The literature reviewed here supports a particular line of action when it comes to creating effective conservation management plans. A basic assumption that underlies this research is that local community participation is absolutely necessary in order to make marine protected areas effective, fair, and sustainable. However, a comprehensive

picture of a local community can only be produced by broadening the historical scope of investigation since each community is essentially comprised of a number of smaller "communities." This type of expanded research includes examining groups such as women that are often overlooked due to traditional social roles. Women are, in fact, an especially important group to include in conservation activities due to their influential, albeit often private, positions within the community.

The literature goes on to assert that even groups within the larger community cannot be considered homogeneous. The women, for example, within one community do not speak with one unified voice. Various socioeconomic factors may influence each woman's access to knowledge and affect her perceptions. Additionally, changes in resource use patterns, such as those resulting from the introduction of tourism activities to coastal fishing communities, are likely to affect the local resident's levels of environmental knowledge and perceptions of formal conservation activities. Understanding how these changes manifest themselves among women within one community is an essential step toward understanding the heterogeneous nature of the group and creating useful baseline data. Information such as this is the starting point to developing the true community participation that is necessary in order for marine protected areas to be successful.

CHAPTER 3

HISTORY AND BACKGROUND

While the first part of this chapter gives a brief history of natural resource protection on a national scale, the second section of the chapter focuses specifically on the state of Baja California Sur. The general history and background of the state is reviewed not only to give more meaning to the evolution of environmental protection measures in the state but also in order to paint a more detailed picture of the geographical and historical setting in which this project takes place.

A Brief History of Natural Resource Protection in Mexico

Mexico boasts a wide variety of geographical areas including the riverless, relatively flat karst terrain of the Yucatan Peninsula, the jungle covered mountains and lowlands of southwestern Mexico and the Gulf coastal plains, the more temperate mountainous regions in central Mexico, and the extreme desert conditions in both northwestern Mexico and the Baja Peninsula. Noting this diverse landscape, it is not surprising, perhaps, that Mexico has one of the highest levels of biodiversity in the world (Breceda et al. 1995). This high level of biodiversity is not matched, however, with a very high level of national environmental consciousness. Indeed, being environmentally "aware" is a relatively new phenomenon in Mexico. Consequently, the environmental movement that began in Mexico in the seventies does not have anywhere near the support of that of the American environmental movement (Simonian 1995). This makes a review of the country's long history of attempts to protect their natural resources necessary in

order to understand the drive behind Mexico's current environmental protection measures.

Conserving Mexico for Mexicans

Throughout Mexico's history, large-scale resource exploitation has been seen as the route to economic prosperity and almost all of their efforts at natural resource protection have, paradoxically, been related to this reality to some extent (Simonian 1995). In 1861 the first forestry laws were enacted in Mexico thirty years before a similar law was passed in the United States (Simonian 1995). Taking this step so much earlier than the American government may have been due, in part, to the fact that Mexican forests were being depleted at a much faster rate than those in the United States. A perhaps more pressing reason for this action from the government's point of view was to prevent foreigners from commercially exploiting the forests (Simonian 1995). Mexico's attempts throughout its history to reinstate its sovereignty over its national natural resources has repeatedly led to measures such as these that have inadvertently led to conservation.

Mexico has always displayed a rather utilitarian attitude towards its natural resources. Around the beginning of the 20th century, a great deal of effort was put forth trying to catalog the economically useful flora and fauna of the country (Dedina 2000). This exercise not only exposed the paucity of available information concerning Mexico's natural resources, but also illuminated the fact that many of its resources had already been exploited on a large scale by foreigners. Revolutionary sentiment that carried on after the war supported the Mexican government's push to research and establish national control over (especially) commercially important species (Dedina 2000).

The subsequent use of the information gathered in this massive effort to understand the extent of the Mexico's natural resources had both positive and negative affects on their conservation. Some of the data collected was used to determine which lands were available for establishment of national parks. Since 1900, 40% of Mexico's national territory has been decreed under some sort of national protection (Vincent 1998). Mexico's first national park, Desierto de Leones, was declared in 1917 on (what was then) land outside of Mexico City in order to protect an aquifer (Dedina 2000, Vicent 1998). This park was championed by Miguel Angel de Quevedo who later, under Cardenas (1934-1940), became the head of Mexico's first autonomous conservation organization and established Mexico's national park system (Simonian 1995). Most of the current park system was created under the Cardenas administration.

It was during this time period, as well, that the Mexican government began to play a strong central role in managing the nation's commercially important species (Vasquez-Leon 1993). The information gathered concerning Mexico's natural resources helped to create national economic development initiatives. These federal development programs were a principal cause of the decline in the condition of Mexico's environment (Simonian 1995). For example, from 1940-1970, in trying to decrease the nation's dependency on agriculture, the Mexican government pushed for the industrialization of its fisheries, at the expense of conservation (Simonian 1995).

On the other hand, understanding its resources and the associated costs of large scale national exploitation of those resources sometimes led to true conservation. For example, without a whaling fleet of its own Mexico had little to lose and much to gain by banning whaling off its coasts in 1935 (Dedina 2000). Foreign fleets had exploited the

whales found in Mexico's lagoons for many years. Mexico preferred to spend the money it could have used on creating a national whaling fleet on building up its industrialized fishing fleet. By joining a growing international movement to conserve whales, Mexico could reinstate its sovereignty over the whales and their habitats by preventing other nations from whaling along their coasts while at the same time creating a positive international conservation image (Dedina 2000). Consequently, whales enjoy true protection in Mexico's waters to this day.

Mexican Environmental Legislation

Environmental legislation really began in Mexico in 1971, though it was limited at first to contamination and its affects on health. In that year the Environmental Protection Law (*La Ley Federal de Prevencion y Control de la Contaminacion Ambiental*) was published (Vincent 1998). Because Mexico faces the dilemma of trying to protect the nation's environment while simultaneously trying to develop the country economically, many laws lacked the real strength they needed to succeed. Mexico's first pollution control law, for instance, relied more on faith in technological controls than any significant cutting back on certain types of production (Simonian 1995).

By the 1980s, Mexico's environment had declined considerably which gave rise to a more vocal environmental movement (Simonian 1995). The increasing number of environmental non-governmental organizations that began during this time period filled a niche created by the government's seeming inability to deal with the growing environmental crisis (Price 1994). By the 1990s Mexico had over 1000 environmental organizations whose membership was dominated by the Mexican middle class (Simonian 1995). Still, none of the organizations boasted large memberships and the focus of their

efforts continued to be the environmental hazards of Mexico City (Simonian 1995). At least one environmental organization, however, has come to wield quite a bit of power in Mexico. The Group of 100, whose membership consists of well-respected authors and intellectuals, has been successful at influencing the national environmental policy debate (Dedina 2000, Simonian 1995). They work exclusively through creating political pressure and are probably most well known for a massive media campaign they supported to stop an imposing saltworks project within the protected San Ignacio Lagoon (Dedina 2000).

Due in part to Mexico's growing environmental movement, the 1980s also saw the government expanding its environmental protection concerns. In this decade the National Development Program (*El Programa Nacional de Desarollo*) included, for the first time, a chapter on the environment, the National System of Protected Areas was created, and the General Law of Ecological Equilibrium and Environmental Protection (*Ley General de Equilibrio Ecologico y Proteccion al Ambiente*) was published (Vicent 1998). Additionally, Miguel de la Madrid (1982-1988) who ran for president in the early 1980s, was the first to presidential candidate to make the environment a campaign issue (Simonian 1995). As president he created the Secretary of Urban Development and Ecology (SEDUE) which established a national system of protected areas that included the categories of national parks, national monuments, ecological reserves and biosphere reserves (Dedina 2000). By the end of his presidency, however, Mexico City's environmental problems topped the list of the countries concerns, alongside more familiar issues such as national security (Mumme 1992).

The effectiveness of Mexican legislation has notoriously been limited by a lack of administrative continuity, not only concerning the personnel of managing agencies but the agencies themselves. Management of environmental issues in Mexico is no exception. While Carlos Salinas de Gortari was president from 1988-1994 he, at the very least, gave much more lip service to environmental issues than any president before him, especially concerning the problem of air pollution in Mexico City (Simonian 1995). He also transferred management of environmental issues to the Secretary of Social Development (SEDESOL) in 1992 (Andrews et al. 1998). In 1995, under President Ernesto Zedillo Ponce de Leon (1994-2000), the management of environmental issues again changed agencies, this time to the Secretary of the Environment, Natural Resources, and Fisheries (SEMARNAP). Under SEMARNAP, for the first time, the environmental agenda and management of natural resources was actually unified in the same agency (SEMARNAP 2000a). The head of SEMARNAP was charged with consolidating all of the environmental policies and programs throughout the government which, in part, would help to strengthen the agency's ability to implement existing environmental legislation (Dedina 2000).

This restructuring helped to improve environmental management in Mexico. An example of SEMARNAP's range of responsibilities concerning each natural resource can be seen with regards to its role in fisheries management. SEMARNAP was expected to "regulate the exploitation of the fisheries; to study, create projects, construct and

conserve fisheries infrastructure and regulate the formation and organization of the Mexican fishing fleet" (Vicent 1998: 116).[1]

Combining Conservation and Community Development

Throughout these transitions, priorities concerning the environment were not consistent. In the 1980s, SEDUE was relatively strict about limiting human activities in their efforts to protect the environment (Andrews et al. 1998). However, SEMARNAP has emphasized community development more than hard line conservation measures, as perhaps can be seen by its rather utilitarian list of responsibilities concerning the national fisheries. Though some feel that conservation has suffered due to this shift in priority (Andrews et al. 1998), it may simply be a more realistic reflection of Mexico's economic situation.

Concerns about environmental conservation in many third world countries falls well behind other issues such as employment, education, and health and public services. Under these circumstances, economic opportunities routinely take precedence over environmental protection. In light of this, the theory of sustainable development has become very attractive to poorer countries. Mexico has clearly attempted to integrate sustainable development ideas into its environmental programs which is why SEMARNAP focuses so much of its efforts on community development. This, in turn, has led to a concerted effort to encourage community participation in its programs and policy development.

When SEMARNAP was first created in 1995, it published a series of work notebooks (*Cuadernos de Trabajo*) that stated its commitment to community

1 *"Regular la explotacion pesquera; estudiar, proyectar, construir y conservar las obras*

participation. One notebook said that "conservation and sustainable development initiatives would be unproductive and not useful without local institutional solutions" and included among the long list of management functions of natural protected areas the importance of local participation in each activity (INE-SEMARNAP 1995: 23).

By the year 2000, the agency's commitment to community participation was even more evident in its publications. SEMARNAP's 'Work Program 2000' (*Programa de Trabajo* 2000a) for Baja California Sur listed as its primary objective the creation of natural resource management programs whose goals are to contribute to social well being and the mitigation of poverty while they improve environmental conditions and make production more efficient (SEMARNAP 2000a). It goes on to say that SEMARNAP programs should create new job opportunities and sources of income, especially for the rural population. For example, it states rather explicitly that the fishing industry will produce 9,000 tons of food to improve the *campesino*'s diet and 2,300 communities will receive technical assistance, support and training for rural aquaculture programs (SEMARNAP 2000a). In order to accelerate decentralization of environmental management it encourages local capacity building through education, training, and information dissemination (SEMARNAP 2000a).

Currently Mexico boasts 97 actual protected areas under the categories of biosphere reserve, special biosphere reserve, national park, natural monument, national marine park, natural resources protected areas, and areas for the protection of flora and fauna (Arizpe 1998, Vicent 1998). By 2000, however, only 85% of the parks had funding, a management plan, infrastructure and personnel (SEMARNAP 2000a). Even

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de infraestructura pesquera y regular la formacion y organizacion de la flota pesquera"

the protected areas among that fortunate eighty-five percent encounter numerous problems that limit their abilities to carry out effective programs. Even when there is funding available for parks, long-term financial assistance is certainly not ensured and bureaucratic obstacles create funding delays (Andrews et al. 1998). Consistent lack of funding translates into a lack of technical staff, equipment and infrastructure on the local level (Breceda et al. 1995). The government's lack of financial resources has also made it difficult to fund effective enforcement measures. Consequently, for financial as well as cultural reasons, persuasion is still preferred to sanctions for those found violating environmental laws (Mumme 1992). Additionally, the government rarely pays the enforcement officials of PROFEPA (*Procuraduria Federal de Proteccion al Ambiente*) enough to create an incentive to avoid corruption (Bermudez 2001). This problem is compounded by the fact that park rangers have only very recently begun to receive PROFEPA training in order to have the legal authority stop violators themselves (Dedina 2000).

In nations such as Mexico that lack the financial resources to provide strict enforcement for environmental protection measures, community support for conservation legislation is a necessity if it is to be successful. Community participation becomes even more essential when the government's goal is not only to protect resources but also to ameliorate various factors that seem to continually lower the quality of life for its citizens. Literature published by the Mexican federal government continues to recognize this need. The Environment Program 1995-2000 (*El Programs del Medio Ambiente 1995-2000*) published for the nation mentioned that one of the main causes of the continued deterioration of the environment was the lack of information needed to

promote participation and co-responsibility with respect to the environment (Vicent 1998). This type of sentiment has been the impetus behind the genuine attempts of park service personnel working on sites throughout Mexico to integrate the local community in conservation and decision-making activities.

A Brief History of the State of Baja California Sur

Populating the Peninsula

The Vizcaino Desert, located in the northern part of the state of Baja California Sur, is a Human Heritage Site. This area was considered important enough to be declared as such due to the wealth of prehistoric archaeology found there (Breceda et al. 1995). The rich evidence of indigenous cultures that inhabited the peninsula in the past does not, however, in any way reflect the contemporary level of indigenous populations. The original indigenous population is estimated to have been 50,000 people at the time the Jesuits arrived (Tryon 1996). Presently, the Pericu and Guayacura, two of the three original Indian groups that inhabited the peninsula, are extinct. The remaining 1000 or so descendants of the third Indian group, the Cochimi, can be found in the northern part of the Baja Peninsula along the United States-Mexican border (O'Neil 2001).

In the late 17th century, the Jesuits were the first Europeans to succeed in colonizing the peninsula, followed by the Franciscans and then the Dominicans. Together they founded a total of 26 missions along the 800 mile peninsula (O'Neil 2001). European and *mestizo* immigrants came from mainland Mexico to work the ranches adjacent to the missions and continued to do so for the next two centuries. In the 1800s, foreign whalers traded with these ranchers and some married local women from mission

towns (Dedina 2000). Many of the people living in Baja today are descendants of these original settlers.

The lower part of the Baja Peninsula is considered one of the driest places on earth, averaging less than five inches of rainfall a year and sometimes going years at a time with no rainfall at all (O'Neil 2001, Tryon 1996). Given the environmental limitations it is understandable that the population density remained very low throughout the colonial and post-colonial years, especially in the southern Baja state. In the 1930s, encouraged by the cooperatives established by President Lazaro Cardenas (1934-1940) to spur settlement and development in the region, many ranchers migrated to the coasts and began to fish from semi-permanent fish camps (Dedina 2000). By the 1940s, in another attempt to populate the peninsula, the Mexican government initiated a large-scale commercial agriculture project in the Santo Domingo Valley in Baja California Sur (Vicente 1998). Free land was offered to mainland immigrants who were willing to settle in the area and grow primarily cotton and wheat (Vicent 1998).

Due to a favorable world market, the agricultural project did succeed in attracting a large number of immigrants to the peninsula (Vicent 1998). Some of these settlers subsequently migrated from the Santo Domingo Valley to the coasts in the 1950s and 60s to seek employment at recently opened canneries (Dedina 2000). Even as late as the 1980s, when a deep economic crisis hit Mexico, mainland Mexicans migrated to Baja to work in the local fisheries (BCS Gobierno Estatal 1999). Continued immigration from mainland Mexico helped to increase Baja California Sur's population from 47,089 in 1930 to 375,450 by 1995 (Vicent 1998). Even with a population growth rate that was below the national average, the state's population almost doubled between 1930 and

1960. Then, boasting a higher than average national growth rate, the population of the state more than tripled in the following thirty years (Martinez de la Torre 1998b).

Improved state infrastructure also aided the population increase. In 1964 ferry service began, first simply linking Mazatlan, on mainland Mexico, to La Paz, the capital of Baja California Sur. It was not until a decade later that the transpeninsular highway was completed (Vicent 1998). Prior to this, Baja (especially the southern portion of the peninsula) was relatively isolated (see Figure 3.1), consequently productive activities were generally geared toward autoconsumption due to the difficulties in accessing national and international markets. Also important in helping to end Baja California Sur's isolation from the rest of the country was its promotion from a territory to a state in 1974. Baja California Sur, along with Quintana Roo, are the youngest states in the nation (Vicent 1998).

Figure 3.1: Baja Peninsula, Mexico

Little by little, the state's urban-rural demographics changed as well. From 1950 to 1990 the percentage of urban residents in Baja California Sur increased from 36% to 78% as people migrated from the mountain ranches of Baja and immigrated from the mainland to take advantage of employment opportunities available in the cities and towns of the state (Vicent 1998). This was especially true of La Paz which became a commercial-tourism center due, in part, to its designation as a free trade zone (Martinez de la Torre 1998a).

Today, Baja California Sur still has a population of only 423,516, considerably less than the 2,487,700 that populate the northern state of Baja California (INEGI 2000). Baja California Sur has only 0.43% of the population of the entire country and, with only six people per square kilometer, is the least densely populated state in Mexico (INEGI 2000). Table 3.1 illustrates that the municipality of La Paz remains the population center of the state, though due to mass tourism, Los Cabos is not far behind.

Table 3.1: Population by Municipality in Baja California Sur
(INEGI 2000: 49)

Town	Population
La Paz	196,708
Los Cabos	105,199
Comundu	63,837
Mulege	45,985
Loreto	11,787

Occupations and Industries

Baja California Sur's relatively high standard of living compared with the rest of the nation continues to make it an attractive destination for many living on mainland

Mexico who are looking to improve their quality of life. The 1990 census showed that the people of Baja California Sur enjoyed higher than average levels of well being than the rest of the country in housing, nutrition, dress, and especially education (Martinez de la Torre 1998a). Traditionally, the unemployment rates have been lower than the national average as well (Martinez de la Torre 1998b).

Many people continue to be employed in the large-scale agricultural production that is still taking place in the Santo Domingo Valley, though the activity appears to be running up against the geographical limitations of the desert conditions of the peninsula. Following domestic use, most of the water in the peninsula goes to large-scale agriculture purposes (Vicent 1998). Continual overuse of water in the Santo Domingo Valley has made production more and more costly, diminishing the likelihood of its strength as a production sector in the future.

A large copper mine established by the French in Santa Rosalia in the 19th century remains but has scaled down its production (Vicent 1998). Alternatively, a salt mine in Guerrero Negro, established in the 1950s by North Americans and now under joint Mexican/Japanese ownership, is currently the largest facility of its kind in the world (despite not winning the right to expand its production within the protected area in which it is located) (Dedina 2000).

Fortunately, Baja California Sur is blessed with about 25% of the national coastline, more than any other Mexican state (Arizpe 1998, Vicent 1998). Its location in the north Pacific also means that it has access to the most productive fishing grounds in the nation. For such a productive area, however, fisheries production is way below its potential (Vicent 1998). Of the 650 species found in the area that are edible or useful for

industry, only 122 are exploited, about 80 of which are for human consumption (BCS Gobierno Estatal 1999, Martinez de la Torre 1998a, Vicent 1998).

Beginning in the 1970s, Baja California Sur experienced tremendous growth in its fisheries production (Young 1995). The federal government encouraged this growth with the endowment of docks, subsidized credit, and public processing plants to the state as well as intervention in the buying and commercialization of the fishing yield (Martinez de la Torre 1998a). Nevertheless, the fishing industry in the state continues to be dominated by small-scale activities. In fact, about 90% of the of the state's 3700 unit fishing fleet consists of coastal, small-scale boats (BCS Gobierno Estatal 1999).

On the Gulf of California side of the state the sardine is the most significant fishery. By far the most lucrative state fisheries, however, are found on the Pacific coast — abalone being the most valuable, followed by tuna and lobster. Together these contribute 64.4% of the total state fisheries yield (Marinez de la Torre 1998a). Though shrimp, which nationally is considered the most valuable fishery in Mexico, can be found in the Gulf of California, it is a relatively young fishery to the state of Baja California Sur. Despite this fact, shrimp has been overexploited in the Gulf due to the overcapitalization of the mainland shrimp fleets since the 1950s (Martinez de la Torre 1998a).

Though the fishing sector is only responsible for 4% of the state's wealth and employs only 6.5% of the state's population, it is considered an important production sector for the state since it is a source of food and employment for rural coastal areas (BCS Gobierno Estatal 1999, Martinez de la Torre 1998a). Many coastal communities in Baja California Sur are almost entirely dependent on fishing activities as their source of

income. Additionally, for these communities as well as the remainder of the state, these fisheries produce an extremely important addition to the local inhabitants' diets - a much needed source of protein (Martinez de la Torre 1998a).

Unfortunately, the fisheries of Baja California Sur developed in a haphazard manner without much concern for conservation. Since the coastal fishing communities were only relatively recently settled, there was little chance for a local, community-based system of management to develop which might have served to restrict outsider access to the local fisheries (Young 1995). Consequently, many species, especially the most commercially valuable ones like abalone and lobster, are being overexploited (Vicent 1998). Oysters, squid, and clams are also among the many species showing signs of over exploitation while a number of mollusks are actually in danger of extinction (Marntinez de la Torre 1998a, Vincent 1998). Many fisheries appear to be collapsing since their catches peaked in 1980 and have been declining ever since (Mendoza Salgado et al. 1998, Vicent 1998).

How does a region that has not nearly reached its fishing potential in a general sense due to its incredible wealth of local marine flora and fauna, arrive at a situation where their primary fisheries are collapsing? A number of factors have contributed to this situation. Historically, fisheries management in Mexico has been very centralized with a rigid, top down approach. The absence of local input in the decision-making process created a number of local level management contradictions making it difficult to regulate the fisheries effectively (Vasquez-Leon 1993). The state fisheries activities are not very diversified either, which has lead to too much fishing effort concentrated on a small number of species. Almost unanimously researchers recommend diversification as

a way to maintain a productive fishing sector in the state. Why has diversification been so difficult? One factor has been the insufficient number of investigations into the potential of other fisheries. Additionally, there is the lack of infrastructure, boats, and equipment available to exploit other products (Vicent 1998). A third contributing factor has been the disorganization of the producers. The towns where fishing is taking place generally lack freezing facilities which has allowed the intervention of an excessive number of intermediaries since markets are often located far from the points of capture (BCS Gobierno Estatal 1999). In fact, the state industrial fishing plants operate below capacity because many work with technology that does not meet international standards of production (BCS Gobierno Estatal 1999). Unfortunately, this eliminates a number of potential international markets for the state's marine products.

The government considers the coastal lagoons of the state favorable environments to practice aquaculture. This is being viewed as a way to promote rational exploitation of marine species (BCS Gobierno Estatal 1999, Arizpe 1998). From 1990 to 1994 the Mexican government invested in aquaculture projects throughout the country (Vicent 1998). Unfortunately, aquaculture may not be the most sustainable and appropriate activity for the area. As has been shown in other regions, it causes mangrove deforestation and the local population of fishermen will need extensive technological training. Often the fishermen lose the independence that attracted them to fishing to begin with and simply become maintenance workers (Vicent 1998).

As fishing becomes less and less profitable, some fishermen are looking at various forms of marine-based tourism as a way to diversify and augment their household income. On the lagoons of the Pacific coast, a number of local fishermen have become

whale watching guides during the winter/spring months when the gray whales inhabit the area (Dedina 2000). On the southern tip of the peninsula and the Gulf coast, other commercial fishermen have been attempting to diversify their production activities by offering sports fishing services to tourists. Sports fishing has become a very important industry in terms of the amount of money and employment it generates for the state (Arizpe 1998). Mexico is, in fact, one of only two countries (the other being Panama) that protects the main species targeted by sports fishing (billfish, dorado, and swordfish) from commercial fishing within 50 miles of shore (Baja Sun 2001).

This does not, however, seem to be preventing the size and amount of sport fish from diminishing. While the sports fishermen are quick to blame commercial fishermen for this (and therefore ineffective regulations as well), it may also be important to consider that the number of people participating in sports fishing has skyrocketed. For example, between the East Cape and Cabo San Lucas alone there are more than 800 registered sports fishing boats, up from only 80 boats registered 15 years ago (Baja Sun 2001). Add to this the hundreds of private yachts in the area that also sports fish and it becomes obvious that the recreational fishing effort has gone up tremendously in the past two decades. Unfortunately, because it can be such a lucrative activity, many of the sportsfishing operations are owned by foreigners, though most hire Mexicans as ship captains. This has caused a lot of conflict. Since there seem to be barriers to entry for local fishermen in the state's tourism hot spots, fish are seen as being conserved for foreign fishermen (both the owners and the tourists alike) (Greenberg et al. 1993).

Tourism is an important source of export revenues for Mexico, being surpassed only by the petroleum industry and, more recently, the *maquiladora* industry (INEGI

1998A). The vast majority of tourists to Mexico come from the United States (INEGI 1998A). Though alternative forms of tourism such as ecotourism (whale watching for instance) and sports fishing are growing, historically the tourists have been drawn to the sun and sand type of tourism. Mexico capitalized on this trend by building mega-resorts such as Cancun to attract the mass tourism market. While Loreto, on the Gulf coast of Baja California Sur, was pegged for this type of massive tourism infrastructure buildup in the 1970s, it is really the southern tip of the peninsula, primarily Cabo San Lucas, that has become the tourism hot spot in the state.

Tourism started to grow in the Cape region in the 1970s with small-scale hotels and restaurants. By the early 1980s when 377,000 tourists came to the state, La Paz was still the primary tourist destination. But by1995, the number of tourists had increased to 657,283, and the vast majority of them were headed to Los Cabos (Vicent 1998). Today, Los Cabos has the majority of hotel rooms in the state (62%) including the most upscale hotels. La Paz has 23% of the hotel rooms of the state while Comondu, Mulege and Loreto combined have only 15% of the hotel rooms in the state (Vicent 1998: 72).

While tourism is presently considered a powerful force for state economic development, one has to view the Los Cabos region as a warning. Though the economic benefits have proved to be great, the area developed with virtually no planning, which has caused a number of problems. The area's economic success has drawn an influx of people from the mainland seeking employment. This massive immigration has led to major environmental and social problems. More environmental impact research needs to be done to understand the true consequences this type of unplanned mega-development has had on the natural resources of the area. Attempting to avoid more problems caused

by this type of development, the state development department is pushing to diversify the state's tourism plan (Vicent 1998). They are looking to support and promote various forms of alternative tourism such as ecological, heritage, and scientific tourism.

The growth of the tourism industry in Baja California Sur has been a major force in changing the work force demographics of the state. In 1960 the primary sector (agriculture, fishing and mining) employed about 60% of the working population (Martinez de la Torre 1998b). Now only 20% of the working population is in the primary sector while 60% of the population is employed in the services sector (Vicent 1998). This has caused the competition for tourism related jobs to increase, often being filled by Mexicans from the mainland that have specific tourism industry education

Environmental Protection in Baja California Sur

Baja California Sur is blessed with a rich environment that may be threatened if the state's tourism development is very successful on a large scale. Two ecological zones are represented in the state: the Sonoran Desert (arid) and the Cape Region (semiarid) (Breceda et al. 1995). While these environments do not support the type of biodiversity that can be found in tropical areas, the have a much greater percentage of endemism, especially on the islands (Arizpe 1998, Breceda et al. 1995, Vicent 1998). About 70% of the 100 or so cacti found on the peninsula are endemic, 17 species of which are in danger of extinction (Arizpe 1998, Mendoza Salgado et al. 1998). Also considered endemic are an estimated 23% of the state's flora and 80% of its vertebrates (Vicent 1998). Additionally, there are 12 animal species in danger of extinction, 22 animals under special care protection, and 20 threatened plant species (including the 17 cactus species) (Mendoza Salgado et al. 1998).

In desert areas, fewer people can exist in a given amount of space, thereby making the local environment extremely vulnerable to rapid population growth. Currently, however, Baja California Sur is considered to have one of the least (if not the least) altered natural states in all of Mexico (BCS Gobierno Estatal 1999, Martinez de la Torre 1998b, Vicent 1998). The natural resources within the state as a whole have remained relatively healthy due to the state's very low population density. About 40% of the state is also considered protected on some level (BCS Gobierno Estatal 1999). Though it may logically seem that this protection has aided in restricting resource use, these protected areas are similar to those in the rest of Mexico, meaning that traditionally the regulations on paper have not, for the most part, been effectively implemented.

The history of environmental protection in the state of Baja California Sur has followed that of the rest of the nation. Throughout the state's past, large-scale exploitation of resources by foreigners led to a number of ecological disasters. One of the initial attractions to the region for the Spanish explorers in the 16th century was the large numbers of pearls to be found in the area which were exploited until the 1940s (Carino and Alameda 1998). Though people are still attempting to make money from extracting pearls today, there are very few to be found since their populations had previously been decimated. Gray whales were hunted to the brink of extinction by foreign fleets from 1846-1870 (Carino and Alameda 1998, Dedina 2000). In the 1900s, shark and tuna populations were also exploited in excess by the fishing fleets of other nations (Carino and Alameda 1998). Though at various times throughout the state's history concessions of maritime zones had been given to foreigners, after the revolution research was conducted to understand how Mexico could be reserved for the Mexicans.

Here, as in the rest of Mexico, subsequent acts of 'conservation' were really meant to reinstate the nation's sovereignty over the natural resources found within its borders.

Baja California Sur had an even slower start on conservation than did the rest of the country since it was not a state until 1974 and therefore did not have the support of state funded initiatives. The 1975 state constitution, sounding rather ahead of its time, mentions that the citizens of the state have a right to a healthy environment and that the state would promote the actions necessary to preserve natural resources for the long term (Vicent 1998). Unfortunately, since it was such a young state, there was little political infrastructure in place to truly pursue these initiatives (Vicent 1998). In fact, environmental institutions are really just starting in the state. Environmental consciousness has grown relatively slowly in Baja California Sur, which may be due in part to the fact that the state lacks very large cities such as Mexico D.F. and Monterey with all the obvious environmental hazards they cause for their citizens.

It was not until 1976 that a specific agency was developed to be responsible for the state's natural resources (Vicent 1998). Again, as with the rest of Mexico, the institutions responsible for the environment in Baja California Sur have always suffered from lack of funding, translating into lack of resources and personnel. Nevertheless, the state has managed to declare more area protected than any other state in the nation (see Figure 3.2) (Breceda et al. 1995). Besides Loreto Bay National Marine Park which was created in 1996 and can been seen located about halfway down the eastern coast of Baja California Sur in Figure 3.2, there are a number of other important parks worth mentioning.

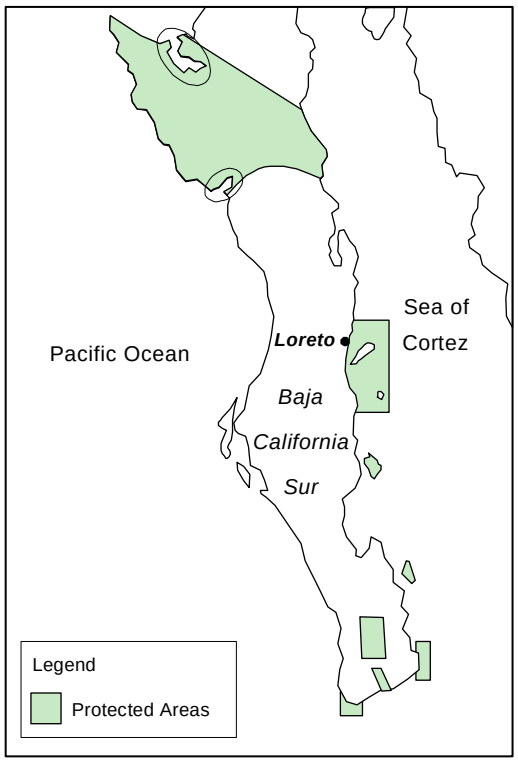

Figure 3.2: Protected Areas in the State of Baja California Sur
(adapted from Vicent 1998:48)

In 1972, Scammon's Lagoon was declared a whale refuge and seven years later San Ignacio Lagoon was also declared a protected area for whales (Dedina 2000). Cabo San Lucas Submarine Refuge was declared in 1973. In 1978 the Islands of the Gulf of California Reserve was created to protect the land and surrounding coastal waters of the islands (Breceda et al. 1995). Cabo Pulmo Marine Park became the second protected marine area when it was established in 1995. Finally, there are three land reserves including San Jose del Cabo and two biosphere reserves — El Vizcaino (1988) which includes both coastal and terrestrial area and Sierra de la Laguna which is exclusively terrestrial (1994) (Vicent 1998). El Vizcaino Desert Biosphere Reserve, with 2.5 million

hectares, is the largest nature reserve in Mexico and actually incorporates the protected whale lagoons mentioned above (Dedina 2000, Vicent 1998).

While this is an impressive list of protected areas, it is important to remember that none of these areas is actually protected very well. Most of these parks went years after their declaration without an actual management plan with which to work. The biosphere reserves seem to have the most to offer since they appear to incorporate community needs alongside the needs of conservation. However, probably because they are trying to accomplish so much, they have been shown to have a difficult time truly achieving any of their goals (Young 1995). Most of the local people develop their attitudes about the natural resources around them from their life experiences, which have not necessarily fostered a conservation ethic. Consequently there does not seem to be a clear understanding of protected area status by local populations, so some community members seem to simply band together to try to circumvent regulations instead of going out of their way to try to comply with them (Vicent 1998, Young 1995). This has led some to believe that there is not much hope for some resources, like the state's lucrative fisheries for instance, to be conserved in the long run (Young 1995).

Currently, it seems to be widely recognized by researchers and government personnel alike that there is a need to actively seek the participation of local people in protected area activities if they are going to be successful (BCS Gobierno Estatal 1999, Dedina 2000, Vicent 1998, Young 1995). In 1992, the Law of Ecological Equilibrium and Environmental Protection *(Ley del Equilibrio Ecologico y la Proteccion al Ambiente*) of Baja California Sur was created which called not only for coordination between various levels of government but also for the integration of local people into activities

aimed at impeding environmental deterioration, citing it as essential in order for them to work (Vicent 1998). The State Development Plan included a strategy to promote the formation of citizen groups to participate in actions that support natural protected areas which is also expected to improve the local inhabitants' quality of life (BCS Gobierno Estatal 1999). Interestingly, the plan specifically mentions that it would be necessary to equalize opportunities to participate in the social process — that there is a need to promote the participation of women in decision-making activities (BCS Gobierno Estatal 1999).

This type of rhetoric is encouraging for those in the field who are working toward meaningful environmental management. It is especially supportive to those looking specifically to increase women's participation in a male-dominated society. Seeing the need for the integration of locals and having the willingness of managers to try to accomplish this is certainly the first step to achieving true community participation. However, making this work in reality can prove to be quite challenging for all concerned. A thorough understanding of the local situation is essential to the process.

CHAPTER 4

LORETO

A Brief Early History of Loreto

The Loreto area was inhabited by the indigenous group the Monqui of the Guayacura tribe (O'Neil 2001). Their location on the shores of the Sea of Cortez made it relatively easy for them to fulfill their dietary needs due to their access to seafood. At that time, and really until relatively recently, people could wade out from the beach and capture yellow tail fish as they would frequently congregate and thrash around in feeding frenzies just off shore, though men would also fish in deeper waters using rafts (O'Neil 2001).

It is clear from Monqui myth that fishing activities have been important to the inhabitants of the Loreto area from the beginning. According to legend, the principal God of the Monqui, Guamongo who lived in lands to the north, sent a spirit named Guajaiqui to the Baja peninsula in his name. On Guajaiqui's journey he blessed the land by creating good fishing spots and planting pitaya cactus, the fruit of which has historically been a favorite for all inhabitants of the peninsula (O'Neil 2001). Even with a rich food source, however, the population of the Monqui never exceeded 400, which was the number of inhabitants when the Jesuits arrived in 1697 (O'Neil 2001).

The first mission of both upper and lower California was built by the Jesuits in Loreto in 1697. The town of Loreto eventually became the religious center of the 18 missions built by the Jesuits over their 70 year occupation of the area and was considered the capital of both Alta and Baja California (O'Neil 2001). Throughout the subsequent

rules of the Franciscans and the Dominicans, Loreto remained important though the capital of the Californias was moved to Monterey in Alta California in 1776 (O'Neil 2001). In 1804, when Alta and Baja California were separated, Loreto regained its title as a capital, this time of just Baja California. During the war for independence from Spain, the Baja Peninsula found itself more isolated than usual from the rest of the country since it did not support the revolution (O'Neil 2001). The local authorities' fears were well founded as the Catholic Church lost much of its power in the peninsula after independence in 1824 when Baja California was officially declared a territory of Mexico. La Paz took over as capital of the territory in 1830 and has remained the capital ever since (O'Neil 2001).

Explorers and entrepreneurs were attracted to the peninsula throughout the 19th century and many settled in the Loreto area. In 1820, for example, two brothers Pedro and Lucas Davis came to Loreto from England via the United States and are the ancestors of the more than 1000 Davis that live in Loreto today (O'Neil 2001). Up until the middle of the twentieth century most people in Loreto had a kitchen garden, ranches with some livestock, and participated in pearl diving and fishing. Many of Loreto's young men spent at least a few years on Carmen Island, just off the coast of Loreto, working the salt. Dates, mangos and other tasty fruits grew throughout the town while sea turtle and clams were counted among the favorite dishes of the locals (Cannon 1966). Loreto's primary connection to the mainland at this time, its source of mail and staple foods, was through a ferry link with the city of Guaymas in Sonora. Ferry service was terminated once the transpeninsular highway was completed in the early 1970s.

Seven miles off shore from Loreto, Carmen Island has figured prominently in the area's history, some of the current residents of Loreto even having grown up there. It is the largest island near Loreto at almost 19 miles long and 12 miles wide (O'Neil 2001). And while it is home to some interesting endemic flora and fauna, the two mile wide salt bed on the island is the main attraction. The missionaries knew of the salt on the island but they had a difficult time extracting it, as did the Mexican government after them (O'Neil 2001). In 1862, salt production on the island was sold and privatized. Eventually as many as 400 people worked in the salt industry on Carmen Island at one time (Cannon 1966, O'Neil 2001). Salt production did not end on the island until 1983 when it was realized that its expensive production methods could not compete with salt production elsewhere (O'Neil 2001). The island is still owned by Salinas del Pacifico, S.A., the company that bought the island in 1944 (O'Neil 2001). Today the island is home to 26 *borregos cimarrones*, a protected species of long horn sheep that were captured and brought to the island in 1995 with the hopes of breeding them.

Loreto has been battered by hurricanes and earthquakes many times throughout its history, including the 1877 earthquake that toppled the mission church which had stood for almost 200 years. The church was not rebuilt until 1948 when Monsignor Modesto Sanchez, the first permanent priest to be assigned to Loreto in over one hundred years, began the reconstruction project (to be finished with money he personally won in the Mexican national lottery!) (O'Neil 2001). In 1959, a devastating hurricane flooded and destroyed the town again. This time many saw it as a mixed blessing since it not only brought significant federal funds to rebuild and improve town infrastructure, but the silt and debris brought down the arroyos is said to have made Loreto Bay more hospitable to

mullet populations (Cannon 1966). This, in turn, attracted larger numbers of game fish. The discovery of great amounts of marlin, sailfish, yellow fin tuna, and dolphin fish (*dorado*) off the shores of town turned Loreto into a sports fishing hot spot. The money the sports fishing tourists spent in town soon became the backbone of the local economy (Cannon 1966).

With only ferry service connecting Loreto to the rest of the country, the town remained relatively isolated until the late 1940s when the first flights came from both Guaymas and Tijuana to Loreto (O'Neil 2001). Loreto's isolation was truly ended in 1973 when the transpeninsular highway was finally completed and its route passed right along the town's edge. People could now easily drive from the United States border to the southern tip of the peninsula in just a few days.

As Loreto became less isolated, more modern amenities trickled into town. In the early 1950s the first hospital was built in Loreto. Carmen Island received electricity in 1954 (ten years prior to it arriving in the town of Loreto) and potable water was finally available in houses in 1960 (O'Neil 2001). While the first primary school was built in Loreto in 1795 thanks to the missionaries, the first secondary school was not built until 1965 (O'Neil 2001). This had been preceded in the 1950s with a boarding school that children from the surrounding ranches could attend.

Loreto Today

Almost 56% of Mexican citizens over the age of 15 have not finished basic education (the completion of high school) and almost 20% have not completed primary education (equivalent to the sixth grade in the United States) (Flores 2000). Additionally, about 10% are considered illiterate (Flores 2000). Today Loreto boasts eight

kindergartens, 12 primary schools, one work training school, three secondary schools, two high schools, and one school for special education (SEMARNAP 2000b). Having a relatively large number of schools in town may have helped Loreto achieve a 95.3% literacy rate — considerably higher than the national figure of 90% (Flores 2000, SEMARNAP 2000b).

The municipality of Loreto has a population of 11,812 people (5,684 of which are female), only 2.8% of the state's population (INEGI 2000). Most of the streets downtown are paved, though dirt roads run through the surrounding neighborhoods. There are a number of health clinics available to everyone in town and social services as well. The majority of housing in Loreto is quite sturdy, built with concrete block, and everyone has access to electricity, phones, potable water, and sewage drainage. Poorer housing can be found in some new neighborhoods located on the outskirts of town that have just recently begun to be occupied. Generally these people begin to slowly upgrade their housing as finances permit. There is also one older neighborhood, Colonia Zaragosa, that has a higher percentage of poorly built, inadequate housing. Many of the commercial fishermen that live in this neighborhood have outhouses instead of bathrooms and generally do not have water inside the house or telephones.

About 15% of Loreto's population do not live in the actual town of Loreto but in the fishing villages of Juncalito, Agua Verde, Ensenada Blanca, Ligui, and San Nicolas (SEMARNAP 2000b). These villages line the coast of the Sea of Cortez to the north and south of Loreto but are within in the municipality of Loreto. The original inhabitants of the fishing villages migrated from mountain ranches to the coast when things got difficult economically and settled in what were previously just fish camps. Now more than one

generation has grown up in these fishing villages, and a few people have arrived more recently to settle near their relatives. Because these communities generally consist of just a few extended families, a sort of 'clan mentality' has arisen over the years (Dedina 2000). This means that although these communities are very small, they are often quite divided.

The primary source of income and subsistence in these communities (indeed, the only source of income in some of the villages) is commercial fishing. Though some fishing villages are located just 10 miles from Loreto, the dirt access roads to the villages from the highway are often deeply rutted and sometimes completely washed away, effectively increasing the separation between the villages and town. Therefore, though Loreto has become much more connected to the rest of the world over the years, the fishing villages have retained that isolated quality that is so common to fishing communities across the globe.

The quality of life in these fishing villages is not nearly as good as it is in Loreto. These small communities lack basic health and social services. None of the villages have sewage systems or phones and the only electricity comes from government-donated solar panels. Most of the residents are not grateful for the solar panels since they feel the government supplied them simply because they did not want to give them electricity. This may be true, seeing that one of the fishing communities is located only six miles from the power plant.

In the summer when temperatures can reach more than 110 degrees, people in the villages generally sleep outside where, if they are lucky, they can catch a breeze. All of these villages have recently received access to potable water, though it may not be

available in the actual houses. Most of the houses in these villages are of low quality being made of carton, metal sheets, thin plywood boards and/or palm thatch. Some of the fishing villages have recently built schools, though the facilities are inadequate, often lacking books, paper, and writing utensils, and sometimes having a teacher but no classroom or a classroom but no teacher. None of the fishing villages have schooling available beyond the secondary level (equivalent to ninth grade in the United States). Prior to the construction of these schools the only choice for children in the fishing villages was to attend boarding school in Loreto or not go to school at all. Parents were asked to collect their children every Friday evening and bring them back to school Sunday night. The cost of the trip every week was prohibitive for many families, leaving formal education beyond their reach.

More girls than boys are enrolled in the secondary schools of the fishing villages (Tryon 1996). After primary school many boys simply begin to fish and leave school behind. Occasionally children in the fishing villages do go on to the high school that is located in Loreto though, again, it is primarily girls. The main obstacle to attending high school is its location since it is only really feasible if the students live in town. This option is only available to them if they have a relative that lives in Loreto with whom they can room. A consequence of the lack of adequate educational opportunities in the fishing villages is a very high rate of illiteracy. One researcher estimated that 50% of the adult population of the fishing village in which he worked was functionally illiterate (Tryon 1996). As is characteristic of other fishing communities in the world, the residents' average level of formal education simply does not come close to that of their knowledge of the natural environment around them.

The municipality of Loreto has a relatively young population with about 46% being under the age of 19 (SEMARNAP 2000b). Of the 2,306 economically active people in Loreto, about 11% work in the primary activities related to agriculture, cattle, and fishing and 16% of the town's working population works in secondary (industry related) jobs (SEMARNAP 2000b). The overwhelming majority (70%) of the working population is involved in the service sector and more growth in this sector is expected (INEGI 1995, SEMARNAP 2000b). Though it is clear that not a very large percentage of Loreto works in commercial fishing today, it is a traditional and important part of the town's economy.

Commercial Fishing in Loreto

The inhabitants of Loreto have always been tied to the sea. While people from the state capital La Paz are sometimes referred to as '*Choyeros*' meaning the cactus people, residents of Loreto are occasionally called '*Almejeros*' meaning clam people (Davis 2001). Many fishermen and children go out daily to dive for clams for household consumption. Loreto is particularly famous for its local species of chocolate clams. The local residents frequently mention the time a chef from Loreto was flown to the nation's capital with an order of chocolate clams to fix *Almejas Loretanas* for one of the presidents of Mexico.

Another favorite of the people of Loreto, and really virtually all the coastal communities along the Baja Peninsula, is any dish that includes sea turtle. Especially popular is sea turtle cooked in its own shell. This dish was often the centerpiece of traditional family gatherings. It was not uncommon for a fisherman to catch a boat full of sea turtles (about 20) in a night which meant that turtle was a regular and important part

of the local inhabitants' diet. The high fat content of turtle meat is what makes the locals find it so delicious and is also why they feel that the consumption of turtle fortifies anyone who eats it. There are many local tales of a sickly young man being sent out with a group of old fishermen in an attempt to cure him after having no luck with doctors. The old fishermen would regularly make the young man drink turtle blood and eat turtle meat and he would soon regain his health and vitality and build up great strength.

Though a permanent ban was placed on capturing sea turtles in Mexico in 1990 due to its endangered species status (Arizpe 1998), sea turtle remains a favorite of the locals (fishermen and government officials alike). Since there are so few turtles left and because the penalties are very severe if someone is found capturing a turtle, it has become rather expensive — a delicacy really, a real treat. No longer do many families eat turtle out of its own shell, however, since that would be very obvious. Only people with a great amount of authority in town dare to do that.

Commercial fishing is now the second most important economic activity in Loreto (INEGI 1995). In the year 2000 there were 278 commercial fishing boats registered in Loreto with about 350 full time fishermen working from them to provide the main source of subsistence and income for over 200 families (Gutierrez Barreras 2000, Bermudez 2001). The techniques used for fishing and the target species in Loreto have not changed for many years. Scale fish, not considered a very valuable fishery in the state, form the economic base for the local commercial fishermen. Generally the fishermen use 22-foot long fiberglass boats equipped with 55 horsepower engines and, for equipment, use mostly hook and line or a type of long gill net with openings between four to ten inches in width (Gutierrez Barreras 2000). Parrotfish, snapper, sea bass and

yellow tail are a few of the important rocky bottom fish exploited by the local fishermen. For years the local fishermen have also taken part in diving for various commercially valuable mollusks, though due to severe declines in their populations it has become more difficult recently to receive permits to take part in this fishery.

A new and promising fishery for the locals is that of giant squid. For years the Japanese had exclusive permission from the Mexican government to capture squid and they would bring it aboard their factory ships and process it themselves. In the late 1990s, the Mexican government took this permission away from the Japanese and gave permission to Mexicans to capture it. This fishery generates the greatest economic benefit for the local fishing community and also alleviates some of the pressure on the more traditional fisheries but the squid's appearance in the Sea of Cortez is unfortunately very unpredictable — some years they arrive in great quantities and some years they do not arrive at all (Gutierrez Barreras 2001).

There are two squid processing plants in Loreto; one is owned by Mexicans and the other by Koreans. The fishermen fish for squid at night and sell their catch to representatives from the processing plants in the early hours of the morning. The fishermen have very little control over the prices they receive for squid. Some fishermen form debt relationships with these processing plants borrowing money for gas and ice and repaying each night out of their profits. If the price becomes too low, however, the fishermen will not go out to fish since they would simply end up losing money.

The squid fishery and its associated processing plants located in town have opened up an unusual opportunity for women in Loreto. During the three to seven months of the year that squid is being caught many local women are employed in the

processing plants. Unlike so many other places in the world, the women of Loreto have not traditionally taken part in any of the actual fishing or reef gleaning activities, nor have they participated in the processing or marketing of the marine products. Some people explained that for as long as they could remember there were *permissionarios* (middle men) that would buy the fish whole and take it away in their refrigerated trucks to be sold and processed elsewhere, usually La Paz, Ciudad Constitucion, or Tijuana. This meant that there simply was no processing niche available for the women to fill. And since many of the women originally came from ranches, they never had this tradition elsewhere either. So it wasn't an activity they were giving up, it was one that the women had never taken part in anywhere.

A number of women explained their historical lack of participation in the local fisheries as a product of *machismo;* that until recently it was unusual for men to allow the women in their lives to work outside the home or participate in production activities. *Machismo* is a part of traditional Latino culture that magnifies male dominance and female subordination in every type of social relationship. Various women remarked repeatedly about the high level of *machismo* in Loreto compared to elsewhere in Mexico and even elsewhere in the state of Baja California Sur. Perhaps it is because Loreto has been so isolated throughout its history and the type of people that came to Loreto to live had a certain 'frontier mentality' that did not necessarily foster the ideas of women's liberation which have begun to take root elsewhere in the country. Even now, women that are more outspoken and have lives outside of their homes say that their husbands have 'given them permission' to be free and do what they want. These women feel and

certainly are more independent than most other women in town, but they still fail to see the irony in their statement since it is so much a part of their local culture.

To a much lesser extent than in processing, women have also begun to take part in the actual squid fishing itself. They go out at night with their husbands or other male family members and fish right alongside the men. The few women that take part in this fishery and some of the other scale fisheries have something in common - they are generally from very poor households and do not have sons. To prevent her husband from having to partner up with a fisherman he is not related to, a woman will fish with her husband in order to retain as many profits for her household as possible. Even if these women have been fishing alongside their husbands for years they do not consider themselves fishermen. They feel they are just being their husband's partner through the good and bad and doing what they have to do for the benefit of their household.

In commercial fishing households that are better off financially, women still have opportunities to obtain some experience fishing. They may go out for 'fun' to fish with their husbands from the boat, most often taking their children and other relatives along as a family outing. Also, husbands sometimes take their wives to Puerto Escondido to fish off the docks in the evening. The way the women describe these evenings, however, it sounds more like a date than an effort to truly catch fish.

Most women in town stay away from fishing altogether. Even among those that have grown up in commercial fishing households, some feel it is 'unladylike', really more of a male activity. Others associate fishing with being out in the sun for long periods of time. The sun is very strong in Loreto, especially in the summer when the fishing is best, and a number of women believe that extended exposure makes them

physically ill. Mostly the women that are particularly adamant about not going out in a boat to fish simply cannot swim and have developed quite a fear of the ocean.

The local commercial fishermen are very aware of the best places to fish and the best times of the day and year to fish there. The fishermen from five local fishing villages and the town of Loreto all fish at the same places in the rocky areas surrounding the five islands off the coast of Loreto, though they are not territorial among themselves about fishing spots. They do, however, keep track of the fishing equipment each other is using. In the winter months when it is windy and choppy at sea and almost impossible to catch anything with a hook and line, nets are considered really a necessity for fishing with any success. However, when conditions are better some equipment, especially the nets with very small holes, are considered to be too efficient at catching fish. To some extent there is social pressure to use less efficient technology and not be selfish by using small mesh nets, but there are always some individual fishermen that do use this equipment, and this causes conflict. The fishermen using the more benign equipment feel these other fishermen are being unfair. They believe that five or more fishermen's families could be supported from one fishing area in one day if everyone used a hook and line, but only one fisherman's family if a net is used. The nets simply catch everything in sight and there is nothing left for others.

Without a real effective way to keep each other in line with what are considered 'fair fishing practices', the fishermen of Loreto are truly at a loss when it comes to outsiders. Sometimes fishermen from the Pacific coast, who have a reputation of violence and lawlessness, will come over to fish off the shores of Loreto using nets in the locals' prime fishing spots. The local fishermen would like to kick them out because they

feel the Pacific coast fishermen really do not have a right (much less than anyone from Loreto doing the same thing) to use that equipment in their fishing spots. The fishermen from Loreto refuse to approach them, however, because they believe that the Pacific coast fishermen are all carrying guns and feel it is not worth risking their life.

During squid season there is an enormous influx of fishermen from all over the peninsula that camp out on the beaches and fish for squid at night. The Loreto fishermen appear to be okay with this, probably because there is usually more than enough squid to go around. What bothers them is that these fishermen contaminate the beaches with large amounts of trash and squid waste. Most upsetting is that the beaches of the area essentially become one large latrine which creates a number of serious health problems for the locals residents.

For years Mexicans from Mazatlan, Guaymas and Topolobampo would bring their trawlers to Loreto Bay to fish for shrimp (Gutierrez Barreras 2001). Locals say that it was a regular part of the evening sounds, to hear the hum of the shrimp trawlers working just off shore. Some of the local fishermen were not bothered by this since they felt that the shrimpers were just other fishermen trying to make a living. Plus, the Loreto fishermen really did not have access to effective shrimping equipment so they did not see it as competition. The locals that had some awareness of how these trawlers worked, though, became angry. They felt that Mexicans from the mainland were catching their fish along with the shrimp and damaging the local environment, but there was very little they could do to stop it.

It is evident then that there has been really very little effective community-based management of the marine resources in Loreto. In the past, the local population was so

low and the fishermen's technology so limited that there was not much of an impact on the marine resources even without a concerted effort to conserve. As fishing technology became more efficient and the population increased, the social pressure used to restrain people from overfishing proved to be limited in its effectiveness. Additionally, the local community has had basically no power to resist the encroachment of outsiders into their fishing areas.

As is common elsewhere in the world, fishermen in Loreto take part in multiple occupations in order to make ends meet. The commercial fishermen that live in town may occasionally also work as security guards, construction workers, prison guards, convenience store clerks, and handymen among other things. The fishermen from the outlying fishing communities do not really have these options. In these villages people build their own houses and work on their own motors because no one has the cash to pay people for services. So the village fishermen deal with the inherent riskiness and seasonality of fishing by attempting to diversify somewhat within their fishing activities, as do the fishermen in town as well. They change their equipment throughout the year using more nets in the winter from October to March and more hook and line in the summer from April to September in addition to experimenting with other low technology forms of fishing equipment. They supplement their diet with clams throughout the summer when it is easiest to dive for them. They fish at night during squid season and try to get a permit for diving for valuable mollusks in the spring/summer season. And they vary their bait, equipment, and the locations they fish as they target various species of scale fish throughout the year.

Because every fisherman tends to make these changes at the same time, however, they are still cumulatively exerting a great amount of fishing effort on just a few species. Some species like sea cucumbers are currently off limits to the fishermen because they are recuperating from having been previously overexploited. Other species seem to be commercially extinct. For instance, many commercial fishermen used to participate in shark fishing to sell the especially valuable fins and skin. Now there are so few sharks left it is rare to find any at all in the area. As fisheries start to decline, many commercial fishermen are looking to other sources of income, the most promising in Loreto being tourism.

Tourism in Loreto

Currently tourism is the most important economic activity in Loreto. The town has about 500 rooms available in various one to five star hotels, 20 restaurants, numerous and sometimes mobile souvenir shops, 11 travel agencies, and two car rental places (INEGI 1995, INEGI 1998b). The Loreto airport has regular flights to and from Los Angeles, Ciudad Obregon and La Paz and charter flights generally come twice a week from Canada (INEGI 1995). There are about three times as many foreign tourists than nationals and most come to Loreto to go sports fishing.

Loreto was mentioned in John Steinbeck's "The Log from the Sea of Cortez", first published in 1951, as a good fishing spot (1995). Almost a decade later, in 1959, the first tourist hotel was opened in Loreto by an American who flew in on his own airplane and quickly verified the recreational fishing potential of Loreto. He named his hotel The Flying Sportsman's Lodge. In the early 1960s, Hotel Oasis, the first hotel in Loreto to be owned by local residents, opened its doors (O'Neil 2001). Both of these hotels were

mentioned in Ray Cannon's coffee table book entitled "The Sea of Cortez" the cover photo of which depicts a sunrise over Loreto Bay (1966). Cannon's book brought Loreto to the attention of sports fishermen around the world as he described in great detail the seemingly unbelievable quantity of game fish inhabiting the nearby waters. He offered advice concerning the best types of bait to use, described the thrill of battling huge game fish, and then wrote with awe that this type of fishing happened day after day after day. In describing Loreto he described a sports fisherman's paradise.

By the 1970s Loreto had been pegged by the federal government as a having great tourism potential (having in mind more the sun and sand type tourism rather than sports fishing), and they decided to invest a significant amount of money to build up the tourism infrastructure of the area. With the help of FONATUR (the Mexican National Fund for the Promotion of Tourism) and funds from the World Bank, Loreto was to become the next mega-resort, something akin to Cancun with a focus on discos and beaches (O'Neil 2001). By 1974 the international airport was operating just a couple of kilometers south of Loreto and a tourism zone was designated three kilometers beyond that (Tryon 1996). This was also the time that downtown Loreto improved its infrastructure by paving its roads and putting in street lamps, beautifying the town square, and building a boardwalk along the water. By the 1980s development began in the tourism zone south of Loreto. In Puerto Escondido they attempted to create the infrastructure for a well-serviced yacht club by dredging the marshes and creating canals. An 18-hole golf course and condominiums sprang up among the desert landscape just next door in Nopolo.

Unfortunately, a hotel they had begun to build in Puerto Escondido began sinking before it was even finished (Tryon 1996). Investors began arguing, the project was

abandoned and investors pulled out or went to court. Today, Puerto Escondido, due to its natural beauty and limited services, does attract hundreds of yachts, though the yachters for the most part tend to bring all their own supplies and stay on their boats. A large five star hotel was built alongside the golf course in Nopolo and retains about 50% occupancy throughout the year. A number of condominiums have been built, though the majority are not filled even today. In the end, though a number of locals quit their more subsistence-oriented jobs and started to build small souvenir shops and restaurants, the huge influx of tourists that was anticipated never came. Though some believe Loreto has not reached its tourism potential, others feel the fact that Loreto did not attain mega-resort status is not such a bad thing, especially considering the fragility of its desert environment.

Though mass tourism did not develop as expected, government officials did not lose hope. In 1992 Loreto became its own municipality, having previously been a part of the municipality of Comondu. At that time the town received a new water source (after a long drought the town's previous water source had been infiltrated by sea water) and the boardwalk was upgraded. The 1996-1999 development plan for Loreto was somewhat unique among town plans throughout the state in its focus on the deficiencies and needs of the town in order to make it a prime tourist destination (Vicent 1998). Traditional types of tourism are being encouraged such as a steady but small stream of kayakers. Since the early 1980s kayakers have been coming to the Loreto area and bringing a small amount of tourist dollars to the more remote fishing villages. NOLS (National Outdoor Leadership School) based one of their regular kayaking trips out of Ensenada Blanca

(Tryon 1996). Agua Verde has also begun to offer a limited number of services to kayakers.

Loreto's historical importance has made it a prime destination for heritage tourism, as well. In 1997 the town center hosted huge celebrations in honor of Loreto's tercentennial and the celebrations have continued to take place each October. Additionally, cultural tourists are attracted to a number of cave painting sites that are close by. Considering the day-long trip along questionable mountainous roads to reach these paintings, one might also consider this adventure tourism.

New kinds of tourism are being investigated by the town. Currently school children from Loreto occasionally visit the abandoned town on Carmen Island and there are plans to build some modest infrastructure on the island in order to encourage more tourism (O'Neil 2001). The town is also contemplating natural history cruises and hiking in the mountains as potential nature-oriented tourism activities to go along with the growing number of whale watching tours that already take place in the winter/spring months (SEMARNAP 2000b). Additionally, on a larger scale, Loreto's marina is scheduled to have a significant make-over to prepare it as a destination port for cruise liners in the very near future (SEMARNAP 2000b).

While Loreto obviously has a diversity of attractions to offer tourists, the overwhelming majority of visitors to Loreto continue to be sports fishermen. Of the 128 businesses that offer tourist services in Loreto, 90 offer exclusively sports fishing services while only 12 are dedicated to kayaking, 10 to SCUBA diving, and 16 businesses offer a mix of all three services (Maldonado 2001). Sport fishing is so much a part of the fabric of Loreto that its prime target species, the *dorado* (dolphin fish), has

been incorporated into its city seal. There are about 200 people dedicated to sports fishing in Loreto, only three of which are foreigners (Maldonado 2001). (This is quite different from the situation at the southern tip of the Baja Peninsula where the majority of the sports fishing business is run by foreigners.) There are a few individuals in Loreto that own a number of boats each and regularly hire others to captain the boats. However, most of the sports fishing services are offered by individuals who own their own boats. Without being associated somehow to a hotel or a tour agency, though, it can be difficult to connect with the sports fishing tourists. Many feel that since the number of people offering sports fishing services has increased dramatically over the years, there are simply not enough tourists to go around. In the winter months from October to March when visitors looking to sports fish are truly few and far between, most of the men involved in sports fishing simply start to fish commercially to make ends meet, though they do so illegally without the necessary permits.

The town has encouraged sports fishing by creating 18 different sports fishing tournaments and also by reserving a number of species of fish just for sports fishermen. Dolphin fish, rooster fish, marlin and sailfish are considered off limits to commercial fishermen (Gutierrez Barreras 2000). The species that both commercial fishermen and sports fishermen target (snapper, yellow tail and sea bass) are overexploited which adds to the long-standing conflict between these two groups (Gutierrez Barreras 2001). That this conflict has a long history is evident from the caption below a photograph of five commercial fishermen laying out a net on the beach beside their boat in Ray Cannon's "Sea of Cortez" (1966). The caption states: "No friends of the sports fishermen are the commercial fishermen who work the Cortez. With huge quantities of game fish being

removed daily by the netters, there is little wonder that the big game fishermen get upset just at the sight of a group like this" (Cannon 1966:57).

Some tourists and expatriates even seem to feel animosity toward the commercial fishermen. They often ask out loud why the commercial fishermen do not just start offering sports fishing services which they feel is a much more benign, conservation-oriented use of the local resources. It is true that sports fishermen, whether they own their own boat or not, make much more money than commercial fishermen, so the activity should seem attractive to them. It is precisely because of their poverty, however, that most commercial fishermen are simply not in a position to switch over to sports fishing. Any commercial fishermen that were in the financial position to begin offering sports fishing services likely made the switch years ago. Though the sports fishermen use the same types of boats as commercial fishermen do, they are certainly not in the same condition. Tourism boats need to be extremely clean, newly painted, have more seats, and have canvas shades to protect the tourists from the sun. Additionally, they need high quality sports fishing equipment that can be very expensive. While this investment may not seem like much to some, it is enormous and simply impossible to the majority of commercial fishermen who are living day to day financially. Perhaps even more importantly, since there currently appears to be more services available than tourists seeking them, people just starting to sports fish would have a hard time attracting business even if they did have suitable equipment, especially since very few speak any English.

There are no women sports fishing captains, though some widows now own their deceased husband's sports fishing boats. To continue the business, these women hire a

captain to take the tourists out fishing. There are a number of women that do work in sports fishing agencies and hotels arranging sports fishing trips. Additionally, the wives of sports fishermen often get involved by shopping for food and drinks, packing the tourists' lunch (which can take a significant amount of time if it is a large group hiring multiple boats), and running to the fish office and bank buying sports fishing permits for their husbands' clients. In general, these women experience the sea as most of the commercial fishermen's wives do — they go out on family boating trips occasionally or do not go out at all. None of the sports fishing wives work on the sea alongside their husbands.

The majority of people in town work in service related jobs in hotels, restaurants, and shops. Though not directly related to the sea like commercial and sports fishing jobs are, they are indirectly linked to the sea since most of their jobs are associated with the tourists that come to Loreto to fish. Some of these jobs require a higher level of education as the employees may need to keep track of inventory, do bookkeeping, know how to use computers, and maybe even speak English. Many people have come from elsewhere to hawk their wares or take the higher-level jobs that businesses might have a hard time filling with the employment pool available in Loreto. These days it is as common for women to work in these types of service related jobs as men. Many businesses employ just about everyone in the owner's family as well as other non-family employees. Of course, these types of land-bound tourism jobs are generally not available in the fishing villages, only in the actual town of Loreto.

Families involved in land-bound tourism occasionally own their own boats, especially if they own a lucrative business, and may go out recreationally to fish and/or

visit the islands with family on Sundays and holidays. Those that do not own a boat may be invited to go out on a friend's boats or the boat of an extended family member that may be involved in either commercial or sports fishing. It is not uncommon for someone, especially a child, in a land-bound tourism household to dive for clams for household consumption since no equipment and little experience is necessary. Unlike the commercial and sports fishing households that have a lot of access to other types of fresh seafood daily, the land-bound tourism households generally have to buy or barter for seafood from a friend that fishes or buy it from the grocery store. It is often the case that the men and women of land-bound tourism households only ever get to interact with the sea when they spend the occasional day at the beach. Some really have no contact with the marine environment to speak of.

Women's Activities in Loreto

For remunerative activities, there are a number of jobs that women are likely to have besides the ones associated with land-bound tourism. Women work as bank tellers in town as well as clerks in all types of shops from grocery stores and bakeries to movie rental stores. Women also work for the municipal government, though almost exclusively as secretaries save the one woman director in charge of town cultural activities. Many women in town are teachers and some are even directors of schools. They are more likely, however, to be found at the lower grade levels. Additionally, many women bake, sew, and make party favors or artistic objects in their homes to sell. The women who live in the town of Loreto are fortunate to have these positions and sources of income available to them since the women who live in fishing villages do not generally have these opportunities.

As is true elsewhere in Latin American countries, church activities rank very high in importance for women, especially women that are middle-aged or older. Although there are Seventh Day Adventists, Evangelists, and Jehovah's Witnesses in Loreto, Catholicism dominates the town's religious life. In the year 2001, 600 children were scheduled to have their first communion in Loreto — a very large number considering the town's population. Large family parties are thrown to celebrate first communions and saint's days, which are generally considered even more important than people's birthdays.

Women attend church more than men do and are also more involved in church functions. There are a number of church groups that both women and men can take part in. Some, like *La Renovacion* are basically concerned with learning more about the Catholic religion and how to incorporate Catholicism into people's everyday lives. Whereas many couples start attending the meetings together, usually it is the women that continue going indefinitely. Other church groups are more associated with doing social works and encouraging others to be a part of the church community. One very active group such as this is *Las Damas de Guadelupanas* (the Women of the Virgin of Guadelupe) whose members are generally women over the age of fifty. There is also a male counterpart for this group called *Los Caballeros de Guadelupanos* though they are not very active in Loreto. Each fishing village has a church in which the women are highly involved. Though there are no chapters of the church groups in the villages in which the women can participate, the priest from Loreto makes his rounds on occasional Sundays to the fishing villages to lead special masses.

According to the staff of the local political party offices (PAN, PRI, PRD, PAS), ninety percent of the fieldwork that is done for local parties is done by women. They volunteer to go door to door, put up signs, hand out flyers, do fundraisers and play host for meetings. In the 2001 elections, there were three women (two for PRI and one for PAS) that were attempting to be nominated by their party for significant positions in the municipal government. These women were all in their 40s and while the two PRI candidates had political backgrounds the PAS candidate had never before held a political position. Interestingly, according to the PRI office staff, between 70 to 80% of the voters in Loreto are also women. Even the men and women who live in the fishing villages are quite politically active since Mexico's unique brand of capitalist/socialist politics permeates every Mexican's life.

Women also belong to volunteer groups such as *Club de Leones* (the Lion's Club) and *Club de Amistades* (the Friend's Club) both of whose aim is to raise money and do social services for those in need. *Desarollo Integral de la Familia* (DIF) is a government agency that is also concerned with the welfare of families in the community. It is probably because of this orientation that it is the only government agency in town that employs a number of women in some capacity other than as secretaries. All of these groups have clothes drives, offer free haircuts, collect unused medicines to distribute, and organize free doctor's visits. DIF also sponsors training workshops for both men and women to teach them marketable skills and they organize group marriages to legalize many poor couples' unions — men and women who are living as but are not actually husband and wife due to the costs associated with an actual marriage ceremony. Women in the fishing villages are not members of any of these groups but rather are generally the

recipients of the welfare activities these groups coordinate, as are other very poor families that live in neighborhoods within the town of Loreto.

Some women in town take part in environmental activities. One woman works for one of the two environmental non-governmental organizations in Loreto and a number of women, especially teachers, volunteer (mainly to supervise children) for various environmental activities sponsored by these groups. There is room for women to be more active with these environmental organizations but, unfortunately, most women do not know they exist.

Creating a Protected Area in Loreto Bay

The first environmental non-governmental organization in Loreto was *Grupo Ecologista Antares* (GEA) who roots reach back to the mid-1980s. It was at that time that people first began to vocalize their concerns about what they considered a 'free-for-all' happening in Loreto Bay. Japanese tuna boats and Mexican shrimp trawlers were regularly making their way through the bay, destroying the environment, depleting local fish stocks, and often tearing up the nets set out by the local fishermen. In 1985, a small group of people including the future president of GEA, began fighting with the Mexican government trying to get them to take action against these outsider boats working in their bay. The government did manage to get rid of the Japanese tuna boats, but the Mexican shrimp boats could not be ousted. According to Mexican law, Mexican citizens can fish anywhere in national waters; there is no regionality and therefore no legal way to keep the shrimp trawlers out of the bay.

The group understood that in order to get rid of the shrimp boats, they had to figure out a way to make shrimp trawling illegal in Loreto Bay. It was in 1991 that they

hit upon the idea of making the bay a protected area. On August 4, 1994 the group drafted a letter to President Ernesto Zedillo (1994-2000) asking that he declare Loreto Bay a national park - the strictest designation for a protected area in Mexico. Realizing an association was more powerful than a group of individuals, GEA was formed in 1995 and pursued this goal of protecting Loreto Bay. In a remarkably short period of time (especially by Mexican standards) everything fell into place. President Ernesto Zedillo declared Loreto Bay a national marine park on July 19, 1996.

Upon its declaration Loreto Bay National Marine Park became the third marine protected area in the Sea of Cortez after the Upper/Lower Colorado Biosphere Reserve in the northern part of the sea and Cabo Pulmo Reserve near the southern tip of the peninsula (Paxton 1999). It also gained recognition as being the only protected area in all of Mexico that was created at the request of the local 'community' (Dedina 1998). The park's management plan even states this: "the community of Loreto and its authorities organized (…) so that the zone could be protected (SEMARNAP 2000b: 3)." Few people making this impressive statement have stopped to examine who was actually involved in writing the request to the federal government. The people who requested the park were in fact only one segment of the community, which consisted of local and state government officials and individuals who represented tourism associations such as those of the taxi drivers, hotels, restaurants, and sports fishing agencies. These people realized, quite correctly, that their jobs depended on healthy fish stocks in Loreto Bay. There were, however, no commercial fishermen and few, if any, women present at these meetings or at the drafting and signing of the letter to the president of the republic (Arcas 2001).

Making the mistake of thinking that the small but influential group that drafted the letter spoke for the whole community has made the park service's job much more difficult.

Loreto Bay National Marine Park

Loreto Bay National Marine Park is almost 500,000 acres in area and contains five islands that were already under protection as part of the Islands of the Sea of Cortez Migratory Bird and Wildlife Refuge that had been declared in 1978 (see Figure 4.1) (SEMARNAP 2000b). The islands make up 11.9% of the area of the park and the other

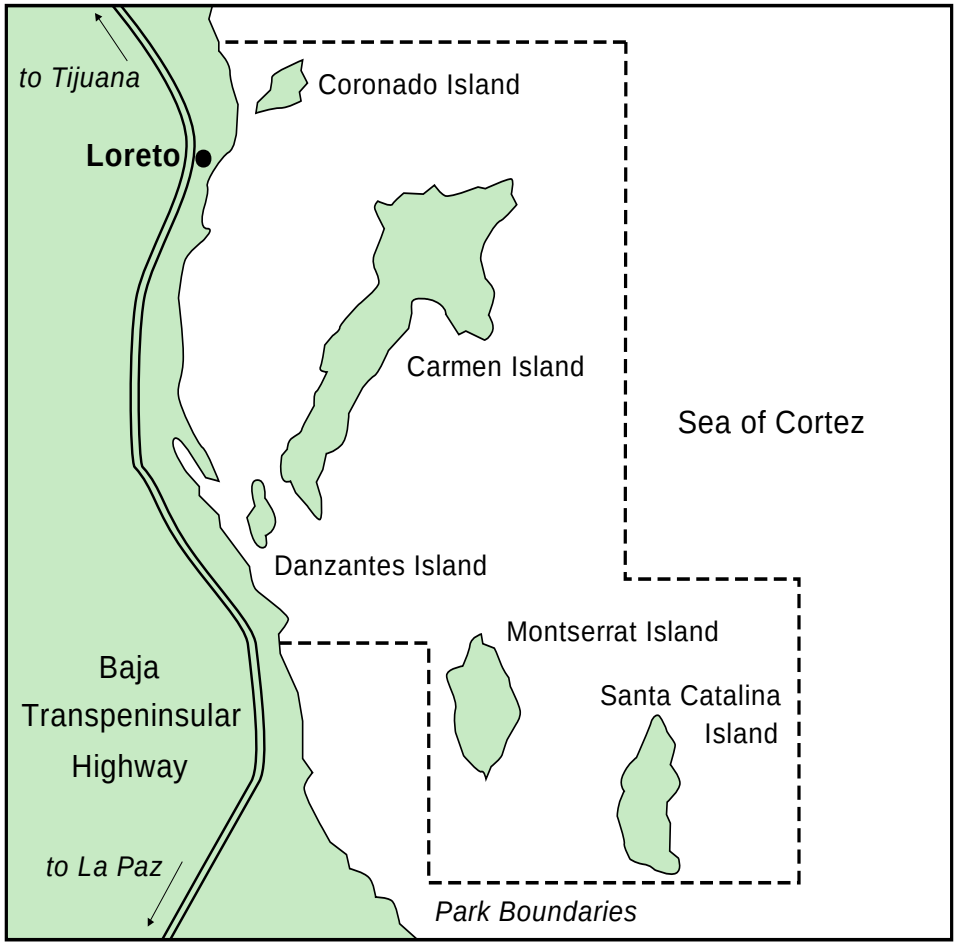

Figure 4.1: Loreto Bay National Marine Park, BCS, Mexico

88.1% is marine area (SEMARNAP 2000b). The territory encompassed by the park has the most diversity of marine mammals in all of Mexico and the islands are home to numerous endemic species of flora and fauna including the famous rattleless rattle snake of Catalina Island (SEMARNAP 2000b). In fact, 102 species found within the park boundaries are considered to be under some type of formal protection (SEMARNAP 2000b).

Once created, the three primary goals of the park were to eradicate shrimp boats from the bay, halt the introduction of exotic flora and fauna to the islands, and prohibit the use of destructive fishing techniques such as purse seines and the use of spear guns during night dives. Before an official management plan is ratified, however, the only regulations that can truly be enforced are the prohibition on shrimp trawlers that had been written into the declaration of the park, and national fishing regulations that should have previously been in effect. Because there were few federal government representatives in Loreto before the park was created, however, many of these PESCA (the national fishing agency) regulations had never consistently been enforced. Considering that by 1999 there had been a 98% reduction in illegal shrimp trawling in Loreto Bay (Paxton 1999), the park can be seen as a success in terms of its initial and primary goal.

When the park was first declared, a director was hired immediately and has remained with the park to this day. Director Benito Bermudez is a marine biologist originally from a town in the agricultural center of the Santo Domingo Valley of Baja California Sur. He was a researcher at the university in La Paz and also, for 20 years, owned his own fish business that bought and sold seafood. Previously he had worked for two years for PROFEPA (the enforcement arm of the park service) in Sonora.

In the beginning Bermudez was the only park employee in Loreto, working from his briefcase because he lacked an office. Since then the park has acquired three offices, three boats, and three park vehicles and hired four more permanent employees: a subdirector who is in charge of tourism aspects of the park, a chief of projects, an administrative assistant (the only female), and an operations assistant. Additionally, four other people (two of whom are female) have been employed in six month to year long positions as a tourism administrator, environmental education coordinator, technical advisor, and monitoring assistant. Of the permanent employees, two received their Masters degrees in marine resource management at the university in La Paz, and one has his Bachelors degree in marine biology from Sinaloa. Interestingly, most of the employees, both permanent and temporary, seem to have gotten their jobs from knowing each other at the university in La Paz or from time spent in Sinaloa.

The only park service employee that is actually from Loreto is the 20-year-old monitoring assistant. He had heard of a volunteer position available at the park from his father and, after volunteering for six months, the park offered him a year-long paid position. Interestingly, he had not even heard of the park before his dad mentioned the volunteer position to him. This is somewhat shocking seeing that youths in school and recent graduates probably have more information available to them about the park than anyone else in Loreto due to the school's environmental curriculum. Unfortunately, information about the park certainly has not had much of a chance to disseminate through personal contact with park employees either. Only one park service employee has children in Loreto and the others have, at most, only a spouse. With no real family in

town it is not surprising that park personnel mainly socialize exclusively with each other. This is, of course, how they got the jobs in the first place, because they were friends.

In 1998 The Nature Conservancy (TNC) became involved with Loreto Bay National Marine Park through a program called Parks in Peril. A park in peril is one that is considered in danger of remaining a park just on paper if they do not receive assistance. TNC chooses parks in Latin America that have a local environmental non-governmental organization (ENGO) associated with it with whom they could create a partnership. Through this three-year partnership TNC tries to build up the ENGO's capabilities to apply for grants, administer funds, and organize park related activities, among other things. In Loreto Bay, TNC has helped out the park a great deal by providing funds for a number of much needed items including park vehicles and money to support the temporary employee positions mentioned above.

Involving the Community in the Park

National parks in Mexico have five directives: vigilance, environmental education, monitoring, scientific investigation, and diffusion of information. They are also charged with organizing commercial fishing activities, sport fishing activities and all other touristic activities that take place within the boundaries of the park. In order to carry out these objectives well and be inclusive, one park employee, Alfredo, has built up a relationship with the people in the fishing communities, fearing that their distance might inadvertently leave them out of park service activities. While none of the communities or the town of Loreto are considered to be within the park boundaries, they are in its 'zone of influence'. This means the park personnel are concerned with the activities take place on land that might be affecting the marine environment as well as the

resource extractive activities the people living in these communities take part in within the park boundaries.

Involving Women

Alfredo is the park employee with the most responsibility for maintaining contact with the communities. He travels to the fishing communities about three times a week, visiting the ones closest to Loreto most often. Spending so much time on community outreach to the fishing villages was clearly necessary. Most women in the fishing villages did not even know there was a park before 1998, the year that Alfredo started working for the park. At this point, the park service has spent so much time specifically including the residents of the fishing villages that the women there are better informed about the park and its regulations than are the women in Loreto. The park focuses quite a bit on the 'social welfare' goals of SEMARNAP in the villages often bringing medicinal supplies as they make their rounds as well as dispensing boxes of staple foods to the families. Additionally, they also have spent time trying to organize women's cooperatives in an attempt to create a source of work and money for women within these communities.

Women's Cooperatives

There are two women's cooperatives that are active in the municipality of Loreto. One cooperative, called *Mujeres del Golfo* (Women of the Gulf), consists of about 10 women from Ligui while the other is called *Muchachas de la Prepa* (High School Girls) and has about 10 members from Ensenada Blanca, these being girls between the ages of 15 and 24. There is also a cooperative in Juncalito but it is not very consistent in its activities, due to internal strife and an incipient women's cooperative in Agua Verde.

There are no women's cooperatives in the town of Loreto. The park has helped the women's cooperatives to organize and apply for the necessary permits to do various activities. Some are involved in aquaculture projects, others package ornamental fish, and most sell refreshments to beach goers.

It has taken the *Muchachas de la Prepa* two years to get all the necessary permits and credentials to be able to charge the (mainly American) RV tourists that camp on their beach all winter $10 pesos each a day as payment for picking up the trash they leave. The money that women's cooperatives make rarely goes to its members' households. It is usually pegged for community projects like building a health clinic or fixing up the church. In the case of the *Muchachas de la Prepa*, the name of their cooperative reflects the goal for which they are raising money. They desperately want to earn enough funds to hire a high school teacher to come to their fishing village to teach since none of them had the opportunity to go to Loreto to finish their basic education. Unfortunately for the members of *Muchachas de la Prepa*, most of the tourists that live on the beach all winter long for free refuse to pay the girls the $10 peso a day, the equivalent of one dollar. Even though their activities are not always successful, this type of assistance from the park service had made quite an impression on the women in the cooperatives. When asked what came to mind when they heard the words 'national park' almost unanimously they responded "*ayuda*" which means help.

Other Forms of Women's Involvement

Another way the park has tried to include women was to encourage two women from the *Mujeres del Golfo* cooperative to take positions on the park's technical advisory committee. However, even the park realizes that they do not represent women's interests

so much as they represent their cooperative's interests, especially in aquaculture which could potentially earn quite a bit of money for them.

The park also feels that they have been inviting women to all of their meetings, though they have wondered why, in general, women do not show up. The women, however, say they have not been invited to meetings. Essentially, the park has passed out written invitations to fishermen and men involved in tourism with the man's name on the front of the envelope. The women feel that since their name is not on the invitation they are not invited. A woman would never assume, especially in Mexican culture where women are traditionally not expected to take part in business or planning meetings, that this invitation had anything to do with her. To get beyond cultural obstacles the park will have to go out of its way to involve the women and make them feel truly invited.

There are two types of local women, however, that can sometimes be seen at meetings. Occasionally one of the well-educated wives of a man that owns a tour agency will attend. More interestingly, some of the women in *Mujeres del Golfo* are also often present. This is important to note. The park service has made a concerted effort to inform and include the women's cooperative members in park service activities and has held meetings with them in their villages. Consequently they have started to actually make the trip to Loreto to attend these meetings and, most importantly, have learned to speak out. So, while it is common rhetoric around town that women would not go to such meetings because they would not be interested this is, in fact, not true. Almost every woman asked said that if she felt more educated about park issues and were made to feel as though she were invited, she would be very interested in attending park planning meetings.

Creating a Management Plan

After their declaration, parks in Mexico are given one year in which to write up a management plan. More than two years after Loreto Bay National Marine Park was declared, in October 1998 the researchers at the university in La Paz finally delivered one. When they presented the plan to the fishermen, however, everyone was stunned. By all accounts it was a very thick document, one they had apparently worked on for quite a long time. The problem was that all the regulations in the management plan were purely based on science, they did not reflect reality. For example, the management plan took away traditional fishing areas by declaring them off limits. The researchers had not once met with any of the resource users in Loreto and, consequently, the plan was completely unsuitable for the local situation.

Needless to say, the local commercial fishermen were quite angry. They signed a petition that was sent to the President of Mexico asking that something be done. The park was given more time to come up with a more suitable management plan, but this time the researchers at the university wanted nothing to do with it. The park director asked the subdirector and the newly hired chief of projects to come up with a plan. To prepare for this formidable task they wisely spent six months simply visiting the fishing communities, trying to win the residents' trust. During this time they did not mention the management plan at all. Once the community residents would talk openly with them the park employees spent the next year and a half working with different groups, the commercial fishermen in all the different communities, the sports fishermen, and the tour agencies, to understand what each group wanted and needed to be able to continue making a living. They then put all the proposals together trying to work through the ones

that conflicted and throwing out the ones that were simply illegal and came up with a plan.

This plan was voted on at a meeting, seemingly agreed upon, and then sent off to Mexico City to be reviewed, accepted, and printed. Unfortunately the final meeting at which the plan was voted on took place during a time when most commercial fishermen were taking part in a lucrative mollusk fishery north of Loreto in Conception Bay. The final plan was apparently agreed upon by mainly sports fishing and tourism representatives. When the printed version came back from Mexico City, the commercial fishermen were again very angry. They felt some of the rules were extremely unfair and that this was not what they had agreed to. Luckily, the management plan still had not been printed up in the *Diario Federal* in Mexico City which meant that it was still not official.

During the summer of 2001 the park service took the time to hold a number of workshops to review what was in the management plan in order to understand people's complaints. They accepted new proposals and even set up a computer screen to project maps that would illustrate different regulations onto a wall so everyone could visualize each proposal. This time the commercial fishermen organized among themselves, the communities having previously gotten together to work out their differences in order to show a united front at the meetings. Many had studied and discussed official PESCA laws and knew what would be legal to ask for and what was clearly impossible. The park service, to their credit, let the groups hash it out in the workshops until an agreement was reached on each regulation. The park director had let it be known to all involved that the results of these workshops would be final, they would not get to redo the management

plan again. It was because of this that the commercial fishermen came out in force, seeing from the previous management plan that they had a lot to lose if they were not involved. Consequently, their numbers overwhelmed those of the representatives of the sports fishing and tourism agencies. Once again the only women at the meeting were park service personnel, researchers from elsewhere and a few women from the *Mujeres del Golfo* cooperative. So while the park service made an extraordinary effort for everyone to be involved to make the management plan fair and useful, still the local women were underrepresented.

Enforcement

Since the park was created there has been one PROFEPA officer position in Loreto, and in five years four different officers had filled that position. Until recently, PROFEPA officers have been the only ones with the legal authority to write up citations. If park service employees are in the position of seeing an illegal action, they have to return to shore and get either the PROFEPA officer or the marines (who are stationed in Loreto and apparently have jurisdiction over just about everything) to go out with them and write up the citation for them. They rarely do this since the offender is sure to be long gone by the time they return. The Mexican government has slowly started to train park personnel so that they have the legal authority themselves to cite an offender. As of now, only one park employee in Loreto has that authority. Without that special legal authority, park employees have the rights of every other Mexican to detain someone they feel is doing something illegal, but they run a serious risk of later being sued for infringing on that person's inherent liberty. Most citizens and park employees are not willing to take that risk.

The PROFEPA officer in Loreto does not have his own boat, he goes out with the park service personnel in their boats, making about 10 patrols a month. Over the years most citations have been for shrimp trawlers in the bay. The director knows that the PROFEPA officers can be bought, though he does not feel it is because they are corrupt at heart. From his experience working for PROFEPA in Sonora he knows how little they get paid. He says that until they are paid a sufficient amount to support their families, they will accept bribes to get by. Once a PROFEPA officer is 'overlooking' the activities of a number of fishermen, he is no longer effective.

It is not clear that people in Loreto realize that the park employees do not have the legal authority to stop someone from doing something illegal, though the park feels they do know this. By far the biggest complaint about the park is corrupt, uneven enforcement of what people understand the rules to be. Knowing that PROFEPA officers have a reputation even with their superiors as being corrupt means it is likely that the people are simply aware of actual corruption. More interestingly, they would give specific examples of uneven enforcement. For instance, a park service employee may see a fisherman doing something illegal and do nothing about it while at other times the employee may cite another person for doing the exact same thing. Since PROFEPA is only out with them about 10 times a month, it is likely that most of the time the park personnel were alone and simply could not cite the offender. Additionally, when people mentioned some of the rules that fishermen were breaking that the park did nothing about, they were actually talking about actions that are not illegal. For example, some women believe that all nets are illegal in the park (which is not true) yet they see nets everywhere, so they feel the park is doing a terrible job of enforcing the rules. This misunderstanding is not

surprising in light of the number of regulations that have been proposed for various drafts of the management plan — confusion concerning park rules is rampant in Loreto.

Environmental Non-Governmental Organizations in Loreto

When *Grupo Ecologista Antares* (GEA) was established in 1995 it became the first ENGO in Loreto. Besides pursuing the creation of a protected area in Loreto Bay GEA has supported a number of environmental education activities for the community. By 1997, GEA had created an eco-museum that was, at first, mainly dedicated to whales with whale bones, pictures, and posters on display. Since then the facility has expanded to cover all types of flora and fauna and environmental themes in general. Children can go there to use a rather extensive library of books in English and Spanish about marine and terrestrial species and their environments, a set of Spanish encyclopedias, numerous National Geographic magazines, and field reports. There is also a large screen television on which they can watch a number of documentaries on various species as well as the Discovery Channel and Animal Planet. Additionally, they have shells, corals, and two live terrestrial turtles on display.

GEA has sponsored numerous excursions for children to the islands and has organized groups of children to do litter patrol on the beaches. The president of GEA, Fernando Arcas, visits schools to give talks about the environment and local environmental issues. GEA has housed a number of researchers doing studies in Loreto and has supported field work from whale and shark monitoring to the building of ecological latrines in the fishing villages. Most recently they have played a large role in the annual international turtle meeting that takes place in Loreto each January. While

GEA's primary goal is to 'expose the community to marine life' almost all of their activities are aimed at children.

A second ENGO began activities in Loreto in 1998, though they were not legally established until 2001. This group called *Fundacion de los Amigos de la Bahia* (Friends of the Bay Foundation) has the explicit goal of teaching environmental education to the local residents. *Fundacion de los Amigos de la Bahia* has organized *Abajo el Mar* (Under the Sea) and *Sobre el Mar* (On Top of the Sea) programs for children from nine to 18 years old that teaches them to SCUBA dive and kayak respectively. While the founder of this group says that it is open to teaching groups of adults, all of its activities so far have only involved children. Additionally, the founder has stated explicitly that he believes adult minds are closed to learning new ways of interacting with the environment and that the key to conservation is in teaching the children environmental education.

Women in Loreto

The local women of Loreto have an incredibly wide range of experiences when it comes to the marine environment. Without having the opportunity to take part in the numerous environmental education activities that take place in town, women's knowledge of and connections to the natural resources around them and their opinions of the park and its management of these resources is truly a result of each woman's personal background and daily routine. To illustrate how different three women's lives can be within one community I have summarized a day in life of a commercial fisherman's wife, a sports fisherman's wife, and the wife of a land-bound tourism worker, in this case a hotel employee.

Commercial Fisherman's Wife

Isabel is 44 years old and moved to one of the fishing villages near Loreto from Campeche when she was seventeen. She married a local fisherman and has three daughters. Isabel has had no formal education and has never worked outside of the household except for fishing. She has been fishing with her husband for 12 years.

Most mornings Isabel dresses and is ready to go by 6:00 a.m. Within half an hour she and her husband are in their 22-foot fiberglass boat heading out to sea. The net they had set the night before is about a mile off shore. Isabel tells her husband which way the current is going so they know which end of the net to start hauling up without having to pull against the current. The net is 1000 feet long and 6 feet wide with weights on the bottom and floats on the top. Isabel estimates that the water in this area is about 150 feet deep with a sandy bottom. Depending on what they catch, together they will decide where to set the net next. They each have their own favorite fishing spots. If they set the net out very far near the islands (Isabel's favorite spot) they usually camp out over night to save money on gas.

Together Isabel and her husband haul up the net, calling off what they have caught as they pull it out. Large spider crabs, that Isabel says usually live in very deep waters, are thrown back. The yield is very small and Isabel laments over the large holes in the net caused by the sea lions they found eating the net three days ago. They have to continue using this net, though, until they are through repairing their second net. It takes two hours to pull up the net, not as long as usual since there was very little product. They then motor about five minutes to the north to set the net again, though Isabel thinks it is a little close to shore since she believes the fish pass by farther out. Setting the net takes 15

minutes and then they return home where they both process the fish that they will keep for themselves. It is only worth the trip to Loreto if they have at least 15 to 20 kilograms of fish to sell.

Isabel then cooks breakfast for she and her husband (all of her daughters are off at school in La Paz) which consists of the fish they just caught. After cleaning up, a park service vehicle pulls up with students from La Paz that are participating in a shark monitoring study. They came to talk to her husband to ask him for his help. Meanwhile Isabel continues to clean the house and then begins to water the garden. They eat lunch at about 2:00 p.m. which will be seafood again if it contains any meat at all, and then, after cleaning, they each have some time to relax during the heat of the day. They often spend the afternoon talking. They talk about the park and its regulations, extensively debating between themselves the positive and negative aspects of living near a protected area. They have a late snack before they go to bed at around 10:00 p.m.

Sports Fisherman's Wife

Ana is originally from the Pacific Coast of the Baja Peninsula. She came here when she was 15 to attend teaching school in Loreto. She married a local sports fisherman and is now 38 years old with two sons and a daughter. She has been a teacher in town since she graduated from school.

Ana gets up at about 5:45 a.m. so she can attend a 6:00 a.m. aerobics class. She arrives back at her house in the center of town just after 7:00 a.m. and helps her children get ready for school and then prepares herself. Ana drives to school and arrives at about 8 a.m. where she teaches 25 children between the ages of seven and eight. She teaches from 8:00 to 10:30 a.m. and then after a half an hour break, teaches again from 11:00 to

1:00 p.m. When Ana arrives home soon after the school day has ended she has a woman that helps her clean up and make lunch. Her husband comes home from the tour agency that he owns to eat lunch with Ana and the children. They often cook seafood for lunch, though lunch is just as likely to be beef or chicken. She and her husband occasionally discuss what is going on in the park, especially their concerns with illegal activities that some of the commercial fishermen are taking part in. Then she rests for a bit before going shopping for food to make lunches for her husband's clients the next day. During the season that can mean preparing 15 to 25 lunches in an afternoon.

In the early evening, Ana works on her lesson plans for the next school day. She fixes something for her family to eat at about 8:30 p.m. and then is off to a teacher's course she attends at night. Her day usually ends between 11:00 p.m. and midnight.

Hotel Employee's Wife (land-bound tourism)

Maria is from the state of Oaxaca on mainland Mexico and did not move to Loreto until she was 34 years old. She has had no formal education. Maria and her husband and two of her five children (the rest are grown) live in a house in the new neighborhood of *Miramar* on the other side of the transpeninsular highway from Loreto. The neighborhood's name is ironic since it means 'sea view' of which there is none. Elsewhere she had sold flowers and food from her home. In Loreto she worked for one year as a cook and then made a job of making and selling tamales door to door each day. Though she has not made and sold tamales for quite s few months, she had previously saved enough money to pay for the greater part of the substantial concrete block house they now live in.

Maria wakes up at 7:00 a.m. to make coffee for her husband before he goes off to work and then returns to bed until 8:00 a.m. When she wakes up again she spends some time feeding the dogs and chickens out back. She has breakfast herself (and with her children when school is out) at 11:00 a.m. Maria then cleans the dishes and the rest of the house and spends time watering an extensive garden outside. One of her older daughters owns a store down the street and she walks there when she needs some groceries. During the week Maria might take the bus into town to go by the fruit shop and pick up the left over vegetables to feed to her animals and also does some shopping for herself. Often she has a lot of her grandchildren and neighborhood kids in her house all day and cannot go into town.

In the afternoon Maria prepares the big meal of the day which will be ready at 5:00 p.m. when her husband comes home from work. Her husband works for one of the oldest tourist hotels in Loreto and they sometimes discuss his work at dinner. Being originally from a mountainous region they rarely, if ever, prepare seafood to eat. They do not discuss the park because Maria does not know there is a national park in Loreto. After dinner they watch soap operas on television until about 9 p.m. when the news comes on. Because she does not like to watch the news, she will do some more work around the house until she goes to bed about 10 p.m.

Questionable Assumptions

Because the park was declared at the request of the "local community," park personnel have spent very little time promoting the park or trying to win the support of the local residents, especially those within the actual town of Loreto. Park employees respond with disbelief when told that a large number of people within the community,

especially women, do not even know the park exists. They simply had never questioned whether the majority of the town knew about and supported the park. It becomes clear, however, after examining a day in the life of three diverse women in Loreto, that local residents experience the informational and physical environment around them very differently. Some of the women in Loreto have very intimate contact with the sea and the park service daily and have very strong ideas about the park's management strategies. At the same time, other women can literally go months without ever actually seeing the ocean and not even realize that Loreto Bay is a protected area.

Not understanding these differences has led the park to make at least two false assumptions about the local community. The first is that the majority of local residents know the park exists and support the idea of the park. The second is that the residents have a certain level of understanding about a national park meaning its regulations, its methods, and, in fact, its purpose. Because of these assumptions and the park's apparent openness, the park feels that anyone that wants to take part in planning meetings and decision-making activities will take part in them. But since these assumptions are not true, it means that many people, especially women who are traditionally not involved in such activities, are inadvertently left out.

One of the park publications states that an objective of the park is to promote integrated development of the community and that, in order to do so, they would like to raise the level of social participation (Gutierrez Barreras and Bermudez Almada 2001). They stated that they are trying to accomplish this by not only achieving the participation of all the fishermen but of housewives and youths as well. This is an important and respectable goal for the park, but one the park will not reach without questioning some of

their assumptions. If the park truly wants women to participate in park activities they need to investigate the differences among the women in the community with respect to their knowledge and perceptions of the park. Then they can reexamine their strategies for involving women in park service functions to make them more realistic and effective. This project concerning women and conservation in Loreto Bay is aimed at helping the park do just that. The goal of this study is to contribute to a better understanding of the differences among women in Loreto in regards to their knowledge and perceptions of the environment, conservation, and Loreto Bay National Marine Park.

CHAPTER 5

METHODS AND RESULTS

Context and Participant Observation

Immediately after arriving in Loreto in January, 2001, I found a room in the house of a local family with whom I stayed for the duration of my field work. I lived with Blanca, now the matriarch of one of the large Davis families in Loreto. Although Davis is not a surname that one might expect to find in Mexico, this name along with other foreign names like Cunningham and Green are very common in Loreto due to the explorers, pirates, entrepreneurs and adventurers that were drawn to the town throughout its colorful past. The history of Blanca's family thus extends back generations in Loreto. Her grandfather was even the proprietor of one of the famous pearl diving businesses in town for which both her father and uncle worked.

The family continues to be very active in the community today. One of Blanca's sons, by trade a dentist, is quite involved in town politics and has held seats in the local government for PRI. While I lived there, he was campaigning to become the PRI candidate for the municipal president's elections. Being linked to such a large, established family can have obvious benefits for an anthropologist. Also to my advantage was the fact that Blanca not only lived on the plaza at the center of town, but seemed to be continually at the center of all the town gossip. This, of course, is the perfect living situation for anyone attempting to understand the social fabric of a community. I could learn local history and monitor all types of conversations between

women for content about the park and conservation issues without even leaving my home.

It would be difficult to be a part of a Mexican extended family, however, and not attend numerous Sunday gatherings, baptisms, weddings, fifteenth birthday parties, and funerals among other family affairs. By observing while participating in these social events, I gathered contextual information for my study. I observed day-to-day life while I lived it so I understood what activities the local women participated in daily, who they interacted with regularly, where their information came from, what topics they talked about, and, equally interesting for this research, the things that were conspicuously absent from their day-to-day lives either in activity or conversation. This is the hallmark method of anthropology, participant observation, which I used for the nine months I lived among the townspeople of Loreto.

Participant observation essentially allowed me to become more a part of the community than any methods of simple observation could have done. By developing a clearer understanding of the reality of the local residents' lives I was able to pursue more informed lines of inquiry for my research. For logistical purposes it was also helpful for understanding appropriate times, places, and methods of interviewing the women and the park personnel. Additionally, as the local residents became used to my presence outside of actual interviews, they became more candid with me. And finally, participant observation deepened my appreciation of life in Loreto as the locals lived it. This is essential in order to view the information collected throughout the duration of the study with a critical eye so it will reflect as closely as possible the reality of Loreto, thereby enhancing the quality of this research.

Sampling/Defining Categories

Soon after arriving in Loreto I chose a purposeful sample of 48 women. Coming from a political ecology perspective I chose the sample to specifically represent subgroups of women defined by age and the main economic activity in which their household participated, either recreational or commercial fishing or land-bound tourism. In the absence of census data, the sampling was principally done through chained referral. This entailed finding key individuals who referred me to other people who would be appropriate for my study. These other people would then refer other possible candidates to me and so on. The number of women chosen for the study was dictated by the amount needed to conduct the cultural consensus analysis described below.

I chose a stratified targeted sample of 16 women from households where commercial fishing was the main economic activity, 16 from households where recreational fishing was the main economic activity, and 16 from households where land-bound tourism was the principal economic activity. Within each of these groups I chose eight women between the ages of 18 and 35 and eight women between the ages of 36 and 65.

While selecting the study sample from the three strata, a number of issues presented themselves. For this project, land-bound tourism consists of such activities as hotel and restaurant work, as well as jobs in souvenir shops. These jobs obviously depend on the tourism in town but they are not associated with the sea, the primary attraction for the tourists. It was easier to find households that only participated in land-bound tourism activities than it was to find households that only took part exclusively in either commercial or sport fishing activities. In fact, it quite surprised me the extent to

which many fishermen participated in both types of fishing activities. It is quite common for the sports fishermen particularly to fish commercially in the tourism off-season in order to make ends meet.

Participating in multiple economic activities is a common financial strategy among fishermen around the world. That many fishermen of Loreto also practiced this strategy simply made it necessary to decide on guidelines for placing the households in one category or another. I decided on two criteria to place a household in either the commercial fishing category or sports fishing category: self/community prescribed identity and financial dependence. Even though the fishermen may participate in both types of activities (one usually to a lesser extent than the other), the fishermen generally described themselves as *either* a commercial fisherman *or* a sports fisherman, not both. These self-prescribed identities were consistent with those given by the community – which became evident by using the chained referral sampling method where people would refer me to either sports fishermen or commercial fishermen. If the activity that the fisherman took on as his identity was also the activity that contributed most to the household income, I placed the household in that category.

The women chosen to participate in this study were very diverse. Some of the differences were obviously chosen purposefully, specifically the variation in main economic household activity and age. I also attempted to acquire a balanced representation of women that worked and those that did not. Otherwise, though I made an effort to include a wide variety of women based on apparent education and economic differences, much of the descriptive social and economic information about the women was gathered after they had already been chosen for the study.

Socioeconomic Characteristics of the Sample

The main part of my research consisted of multiple interviews with the 48 women in my sample. With each woman I conducted formal interviews concerning their personal background, interviews using free-listing techniques, belief frame sentences, a photo elicitation technique, and a cultural consensus analysis. All of the statistical analysis done for this study, not including the cultural consensus analysis, was performed with SPSS 9.0.

Socioeconomic Background Interview

The socioeconomic background interview covered a wide range of topics. It was a catch-all for a variety of information that I was interested in that did not fit into the other formal interviews. This included such things as where they grew up, how long they have lived in the municipality of Loreto, the number of children they had, the material with which their house was constructed, the last grade they completed in school, the experiences they had had with the sea, and any contact they had had with the park service, among many other subjects.

The socio-economic characteristics of all the women in the study are summarized in Tables 5.1–5.5. Table 5.1 shows the wide range of family situations experienced by the women in the study. While some have only recently been married, others have been married almost half a century. Likewise, some women have as few as one child while others have up to eight children. Since one of the main tenets behind conservation is that resources should be conserved for use by the next generation, I also wanted to see how many women in my study had children that were not yet adults, for whom they may have felt a greater sense of responsibility for their future. Seventy five percent of the women

had children in school at the time of the study or that would be entering school in the future.

Table 5.1: Socioeconomic Characteristics for All the Women in the Study Sample: Age, Marriage, and Children (n=48)

Variable Name	Range	Average
Age in Years	18–64	38.4
Years Married	2–44	18.2
Number of Children	1–8	3.1

I combined various data from the context interview to create three key composite factors that I use to help describe the different groups of women: 'wealth', 'worldliness', and 'contact with the sea.' These factors do not generate values that have much meaning when they are viewed alone. They are most helpful when used to compare two groups of women, i.e. one group has *more* 'contact with the sea' than another group of women. The 'wealth' factor, however, can help to describe the women as one entire group. Since it is difficult to truly know fishing families' financial wealth (due to the need they have to maintain numerous credit relationships), I created a proxy for wealth that consists of three variables: the neighborhood the woman lives in, the material from which her house was constructed, and the crowdedness of the house. Below I will clarify what each of these variables refers to.

Table 5.2 summarizes the variables that combine to create the 'wealth' factor. Certain neighborhoods, *Colonia Zaragosa* and *Miramar*, are known to be 'poor' neighborhoods (low economic level) while others, *Infonavit* and *El Centro*, are

considered well-off (high economic level). Ten percent of the women in the study came from the fishing villages located within the municipality of Loreto (specifically from *Juncalito, Ligui,* and *Ensenada Blanca*). Most of these communities do not have a dependable source of electricity and have only just recently received running water. The houses are not very sturdy and their bathroom facilities are generally outhouses. The fishing villages are counted among the 'poor' neighborhoods. One can see from the table that about half of the women in the study live in the poorer neighborhoods while the other half live in neighborhoods that are considered 'well-off.'

Table 5.2: Socioeconomic Characteristics for All the Women in the Study Sample: Neighborhood, Housing, and Wealth (n=48)

Variable Name	Number	Percentage
Reside in Fishing Village	5	10%
Reside in Poor *Colonia*	25	52%
Live in Sturdy Housing	42	87%
Lower Economic Category	15	32%
Higher Economic Category	33	68%

Table 5.2 also shows that a majority of the women in the study live in sturdy housing. Houses made of concrete or block walls with a roof made of concrete or metal sheeting are considered adequate, sturdy housing (high economic level) while houses constructed of plywood, carton, and/or palm leaf is considered inadequate, poor housing (low economic level). The crowdedness of the house was determined by the number of people that slept regularly in the house divided by the number of rooms in the house, not

including the kitchen or bathroom. Houses with more than two people per room were considered crowded (low economic level), while anything less than that was not considered crowded (high economic level). The crowdedness of the households in the study ranged from one to eight people per room with an average of 2.4 people per room.

For each woman, if any two of these three variables were considered 'low economic level' I put her in that category. Conversely if any two of these three variables were considered 'high economic level' I placed her in that category. As Table 5.2 shows, just over two-thirds of the women in the study are in the higher economic category.

The 'wealth' factor combines with two other variables to make up the second factor, 'worldliness.' Households in financially difficult situations seem to be impoverished information-wise as well as monetarily. Their focus tends to be directed inward and be more limited to domestic activities, making ends meet, achieving day-to-day, short-term goals. Those households that are more secure financially appear to have more of an outward vision and pay greater attention to events taking place outside of the household.

Education level and work status are the two other variables that contribute to the 'worldlinesss' factor. I divided education into two levels. The lower level of education includes women that have had no formal education experience up to those who have finished primary school (6^{th} grade). The women that have attended secondary school and/or beyond are included in the higher level of education. The sample of women used in this study included women from both education extremes — ones that had never attended school to those that had gone on for advanced degrees after university. Higher levels of academic education contribute to a greater sense of 'worldliness' because formal

education exposes people to a more expanded world view (the 'big picture') and teaches the ability to think critically and in the abstract, hence the world beyond the day-to-day household activities becomes more intellectually accessible to them.

In Table 5.3 the women's educational experience is broken down in order to give greater detail concerning their schooling background. Generally, however, I will compare groups of women by the lower and higher education levels described above and refrain from comparing more precise grade levels. For all of the women in the study, just over half of the women (56%) are in the lower education level while 44% are in the higher education level category.

Table 5.3: Socioeconomic Characteristics for All the Women in the Study Sample: School and Work Experience (n=48)

Variable Name	Number	Percentage
No Formal Schooling	4	8%
Completed Primary School	36	75%
Completed Secondary School	21	44%
Completed High School or Career Training	11	23%
Beyond High School	6	13%
Lower level of Education	27	56%
Higher level of Education	21	44%
Women's mothers who worked	9	19%
Women who worked in past	34	71%
Women who work now	31	65%

Working to earn money inside and/or outside the household is also included in this factor due to a certain degree of independence it gives the woman financially and at

least limited contact with the world outside of her household. In households where women work there is less *machismo* (simply the fact that she is 'allowed' to work indicates this). In these types of households the husband and wife not only seem to have more of an equal relationship where they share their thoughts with each other as partners, but the women have more friends and acquaintances outside of the household. All of this means the woman is exposed to more sources of information and therefore has a greater sense of 'worldliness.' It is not uncommon in Loreto to find the extreme opposite of this, women that say they never leave their house and only ever interact with their immediate family.

I included the percentage of women's mothers who had worked to earn income at some point in their lives in Table 5.3 in order to be able to compare it with the percentage of women in the study who work now. The fact that 71% of the women in this study worked at some point in their lives and compared to only 19% of their mothers is indicative of how much gender roles have changed in Loreto even in just one generation. Some women who had worked in the past stopped working once they were married, hence a lower percentage of women who work now than in the past. More than half the women were working at the time of this study.

The third key factor I use to describe the women in this study is 'contact with the sea' which includes six variables: if the woman is from Loreto originally, the number of each woman's immediate relatives that worked in the sea (includes parents, siblings, and children only); whether or not her father worked in the sea; if she herself has or had a job associated with the sea (includes fishing, aquaculture, or processing fish, shellfish, or ornamental fish); the number of boat trips she took a year; and if her husband worked in

the sea. All of these would indicate the amount of opportunity a woman had to either experience the sea and its environment herself or to hear stories and information about the sea from those close to her. Women that have more contact with the sea would be more likely to visually witness diminishing resources and contamination of the marine environment. This, in turn, would probably influence her perceptions of the need for conservation.

Table 5.4 displays the women's origins as well as the variables that make up the "contact with the sea" factor. Coastal areas, either in Baja or mainland Mexico, were the birthplace for 88% of the women in this study. Most of the women, 71% in fact, were actually born in Loreto itself. Even those women who are not from the area originally have a long history there. While years living in Loreto ranged from one to 60 years, only four women in the study had lived in Loreto for less than 10 years and on average the women had lived in Loreto for 32 years.

Table 5.4 shows that only one third of the women's fathers had a job that was somehow associated with the sea. The increase in jobs associated with the sea within the past generation can, in part, be associated with the relatively recent origins of the sports fishing phenomenon in Loreto. Additionally, in the past, a large percentage of the men in town were salt workers on Carmen Island. This source of work is no longer available. I counted their fathers among the number of relatives that each woman had that worked in sea. Though there were a number of women that had no immediate relatives that worked in the sea, there was at least one woman in the study who was able to count seven. However, on average the women had 1.3 relatives that worked in the sea. Among the

women themselves, only 12% had ever had jobs associated with the sea and only one woman in the entire study sample actually belonged to a cooperative.

Table 5.4: Socioeconomic Characteristics for All the Women in the Study Sample: Origins and Contact with Sea (n=48)

Variable Name	Number	Percentage
From Loreto Area	34	71%
From a Coastal Area	42	88%
From Mainland Mexico	7	14%
Woman's Job Assoc. with Sea	6	12%
Father's Job Assoc. with Sea	16	33%
Belong to Cooperative	1	2%
Never Been on a Boat Trip	10	21%
Boat trip 1–2 Times/Year	25	52%
Boat Trip >2/Year	13	27%

Even among those women whose husbands are fishermen and whose families own a boat there are those who have never actually been in a boat on the sea. In fact, 21% of the women in the study had never been on a boat trip before. Of those women that did go on boat trips, the majority went only once or twice a year. Many of the older women especially mentioned that they do not know how to swim so the idea of going out on a boat scared them.

Additional Methods Used

Free Listing Techniques and Ratings

Moving beyond the gathering of descriptive characteristics for each woman, other methods in the study were used with the intent of discerning their knowledge of the environment and their perceptions of parks and conservation. With each woman I used free-listing techniques to understand the frame of reference she used when considering such words as 'conservation' and 'national park.' I asked what the word conservation meant to them and then had them list what they felt were the most important natural resources to conserve. Fifty eight percent of the women in the study said that they thought of preserving and protecting natural resources when they heard the word *conservacion* (conservation). Of the remaining women, 40% mentioned activities such as maintaining objects in good condition, maintaining friendships, preserving family traditions, or preserving food. Only one woman said she really had no idea what the word meant so nothing came to mind.

Eighty-one percent of the women, when asked to list the natural resources they felt were important to conserve, included sea plants and animals on their list. Interestingly, 15% of the women listed exclusively domestic plants and animals (i.e., pigs, cows, corn, etc.). While conservation was on their minds, I asked each woman to consider whether or not she felt women currently had any type of connection or relationship with the conservation of natural resources. Only 38% of them felt women did have an existing connection to conservation. However, 77% of women could foresee a relationship with natural resource conservation in the future.

Along these same lines, I asked the women to describe the type of place they thought of when I mentioned 'national park' and to list the activities they believed were performed by people that work for a national park. Sixty-three percent of the women described a national park as a natural protected area. The remaining 37% described it as something akin to an amusement park, a zoo, or a neighborhood park with recreational equipment for kids.

Though 67% of the women did not know anyone that worked for the local park service, about half of the women gave a fairly accurate description of the activities that are done by people that work for the park including enforcement, education, research, and trying to control trash contamination. Almost a quarter of the women described the park's job as pure enforcement, policeman-like duties, while 15% felt the park's job was mainly to clean-up, i.e., sweeping and trash collecting. Ten percent had various other ideas including one woman who described the park's main job as doing aquaculture. Only 17% of the women knew that the park had been declared in 1996, and 13% of women did not even know there was a park in the area.

Only two women in this study had attended a park meeting or presentation. One attended because she is a member of a woman's cooperative, and the other because she is a school teacher and park personnel came to her school to talk to her students. Even so, almost three quarters of the women (73%) thought it was mostly beneficial to have a park in Loreto. Twenty-five percent of the women felt that the advantages and disadvantages to having a park were fairly even. Only one woman in the sample felt there were many more disadvantages to having a park in Loreto than there were benefits.

Additionally, to try to understand how these women obtain the information they have, I asked them to rate (from one to ten) how important ten different sources of information were for them, one being the most important up to ten, the least important. I drew the scale out for them on a sheet of paper and had them refer to it for each source I named. This seemed to be less confusing than having them keep the scale in their heads and helped them to remember in which direction the scale went. If the woman rated the information source as a one, two, or three, I counted it as an important source of information for her.

From Table 5.5, which summarizes the women's responses, it becomes clear how much importance women place on the information they acquire from their family and friends. The significance of this becomes more evident when we realize that only one person employed with the local park service is actually from the Loreto area and that the park personnel tend to only socialize among themselves. The other two important sources of information, radio and television, are not very helpful for disseminating information about the park in Loreto either. As of now, the local radio station does not announce any information that has to do with the park or its activities and the television stations are based on mainland Mexico. When news about the state of Baja Sur comes across the television it almost always is in reference to its capital, La Paz.

The methods used by the park to spread information (signs, posters and newspapers) are not considered very important by the women. In general, the Mexican people are not avid readers. Recreationally reading books is not such a common activity in Mexico as it is in the United States. One woman actually told me that if she saw someone reading on the beach she could be sure they were American because no

Mexican would do that. Newspapers, besides being relatively expensive (equal to about the minimum hourly wage), are not considered very accurate sources of information. People are well aware that instead of the relatively unbiased reporting we expect in the United States, most newspapers in Mexico are the mouthpiece for a particular political party and the journalists are regularly paid to report on certain issues or run, verbatim, an article written by someone else. Consequently, many articles are more like paid advertisements and at times are simply completely false.

Table 5.5: Importance of Various Sources of Information
for All Women in Study Sample (n=48)

Information Source	Number	Percentage That Rated It as Important
Family	46	95.8%
Radio	33	68.8%
Friends	30	62.5%
Television	30	62.5%
Car Announcers	24	50.0%
Signs (permanent)	20	39.6%
Books	16	33.3%
Posters	9	18.8%
Newspapers	9	18.8%
Magazines	7	14.6%

For many, the habit of not reading extends to signs and posters. Most women in my study told me they really do not ever pay attention to them. Also an issue here is the

fact that many women are not able to read, making written signs an even more difficult method for relaying information.

Belief Frame Sentences

In trying to test the concern for the "need for conservation" I asked the women to respond to 10 belief frame sentences saying whether they agreed with the sentence, had no opinion, or disagreed with it (Johnson and Griffith 1995). The original idea was to determine the women's perceptions of the decline in or deterioration of resources in the Loreto Bay area. Examples of types of sentences in this test are: There are so few turtles they are in danger of extinction; Ten years ago the quantity of yellow tail caught was much more than now; The intense use of nets in rocky shoals has diminished the quantity of fish you can capture there.

In order to be able to compare the women's concern for the 'need for conservation' I needed to assign points to the women's responses to create an index for each women. I intended to assign two points to the woman's answer if her response indicated that she did indeed perceive the resource depletion and the need to conserve. One point was to be assigned to a woman's response if it came across as neutral, without really an opinion one way or another. And zero points were to be assigned to a woman's response if it indicated that she did not perceive the resource depletion or a need to conserve at all. By adding the points together, I had planned to come up with an index of the woman's perception of the 'need for conservation' — a high score would therefore denote a greater perception of diminishing resources. I hypothesized that women in households associated with fishing activities would sense the need for conservation more

(measured through their observations of resource depletion and degradation) than those in households involved in land-bound tourism.

The belief frame sentences interview did not work out at all as planned, and I did not, in the end, create an index for each woman. I felt that any such index created from the results would not have accurately reflected the reality of the situation since the women were considering the interview questions in very different ways due to cognitive differences. Instead, I analyzed the results of this interview in a descriptive fashion. They offered insight into how important the source of women's environmental knowledge is (either experiential or intellectual) and how they process that knowledge (using their ability to think critically or not) in the formation of their perceptions of the state of the environment and subsequent conservation needs. These cognitive differences will be explained in further detail in the following chapter.

Photo Elicitation Technique

Another formal interview test that did not work quite as planned was the Photo Elicitation Technique (PET). This, too, was to determine the woman's perception of conservation issues, more specifically the overall 'positiveness' of formal conservation efforts. I intended to follow the method as it was used by Nazarea in the Philippines (Nazarea et al. 1998). In Nazarea's work this method was called a Thematic Apperception Test (TAT) and was used to elicit differences in local environmental knowledge. I felt it could also be used to offer a glimpse into local perceptions of conservation, too. With this technique, researchers theoretically can discover inter and intra group variation in environmental perceptions due to class, gender, and ethnicity. When using this method, the researcher presents the subject with a picture and asks the

subject to tell a story about it. This stimulus elicits themes and categories that make sense to the informant and reveals differences in knowledge and perceptions due to the types of associations and observations made.

I showed each woman 10 photos that depicted local actions, activities, or scenes that had conservation (or blatant lack of conservation) themes. Examples of such photos are: a dead turtle caught in a fishing net, a group of kids picking up trash on the beach, a sign saying to protect the mangroves, and a pile of dead bycatch on the shore. I had planned to use discourse analysis to simply rate the stories as having an overall positive, negative, or neutral feel about conservation. I was going to create an index for each woman to test my hypothesis that women in households involved in tourism (both land-bound tourism and sports fishing) would have a more positive perception of conservation than those in households involved in commercial fishing.

I quickly realized that some women would not say much about a photo, not because they did not know a lot about it or have opinions about it, but because of their personalities. Many women were not very assertive, so the method of simply letting them tell a story about the photos was not very effective. Because of this, I decided to change the method slightly by pointing out certain aspects of the photo and asking more directly about them. I took the position that I did not know anything about the activities, objects, or species in the photo or the rules that were implied or being broken in the photo. This allowed the women to, in affect, teach me what they knew, from the more general to the specific. I would continue questioning until is seemed the woman simply did not know anymore or have any more opinions about the subject.

I recorded these interviews and transcribed each one. Depending on the knowledge of each woman and how inclined she was to express her opinions, the interviews ranged from one to four hours long. I analyzed the transcriptions and identified the more important topics that were touched upon in each photo and then extracted the text that was related to it. For example in the turtle photo I recorded if she knew that the turtle was in danger now, that catching turtle was prohibited, why it was prohibited, if she agreed with the park's enforcement of the rules on turtle capture, and then her overall perception of turtle conservation, either positive, neutral or negative (determined by reviewing all that she had said about the photo).

The women rarely simply supported or opposed the park's conservation measures. Much of their support was qualified. If the qualification was something positive, then I put these women in the "positive general conservation category" with those women that had unqualified support for the park conservation measures. Two examples of positive qualifications are that they would support the park rules if the park was not so corrupt about their enforcement or that they thought the park should be even more strict about enforcing the rules. If, instead, they qualified their support for the park rules with the desire for a season to be able to capture certain species or said that the park rules were good except that people should be able to capture such-and-such for home consumption, then these were considered negative qualifications. I placed these women in the negative general conservation category along with those women who stated outright that they did not believe there should be a rule about it at all. There were also women who, even after talking extensively about a topic, surprisingly really did not express an opinion in one

way or another. These women were placed in the neutral perception of conservation category.

The photo topics addressed their knowledge of the area, particular resources, park rules and activities, and their understanding of why the park had implemented certain rules. Additionally, they allowed the women to express their perceptions of the park rules as well as conservation in general. I reviewed each woman's interview and identified the specific knowledge corresponding to each topic so I could compare types of knowledge and perceptions between groups of women. I then used this information to look for patterns between the types of knowledge women had and their perceptions of formal conservation efforts.

Unfortunately, because I chose not to directly ask a list of specific questions about each photo to each woman, not every woman addressed every aspect I would have wanted her to. The more specific opinions a women had about a photo, the more easily she talked about it. Knowing this, it would lead me to believe that a woman's lack of response to a certain aspect of something in the photo probably meant that she had no opinion about it. Of course, it is not possible to simply assume this. Therefore, where I have presented the results of this test in the following chapter, I have noted the sample size of respondents for each topic in the photos, so it will be clear where it was the case that some women did not address a particular issue.

Cultural Consensus Analysis

Finally, I asked all 48 women involved in the previous interviews and eight employees of the park service to complete a questionnaire that I analyzed to determine if there was a cultural consensus concerning marine environmental knowledge. When the

two socioeconomic factors, age and the household's principle economic activity, are considered together the result is six sub-sample groups of women (i.e., young commercial fishing households, older commercial fishing households, young land-bound tourism households, etc.). The cultural consensus analysis requires at least six to eight subjects in each of these sub-sample groups in order to produce significant results (Romney et al. 1986), hence the total sample size of women for this study was 48.

This test first involved doing open interviews with six women (one from each age/household subsample) and one person from the park service to get various ideas concerning processes and functions of the marine environment and species. From the results of those interviews I created a 50-item true-false questionnaire that the women and park service employees completed. This test was used to determine whether there was overall agreement about the marine environment and its processes and functions, if there were clear divisions or distinctions between different types of women or women as a whole and the park service, or if there was no general consensus among anyone about the ideas expressed on the questionnaire concerning the marine environment. I felt this was important to discover since most parks create regulations based on their beliefs of how the marine environment functions. If the women did not share these beliefs, the regulations would not make logical sense to them and the park would probably have to address this.

After administering the true-false questionnaire to the 56 women and park employees, I felt there was confusion on eight of the 50 questions. One question used the word *predecible* (predictable), which many women seemed not to know the meaning of, thinking it meant the opposite of its actual definition. Also, I had used the names of the

four seasons in seven of the questions which seemed to confuse the women as well. They are more accustomed to using the terms *el tiempo de calor* (the hot season) or *el tiempo de frio* (the cold season). Table 5.6 displays the cultural consensus analysis output using *ANTHROPAC 4.0* software package after having taken out these eight questions (Borgatti 1996).

In order for it to be considered "one culture" among all the respondents, the first factor needs to be at least three times greater than the second factor. In table 5.6 we see that the first factor is more than four times larger than the second and accounts for 83.1% of the variability. Though the individual scores for all 56 respondents are not shown, only four scores were below 50% which means that the factor loading in this test is high. The average variability (.13) is less than 1/5 of the average level of agreement (.681). All of this combined indicates a very strong "one culture" among the women and the park service personnel. Also, with the average level of agreement at almost 0.7 and with eight people per category, the results of this test can be considered strongly reliable.

Table 5.6: Results of Cultural Consensus Analysis

Psuedo-Reliability: 0.980

Eigen Values

Factor	Value	Percent	Cum. Percent	Ratio
1	26.880	83.1	83.1	7.714
2	3.485	10.8	93.9	1.765
3	1.975	6.1	100	
Total	32.339	100		

Average Knowledge: 0.681
Standard Deviation: 0.130

This analysis shows that there is one cultural system concerning the marine environment that has variation but that is widely shared not only among the different household types and age groups of women, but also between them and the park service employees. It is possible to learn even more about the respondent's beliefs by looking at the results of the 'answer key' from the questionnaire more closely. Consensus means there was general agreement, not total agreement, among the women and park service personnel. Some questions were more split in the responses, but the disagreement had no pattern. Other questions had a much higher rate of agreement. Items on the questionnaire for which there was a high level of agreement are:

- Nets probably do harm to marine animals.
- Using nets hurts the reproduction of various species because they can catch lots of juveniles with the rest of the product.
- The quantity of yellowtail found in Loreto is dropping due to the use of encircling nets because they capture a large quantity of fish.
- Only a small percentage of turtles become adults due to predators.
- Solid trash in the sea causes harm to marine animals because they may try to eat it and consequently die.
- It is easy to over exploit fish by using a spear gun.
- The form of fishing called 'catch and release' probably harms fish because even if they are released they will not live.
- Capturing a species during its time of reproduction diminishes its population.
- Mangroves are a very important area for nesting and feeding of many sea animals.
- Rocky shoals are areas of reproduction for lots of sea animals.

- Animals on the islands are vulnerable when other animals are introduced.

The results of the cultural consensus analysis seem to indicate that the women generally agree that certain types of equipment hurt fish populations — with no distinction between women by what their husbands do or their age. Not only do they already agree with the park but, in fact, the women actually said more often than the park personnel that certain equipment was harmful or that quantities of particular species had gone down because of certain practices. This is noteworthy since it would seem to indicate that the park would not have to spend time convincing any particular group of women that these practices are harmful because, on some level, they already know it.

Interviews with Others

In addition to the interviews and questionnaires described above, I conducted a number of formal interviews with other men and women in town covering a range of topics. This is how I obtained much of the background information about Loreto and the marine park that was used in the previous chapter. For example, I spoke with the local director of FONATUR, each of the nine park employees, and all 18 women that make up the membership of the two local women's cooperatives. Additionally, I conducted multiple interviews with the president and secretary of *Grupo Ecologista Antares* and the president of *Fundacion Amigos de la Bahia,* the two local ENGOs in Loreto.

In order to provide the park with a brief report containing practical suggestions to facilitate women's involvement in park activities I conducted interviews with people from other segments of the community, as well. The focus of these interviews was to understand the various positions held by women in the community and the activities and groups they were currently participating in. The idea was to see where the park's goals

and the goals of the active local women's groups might overlap so that they could try to combine their efforts for conservation initiatives. This would be considerably easier than creating women's groups whose express purpose is to become involved in conservation activities.

To do this I spoke with the six school supervisors in town, the woman who directs teacher training workshops, the director of human resources in the municipal government, and the sole female director in the municipal government (the director of the *Casa de Cultura* - cultural programs). Likewise, I spoke with women working at the local political party offices, the priest of the Loreto's Catholic Church, and the leaders of each women's church group. Additionally, I interviewed the female presidents of two civic groups, the local Sister City Club (associated with Hermosa Beach, California) and the local chapter of the Lion's Club, as well as the president of the local chapter of *Desarollo Integral de la Familia* (DIF).

This information gathered in these interviews provided general background information, especially for the description of Loreto in chapter four, but the interviews were not intended for the cultural consensus analysis or for testing the central hypotheses of the research project. I report the interviews here solely to document the variety of people with whom I spoke in order to write a thorough background ethnography for this project.

CHAPTER 6

ANALYSIS OF RESULTS BY HOUSEHOLD TYPE, AGE, AND LEVEL OF EDUCATION

After using the methods described in the previous chapter to gather information about the women in the study, I analyzed the results by a number of different variables — household type, age, education level, contact with park service personnel, level of involvement in commercial fishing, and location of residence. This was done in order to try to identify any links between these socioeconomic characteristics and the women's level of environmental knowledge or perceptions of parks and conservation. I will only show and discuss the results of the first three of these divisions — household type, age, and education. The first two are important to understand since they were the main variables I was testing in this study. The level of education will be discussed because I discovered, after analysis, a number of significant differences between the two grade levels. Analysis by the other three divisions, contact with park service personnel, level of involvement in commercial fishing, and location of residence, did not yield interesting results.

Description of Women Divided by Household Type, Age, and Education

Analysis by Household Type

When the women are considered by household type we find there is generally a continuum for each variable from commercial fishing to sports fishing to land-bound tourism households. The most difference is found between the women from commercial

fishing and land-bound tourism households, though it is not always a significant difference. This will be shown in the discussion of the variables that follow.

It is possible to say, generally speaking, that women from the land-bound tourism households in this sample are younger, their husbands have been in their jobs the least amount of years, they have lived in Loreto the shortest amount of time, they have fewer children, and have been married for the least amount of time compared with the other households. Women from the commercial fishing households fall at the opposite end of the continuum being, on average, older, married for the longest amount of time, having more children, and their husbands having been in their jobs the longest. Only in amount of years living in Loreto do the women in sports fishing households surpass them.

Table 6.1 displays a number of socioeconomic characteristics by household type. For this table and tables 6.2 and 6.3 the number in the parentheses to the right of each percentage is the raw number to which the percentage is referring and the sample size is indicated at the top of each column. The table shows that the commercial fishing households are significantly poorer than households involved in land-bound tourism ($x2=12.52$, $p<.001$, Fisher's Exact Test $p<.005$). Interestingly, the sports fishing households are also significantly poorer than the land-bound tourism households ($x2(1)=7.39$, $p<.01$, Fisher's Exact Test $p<.05$). Additionally, though the difference is not significant, we can see from table 6.1 that more than twice as many women from land-bound tourism households than commercial fishing households continued their schooling beyond 6^{th} grade. Women from sports fishing households are much closer to their tourism rather than their fishing counterparts in their level of schooling. Nineteen percent of women from land-bound tourism households had advanced education,

attending school beyond the high school level, as did 13% of sports fishing wives, and only 2% of commercial fishing wives. While this may indicate a trend of commercial fishing wives generally having the lowest levels of formal education (interesting because a low level of education is a common characteristic of fishing communities throughout the world) none of the differences are statistically significant.

Table 6.1: Socioeconomic Characteristics of Women by Household Type

Variable Name	Household Type		
	Commercial Fishing HH (n=16)	Sports Fishing HH (n=16)	Land-bound Tourism HH (n=16)
Wealth (% that are poor) *	56% (9)	38% (6)	0% (0)
Schooling (% with >6th grade education)	25% (4)	50% (8)	56% (9)
Working Now	56% (9)	56% (9)	81% (13)
Originally from Loreto	75% (12)	88% (14)	50% (8)
Job Assoc. with Sea **	31% (5)	6% (1)	0% (0)
Dad's Job Assoc. with Sea***	63% (10)	19% (3)	19% (3)
No Boat Trips	13% (2)	13% (2)	38% (6)
>2x/year boat trips *	50% (8)	31% (5)	0% (0)

* Indicates a significant difference between commercial fishing hh & land-bound tourism hh and a significant difference between sports fishing hh & land-bound tourism hh.

** Indicates a significant difference between commercial fishing & land-bound tourism hh.

*** Indicates a significant difference between commercial fishing hh & land-bound tourism hh and between commercial fishing hh & sports fishing hh.

In regards to the number of women that were working at the time of the study, sports and commercial fishing households had an equal percentage while land-bound tourism households had a much higher percentage of working women. The results of the wealth, education, and work variables for the sports fishing wives are really indicative of the general pattern of their socioeconomic characteristics throughout the study. Sometimes they are more similar to the land-bound tourism households, other times they are more similar to the commercial fishing households, and often they are in the middle between the two.

When we combine the wealth, education, and work variables to create the 'worldliness' factor we can see that women from land-bound tourism households have a greater level of 'worldliness.' That is to say, they were generally better-off financially with a higher level of education and more of them took part in remunerative work. Women from commercial fishing households fell at the other end of the 'worldliness' spectrum being the poorest with the lowest level of education and fewer of them working for an income.

To understand the differences in amount of contact each of these groups of women has had with the sea a number of variables have been compared, including where they are from. Table 6.1 shows that, interestingly, only half of the women from land-bound tourism households are originally from Loreto. This variable is one of the few instances where the sports fishing households are on the other end of the continuum with the highest percentage, 87%, actually being from Loreto.

Thirty-one percent of the land-bound tourism wives were from mainland Mexico - more than twice as many as either of the other two groups. This situation in Loreto

reflects two trends of migration to the Baja peninsula in general. One trend is associated with migrants from mainland Mexican states with very high rates of unemployment such as Oaxaca, where many of the women in this study were from. These migrants generally have little to no education and take low-paying jobs at hotels and restaurants. Those with a slightly higher level of education that are from these same regions often work in some capacity for souvenir shops that sell *artesanias* from their homeland (Baja itself has a relatively small *artesania* industry compared to mainland Mexico). These migrants usually arrive in Loreto by way of Cabo San Lucas. The other trend concerns very well-educated migrants, predominantly from Mexico City, that come to the area and take over managerial roles at hotels and restaurants. In Loreto especially, these migrants have an advantage over the locals since they have specific tourist trade training and speak at least two languages, skills that few *Loretanos* have.

The 'contact with the sea' factor is also determined by the number of relatives each woman had that worked in some form with the sea, if the woman herself and/or her father worked with the sea, and how often each woman went on boat trips. An independent t-test shows that commercial fishing wives (M=2.4, SD=2.5) had significantly more relatives that work in the sea than land-bound tourism wives (M=.3, SD=.6), $t(30)=3.3$, $p<.01$. Sports fishing wives had an average of 1.1 relatives that work in the sea which is not significantly different than the number of commercial or land-bound tourism wives' relatives that work in the sea. Also, there are significantly more commercial fishing wives than land-bound tourism wives that worked in the sea themselves ($x2(1)=5.93$, $p<.05$, Fisher's Exact Test $p<.05$). Both sports fishing and land-bound tourism wives have significantly fewer fathers who had jobs associated with the

sea compared with commercial fishing wives ($x2(1)=6.35$, $p<.05$). Additionally, there are significantly more sports ($x2(1) = 5.93$, $p<.05$, Fisher's Exact Test $p<.05$) and commercial ($x2(1) = 10.67$, $p<.005$, Fisher's Exact Test $p<.005$) fishing wives that had regularly gone on boat trips more than twice a year than land-bound tourism wives.

After combining these variables we see, as might be expected, that the commercial fishing wives had the most 'contact with the sea' while the land-bound tourism wives had the least. Sports fishing wives had much less 'contact with the sea' than commercial fishing wives did, but had a little more than land-bound tourism wives.

Analysis by Age Groups

The second descriptive analysis was done by age group, the results of which are shown in Table 6.2. Many of the variables that can be compared between these two groups are not very interesting because they are a simply a result of the older group having lived longer (i.e. the older group has been married longer, lived in Loreto longer, etc). Other variables are more appropriate to examine. For example, the older group of women have significantly more children (M=3.9, SD 1.98) than the younger group (M=2.2, SD.98), $t(46)=-3.80$, $p<.001$. Though this may also be associated with the fact that they have lived longer, what is interesting is that in spite of having fewer children, the younger group of women live in significantly more crowded houses. Living in crowded houses appears to be indicative of the younger women's financial situation. In general, the women seem to become more financially stable as they get older.

Table 6.2 displays the results of various socioeconomic characteristics by age group, including wealth. The women in the younger group (ages 18-35) are, in fact, significantly poorer than those in the older group, $x2(2)=4.75$, $p<.05$. The other

descriptive variables displayed in the table show no significant difference between the two age groups. For example, the younger age group has an average of 1.2 relatives that work in the sea compared with an average of 1.4 for the older age group. All in all, it is remarkable how similar these two sub-groups are across most variables.

When the variables are examined together, the older age group (ages 36-65) can be considered to have a slightly higher level of 'worldliness' mainly due to the difference in wealth between the two groups. The amount of 'contact with the sea' between the two age groups, however, appears to be relatively even.

Table 6.2: Socioeconomic Characteristics of the Women by Age

Variable Name	**Age**	
	Younger Age Group (n=24)	**Older Age Group (n=24)**
Commercial fishing HH	33% (8)	33% (8)
Sports fishing HH	33% (8)	33% (8)
Land-bound tourism HH	33% (8)	33% (8)
Wealth (% that are poor)*	46% (11)	17% (4)
Schooling (% with >6th grade education)	50% (12)	38% (9)
Working Now	67% (16)	63% (15)
Originally from Loreto	75% (18)	67% (16)
Job Assoc. with Sea	17% (4)	8% (2)
Father's Job Assoc. with Sea	33% (8)	33% (8)
No Boat Trips	17% (4)	25% (6)
>2x/year boat trips	25% (6)	29% (7)

* Indicates a significant difference

Analysis by Level of Education

Table 6.3 displays the socioeconomic characteristics of the women in the study divided by their level of education. Note that because education level was not one of the variables used to choose the women, the sample sizes are not equal. There are 27 women in the lower education group (those women with no formal education up to and including those with sixth grade education) while the group with a higher level of education (women with any education beyond the 6th grade level) includes 21 women.

Table 6.3: Socioeconomic Characteristics of the Women by Education Level

Variable Name	**Education Level**	
	Lower (n=27)	**Higher (n=21)**
Commercial fishing HH	44% (12)	19% (4)
Sports fishing HH	30% (8)	38% (8)
Land-bound tourism HH	26% (7)	43% (9)
Wealth (% that are poor) *	48% (13)	10% (2)
Working Now *	52% (14)	81% (17)
Originally from Loreto	78% (21)	62% (13)
Job Assoc. with Sea	19% (5)	5% (1)
Father's Job Assoc. with Sea	30% (8)	38% (8)
No Boat Trips	26% (7)	14% (3)
>2x/year boat trips	26% (7)	29% (6)

* Indicates a significant difference

We can see from Table 6.3 that the women in the lower education group are significantly poorer ($x2(1)=8.20$, $p<.01$) and were working in remunerative activities significantly less ($x2(1)=4.37$, $p<.05$) than the group of women with a higher level of

education. Combining education level, wealth, and percentage of women working it is clear that the women with a higher level of schooling have a much greater level of 'worldliness' than the women with less education.

In trying to determine the women's 'contact with the sea', we can see from Table 6.3 that the groups are somewhat split. None of the differences between these two groups in any of these variables are very great. It is interesting to note, however, the difference in the number of fishing households between the two grade levels. Seventy-four percent of the lower level education group are fishing households compared with 57% of the group with a higher level of education. The commercial fishing households are especially heavily represented in the group with less schooling. The differences in number of household types between the two grade levels are not significant but may be important to keep in mind when subsequently examining their knowledge and perceptions of parks and conservation. Concerning the number of relatives that work in the sea, the group with a lower level of education have an average of 1.7 while the group of women with a higher level of education have an average of 0.7. This difference is likely attributed to the higher number of fishing households in the group with less formal education and, due to this, the group with a lower level of schooling can be considered to have slightly more 'contact with the sea.'

It may be helpful at this point to summarize the previous description of women by highlighting the women's relative levels of 'worldliness' and 'contact with the sea' by household type, age, and education level.

- By household type
  - Commercial fishing wives have by far the lowest level of ‘worldliness’ and highest level of ‘contact with the sea.’
  - Land-bound tourism wives have the highest level of ‘worldliness’ and lowest level of ‘contact with the sea.’
  - Sports fishing wives fall between the other two types of households in both their levels of ‘worldliness’ and ‘contact with the sea.’
- By age
  - The older age group has a slightly higher level of ‘worldliness.’
  - Both age groups have about the same amount of ‘contact with the sea.’
- By level of formal education
  - The group with a higher level of education has a much higher level of ‘worldliness.’
  - The group with less schooling has a bit more ‘contact with the sea.’

Differences in Knowledge by Household Type, Age, and Education Level

In this section I have compiled the women’s responses to the various interview questions to examine their knowledge concerning the marine environment, national parks, conservation, and the connections underlying why particular park rules are in place. I have then compared the responses by the analysis variables of household type, age and education level to determine if there is any sort of connection between these socioeconomic characteristics and the type of knowledge the women appear to have.

Knowledge of the Environment and the State of Marine Resources

The results of the cultural consensus analysis showed that the women and the park service employees shared, in general, particular ideas about the marine environment and how different fishing practices affect it, based on their knowledge of the environment. The person that scored the highest on the cultural consensus analysis (score of .86) was the one park service employee that actually grew up in Loreto. What I found surprising was that the woman who received by far the lowest score (a statistical outlier, four standard deviations away from the mean with a score of .15) was a 44 year old women from a commercial fishing household that had never gone to school. It surprised me not only because she was from a commercial fishing household but because she was the only woman in my entire study that fished regularly. She had been her husband's commercial fishing partner for 12 years. This means that the one woman in my study who had by far the most contact with the sea also had the most contrary ideas about the marine environment than anyone else I interviewed.

Originally I had hypothesized that the women with the most 'contact with the sea' would have the highest level of environmental knowledge and would also have the most awareness of the state of the marine resources. The division by household type produced the greatest difference in the 'contact with the sea' factor, the women from commercial fishing households having by far the most contact and land-bound tourism women the least. Therefore, following my original hypothesis, I expected the commercial fishing wives to have a higher level of environmental knowledge and be more aware of the state of marine resources than the other types of households. I examined some of the topics

touched upon in the photo elicitation technique and the results of the belief frame sentences interview to try to determine if this was the case.

The results of the photo elicitation technique (PET) showed that every woman in the study could identify resources such as shrimp, clams, and crabs in the photos. The only difference in resource recognition came with identification of mangroves. The division by household type produced more of a difference than by age or education level in mangrove recognition (100% of commercial fishing wives, 81% of sports fishing wives, and 75% of land-bound tourism wives recognized the mangroves) and knowing where mangroves grow (100% of both commercial and sports fishing wives, and 53% of land-bound tourism wives knew where mangroves grew). The commercial fishing women's higher level of 'contact with the sea' seemed to have more of an affect on their recognition of different geographic areas (bays and beaches) and various types of fishing equipment (compressors used for diving and different types of fishing nets). For all of these topics the most difference was, again, in household type as the commercial fishing wives recognized these areas and items the most and the land-bound tourism wives the least. This can only be viewed as a trend, however, since none of the differences were statistically significant.

The belief frame sentences interview was mainly meant to bring out the women's level of awareness of diminishing resources. I expected the women with the highest level of 'contact with the sea' to have witnessed more of the diminishing resources in the area, though I was not clear as to how this would affect their perceptions of formal conservation efforts. Before conducting the belief frame sentences interview, I already knew from numerous conversations with the women from commercial fishing

households that in some sense they were well aware of the diminishing resources. One example of this was when the commercial fishing woman who scored so low on the cultural consensus analysis, the one who was a fisher herself, said to me while fishing one day that it was 'as though someone had taken a sieve through the sea, there were just no fish anymore.'

It came as a surprise, then, when the commercial fishing women scored the lowest on the belief frame sentences (women from commercial fishing households averaged 14.25, sports fishing households averaged 16.38, land-bound tourism households averaged 16.25). Their low score was not only a result of them saying they 'disagreed' with the sentences the most of all the household types, but also because they said they 'did not know' the most. To top it off, the lone woman fisher again received the lowest score of all the women. Did the commercial fishing wives just not want to admit to observing the diminishing resources since commercial fishermen are generally blamed for it in public rhetoric? If this were the case I would not have thought they would so readily talk about diminishing resources anecdotally, where they really do not seem to take a defensive stance at all.

A clue as to what might be going on here came to me after reflecting on the way the commercial fishing wives replied to a number of the belief frame sentences. Instead of responding to the various sentences in this interview with a simple I 'agree', 'disagree', or 'do not know', the commercial fishing wives, much more so than the sports fishing or land-bound tourism wives, related a short personal experience preceding their answers, as an explanation of where they were getting their answers from. One woman, for instance, when asked if she agreed with the statement that shrimp boats capture many

more species than just shrimp, responded by saying that she had briefly boarded a shrimp boat that her cousin had worked on out of Guaymas. She said that she saw barrels full of shrimp on the deck of the boat and that there was nothing but shrimp in the barrels. Hence, she said that she disagreed with the statement. It did not occur to her that the bycatch had been thrown overboard while the boat was still at sea.

Another example was a response one woman gave me to the statement that the intense exploitation of chocolate clams had diminished their population over the years. She told me that when she was a little girl her family would go to the beach, walk along shore in the shallow water and find clams with their bare feet. They would come home with bags full of clams. Now, she said, a diver would have to go quite deep for clams because they cannot be found very close to shore anymore. But since she still sees the divers coming up with bags full of clams, she concluded that there are just as many clams now as there were when she was a girl. She did not seem to realize that the lack of clams in the shallows was due to their population decreasing, that only where they are difficult to reach do the clams still exist in relative abundance.

Likewise, when responding to the statement 'there are so few turtles they are in danger of extinction' many commercial fishing women said they may have been in danger, but they were not anymore. The woman would then add that she herself or someone in her family had been out just the other day and seen a couple of turtles in the water.

Because the commercial fishing wives' had a much higher amount of 'contact with the sea', they have had many more personal experiences with the sea and more opportunity to receive input from different family members that fish. What they hear

from the “officials” (park people, government fisheries experts, etc.) might be in accord with some of their experiences but be in direct contradiction with other experiences they are hearing about or observing personally. To some extent, this probably serves to confuse them. This may explain why these women said that they ‘did not know’ more so than the other groups of women. They formed their opinions about the state of local marine resources by using experiential data and were therefore having a harder time seeing the bigger picture. So, although the commercial fishing wives’ day-to-day talk seemed to indicate that they knew on some level what was happening with local resources, they responded without much certainty in the belief frame sentences interview because they were using a different frame of reference. Being asked to come up with one specific response and feeling that none of them fit into the complex situation that they knew, many times they felt they could only respond with ‘I do not know.”

On the other hand, women that had had no experience at all with the sea having taken no trips themselves nor having any family members that worked in the sea, seemed to feel quite comfortable agreeing that the resources in the area are diminishing. They had not witnessed the diminishing resources first hand but were using intellectual data, information they had read or heard on the television or radio that may not even have been in reference to the local situation, to decide their responses. They had few, if any, personal experiences to cloud their decisions. They simply responded, adding that that is what they had heard. It is important to understand, then, that analyzing belief frame sentences interviews is probably rarely, if ever, a straightforward task. One must keep in mind when examining the interviews where the people are getting their information from and how that might be affecting their responses.

When viewing the belief frame sentences results by age categories we see that it is only with the sentences that specifically referred to the diminishment of resources over a long period of time that we really see some difference in the two group's responses. The older group agreed more with both of these statements while the younger group disagreed more with one and said they did not know more with the other. As with previous comparisons between the younger and older age groups, what is most striking about the results are the similarities rather than the differences.

The results of the belief frame sentences, when divided by education, do display a greater amount difference, though not as much as by household type. In five of the six instances where a considerable amount of difference is present in the responses between the two groups, the group with a higher level of education agreed much more that the resources were diminishing. The group with a lower level of education said four of these five times that they 'disagreed' more and once said they 'did not know' more. The one instance when the lower education level said they 'agreed' more (in reference to diminishing size of squid) the group with more schooling said they 'did not know' more.

Although the belief frame sentences interview did not exactly measure what I had intended it to, the results are intriguing since they seem to reveal a basic difference in the way different groups of women made up their minds on the condition of the local marine resources. This difference seems to be linked to variations in amount of 'contact with the sea' and 'worldliness.' The women with the most 'contact with the sea' also tend to have the least amount of formal education, be the poorest, and work the least (for financial compensation). The combination of these factors appears to create the basis for using experiential data for forming opinions on the state of the environment as opposed to

intellectual data. Therefore, though the women with more 'contact with the sea' (commercial fishing wives and women in the lower level of education group) appear to know more about various local geographic areas, fishing equipment, and finer details about the environment their variety of experiences with the sea seems to serve to cloud their opinions about the state of local resources instead of clarifying them. Hence, my original hypothesis, that women with the most 'contact with the sea' would have the most awareness of the state of marine resources, did not prove to be true.

Knowledge of National Parks in General and of Loreto Bay National Park in Particular

I analyzed the results of the women's interviews to see if there was a difference in how women thought of parks in general and what they knew about Loreto Bay National Marine Park in particular. Table 6.4 shows the results of this analysis by household type, age, and education level. In the tables that follow in this chapter (Tables 6.5-6.9), there may be two numbers in parentheses to the right of some of the percentages. The first number is the raw number to which the percentage is referring. The second number indicates the number of women from that group that remarked on that particular topic in the photo elicitation technique. The percentage shown, in these cases, is the percentage of that new sample size in parentheses. If only one number is shown it represents the raw number and the percentage is of the original sample size that is displayed at the top of each column.

Viewing knowledge of the park by household type, it appears that the commercial fishing wives are the most aware of the park in general. Three quarters of the commercial fishing wives described a national park as a natural protected area as opposed to a neighborhood or amusement park or zoo while just over half of the sports fishing and

Table 6.4: Knowledge of Parks by Household Type, Age, and Education Level

Variable Name	Household Type (n=16 for each)			Age Group (n=24 for each)		Education Level	
	Commercial Fishing	Sports Fishing	Land-Bound Tourism	18–35 Years Old	36–65 Years Old	Lower Level (n=27)	Higher Level (n=21)
Describe Park as Natural Protected Area	75% (12)	56% (9)	56% (9)	71% (17)	54% (13)	56% (15)	71% (15)
Do Not Know of Loreto Bay Nat'l Park	0% (0)	19% (3)	19% (3)	13% (3)	13% (3)	19% (5)	5% (1)
Know When LBNP was Declared	19% (3)	19% (3)	13% (2)	21% (5)	13% (3)	15% (4)	19% (4)
Know Park Personnel	44% (7)	38% (6)	19% (3)	38% (9)	29% (7)	30% (8)	38% (8)
Describe Park Jobs as Complex Combo of Tasks	50% (8)	63% (10)	44% (7)	63% (15)	42% (10)	*26% (7)	*86% (18)

* Indicates a significant difference

land-bound tourism wives did the same. Table 6.4 also shows that the commercial fishing wives were the only group in which everyone knew about Loreto Bay National Marine Park. Additionally, more of them knew someone employed by the park than did women in the other groups. These results are perhaps a testament to the park's efforts to try to garner the support and involvement of commercial fishing households in park management decisions.

The commercial fishing wives' knowledge of the park is tied so much to this community outreach that many of them mistakenly assumed that the park was declared in 1998, which was in fact the year a biologist was hired specifically for the community outreach program, two years after the park had been declared. Neither of the other two groups of women faired much better in knowing when the park was declared, most just knew it had "been around for a while."

In spite of the commercial fishing wives' greater knowledge of the park in general, they did not have the clearest understanding of what the park personnel's jobs entailed. More of the sports fishing wives understood the multifaceted nature of the park's responsibilities. For many commercial fishing wives, the capacity in which she knew someone from the park service (i.e. from their children participating in a cleanup campaign or their husbands being fined) was exactly the job she imagined the park employees doing (i.e. cleanup or enforcement), and nothing else. This is another example of this group using their experiential knowledge.

The sports fishing and land-bound tourism wives were very similar in their knowledge of parks except in personally knowing park service personnel and in understanding the complexity of the park employees' jobs. The land-bound tourism

wives group has the lowest percentage on both of these. Comparing the results of these same variables by age, the younger group seems to have more knowledge about the park. A higher percentage of them described a national park as a natural protected area, knew park service employees personally and had a better understanding of the park personnel's job responsibilities. An equal number of women from both the younger and older group did not know about Loreto Bay National Park though a few more of the younger women knew when it was declared.

The final analysis of these variables was done by the women's level of education. This is the only analysis that produced significant differences between the two groups of women. In this case, the women with a higher level of education knew more about the park than did the women with less education. A larger percentage of these women thought of a natural protected area when they were asked to describe a national park, fewer of them had never heard of Loreto Bay National Park and more of them knew when the park had been declared. Additionally, a higher percentage of them personally knew park service employees and a significantly higher percentage of them understood the variety of tasks for which the park service was responsible ($x2(1)=16.92$, $p<.001$).

To examine the differences in the women's understanding of various park rules, I chose both what I thought would be well-known regulations and more obscure rules. The results of these questions are shown in Table 6.5. All of the women in the study clearly knew that it was illegal to capture turtles. The penalties are harsh for someone found killing a turtle and since it used to be an extremely common ingredient in the local cuisine, its absence at the dinner table is rather conspicuous. Alternatively, few women knew that the mangroves were protected. Most likely this is because they are not found

Table 6.5. Knowledge of Park Rules by Household Type, Age, and Education Level

Variable Name	Household Type (n=16 for each)			Age Group (n=24 for each)		Education Level	
	Commercial Fishing	Sports Fishing	Land-Bound Tourism	18–35 Years Old	36–65 Years Old	Lower Level (n=27)	Higher Level (n=21)
Understanding of Park Rules — % that know that:							
- turtle protected	100% (16)	100% (16)	100% (16)	100% (24)	100% (24)	100% (27)	100% (21)
- compressors illegal	40% (6, 15)	69% (11)	38% (6)	46% (11)	52% (12, 23)	46% (12, 26)	52% (11)
- mangrove protected	44% (4, 9)	20% (2, 10)	11% (1, 9)	14% (2, 14)	36% (5, 14)	12% (2, 17)	46% (5, 11)
- shrimp boats illegal	88% (14)	94% (15)	75% (12)	83% (20)	88% (21)	85% (23)	86% (18)
- some nets allowed	63% (10)	27% (4, 15)	20% (3, 15)	52% (12, 23)	22% (5, 23)	*50% (13, 26)	*20% (4, 20)

* Indicates a significant difference

in abundance in the area, though apparently this was not the case historically since the Monqui Indian tribe named Loreto *Concho* which means 'colored mangrove tree.' Also, the primary threat to the mangroves that remain is not necessarily the locals but more the wealthy developers looking to build along the coastline.

While the land-bound tourism wives consistently knew the least about the park rules, the sports and commercial fishing wives alternated in having the highest percentage of women that knew about particular regulations. There was some confusion across the board about using air compressors to dive for clams. While some knew the compressors were illegal, others thought they may have been allowed with a special permit or that it was okay if the clams were for home consumption and not for business purposes. As for the mangroves, not a lot was known about their protection in general. All the groups of women had relatively high knowledge about the shrimp boat prohibition. Perhaps this is because keeping shrimp boats outside of the bay was one of the primary reasons for declaring Loreto Bay a national park. The largest disparity in knowledge was found with the regulations concerning nets. The commercial fishing wives knew much more than the other groups of women that some types of nets are allowed in some areas in the bay. Most women in the other two groups felt that there was a complete ban on net use though there were a few women that believed the exact opposite, that all nets were allowed to be used in the bay.

When we view these variables by age one can see that again, a greater knowledge of the park and park personnel did not translate into knowing more about the park's rules. While everyone knew about the prohibition on killing turtles, the older group had a higher percentage of women that knew that compressor use was banned, that mangroves

were protected and that shrimp boats were illegal in the bay. Only in reference to the net regulations did the younger group have a higher percentage of women that understood the park rules.

It is only when one views these variables by education that more knowledge about the park in general coincides with more knowledge about the park rules. However, it is only in regards to the net rules that there is a significant difference. The women with less schooling understood the park rule better since most of the women with a higher level of education felt no nets were allowed in the park ($x2(1)=4.37$, $p<.05$).

Knowledge of Conservation

In the United States, thanks to the powerful environmental movement that took-off in the 1970s, the word 'conservation' is very strongly associated with the preservation of natural resources — wild, threatened species and landscapes in particular. Of course, the word conservation means preservation — the environment is just one of many things that can be preserved. Many of the women in this study said that, to them, conservation meant to preserve relationships, food, household items, and family traditions. Also due in large part to the efforts of this environmental movement is a pervasive feeling in America that if we so choose, there is a role each of us can play in conserving the environment be it by altering our personal habits, taking part in group activities, or informing ourselves about the issues and teaching what we know to our children. The questions that I examined under "knowledge of conservation" are aimed at understanding what these women associate the word conservation with most strongly and whether they feel they have a role to play in conserving the environment. Table 6.6 displays the results of these questions by household type, age, and education level.

The variables were first examined by household type. While only half of the sports fishing wives described conservation as the preservation of natural resources, almost two-thirds of both the land-bound tourism and commercial fishing wives responded this same way. More of the commercial fishing wives than women from the other two groups mentioned only domestic plants and animals when they were asked to list species that were important to conserve. In addition, land-bound tourism wives were the most likely to include marine plants and animals on this list. There is no difference at all in the percentages of women in each household group that feel that women have a connection to conservation right now. A much higher percentage of women in the land-bound tourism group, however, could imagine the possibility of a having a relationship with conservation in the future.

While the main economic activity of the household does not seem to have much of a connection to how they think of conservation except for considering a future link between women and conservation, analysis of these same variables by age shows a much greater differences between the groups of women. Women from the older group responded more often than women from the younger group that preserving natural resources was their definition of conservation. Interestingly, however, significantly more of the older group of women also exclusively mentioned domestic animals and plants in their list of natural resources that they felt were important to conserve ($x2(1)=8.20$, $p<.005$, Fisher's Exact Test $p<.01$). At the same time, they mentioned sea plants and animals significantly less than the women from the younger group on this same list ($x2(1)=6.7$, $p<.05$, Fisher's Exact Test $p<.05$). In regards to women's relationship with conservation, there is very little difference by age group. While a slightly higher

Table 6.6: Knowledge of Conservation by Household Type, Age, and Education Level

Variable Name	Household Type (n=16 for each)			Age Group (n=24 for each)		Education Level	
	Commercial Fishing	Sports Fishing	Land-Bound Tourism	18–35 Years Old	36–65 Years Old	Lower Level (n=27)	Higher Level (n=21)
Describe Conservation as Protecting Natural Resources	63% (10)	50% (8)	63% (10)	54% (13)	63% (15)	48% (13)	71% (15)
Important to Conserve Domestic Animals Only	19% (3)	13% (2)	13% (2)	*0% (0)	*29% (7)	*26% (7)	*0% (0)
Important to Conserve Sea Animals and Plants	81% (13)	75% (12)	88% (14)	*96% (23)	*67% (16)	70% (19)	95% (20)
Relationship with Conservation Now	38% (6)	38% (6)	38% (6)	33% (8)	42% (10)	30% (8)	48% (10)
Future Relationship with Conservation	69% (11)	69% (11)	94% (15)	79% (19)	75% (18)	67% (18)	91% (19)

* Indicates a significant difference

percentage of older women felt there was a relationship between women and conservation now, more of the younger women felt there was a possibility of this relationship in the future.

Education level also appears to have a connection to how the women in this study thought of conservation. More of the women with a higher level of education associated conservation with preserving natural resources and also listed sea animals and plants as among those natural resources that are important to conserve. Additionally, significantly more of the women with less schooling only mentioned domestic animals as important to conserve ($x2(1)=6.37$, $p<.05$, Fisher's Exact Test $p<.05$). In response to the questions concerning women's relationship to conservation, a greater percentage of women with a higher level of education felt that there was a relationship now between women and conservation and more of them could also imagine a relationship in the future.

We can see from these results that age and education level seem to affect the way in which the women think of word 'conservation' more than household type. Also, it becomes clear that it was only older women with less education that listed exclusively domestic plants and animals on their list of natural resources that are important to conserve. This is not surprising since that is the same sector of women that seem to spend most of their time in their homes where their day consists mainly of doing household chores, including feeding and taking care of (maintaining, conserving) their domestic animals. Especially for these women, when they hear talk of conservation, preserving wild natural resources is certainly not the first thing that comes to mind.

Understanding the Connections (Why Park Rules Are in Place)

The photo elicitation technique was a useful method to determine if the women understood the reasoning behind various park rules. The very first woman I interviewed told me that there was a prohibition against killing turtles at one point in the interview and agreed with the statement 'there are so few turtles they are in danger of extinction' at another point during the interview. Yet, when I later asked if she understood why it was illegal to capture turtles, she said no, she did not. Having heard her tell me all the information I thought she needed to know to understand why it was illegal to kill turtles, I found her answer difficult to comprehend. As much as I probed, however, it was clear that she honestly did not know.

After witnessing this type of response by many of the women concerning all of the park rules we discussed, I wondered why it was that, with apparently the same type of information at hand, some women were making the connection and others were not. Some women, I came to realize, were thinking critically. The connections may not have been spelled out for them but they were making the seemingly logical connections themselves. Other women, on the other hand, simply did not seem to link the pieces of information together in the same way — they were simply considered separate pieces of information. I examined the women's responses to these questions to discover if there was some sort of relationship between the socioeconomic characteristics studied in this project and the ability to make these types of connections of understanding.

Table 6.7 displays the percentages of women that understood why particular park rules were in place divided by household type, age, and education level. In three of the six cases, more of the land-bound tourism wives than the wives from the other two

Table 6.7: Understanding Why There Are Particular Conservation Rules by Household Type, Age, and Education Level

Variable Name	Household Type (n=16 for each)		Age Group (n=24 for each)			Education Level	
	Commercial Fishing	Sports Fishing	Land-Bound Tourism	18–35 Years Old	36–65 Years Old	Lower Level (n=27)	Higher Level (n=21)
Why Vehicles Are Not Allowed on the Sand Dunes	27% (3, 11)	23% (3, 13)	29% (4, 14)	22% (4, 18)	30% (6, 20)	20% (4, 20)	33% (6, 18)
Why Turtles are Protected	73% (11, 15)	73% (11, 15)	87% (13, 15)	82% (18, 22)	74% (17, 23)	69% (18, 26)	90% (17, 19)
Why Dive Compressors Are Illegal	71% (10, 14)	80% (12, 15)	56% (9, 16)	70% (16, 23)	68% (15, 22)	*52% (13, 25)	*90% (18, 20)
Why Mangroves are Protected	21% (3, 14)	21% (3, 14)	19% (3, 16)	9% (2, 23)	33% (7, 21)	*8% (2, 25)	*37% (7, 19)
Why Shrimp Boats Are Illegal	*80% (12, 15)	*69% (11, 16)	*33% (5, 15)	58% (14, 24)	64% (14, 22)	64% (16, 25)	57% (12, 21)
Why Exotic Animals Should Not Be Taken to the Islands	25% (2, 8)	13% (1, 8)	33% (2, 10)	36% (4, 11)	9% (1, 11)	8% (1, 13)	44% (4, 9)

* Indicates a significant difference

household types understood the reasoning behind the rules, though none of the differences are significant. In two instances more of the sports fishing wives understood the connections behind the rules, though here, too, it was not significant.

Only with regards to the prohibition on shrimp boats did more of the commercial fishing wives understand why the rule was in place. In this instance both the commercial fishing wives ($x2(1) = 6.65$, $p<.05$) and the sports fishing wives ($x2(1)=3.89$, $p<.05$) had a significantly higher percentage of women that understood the rule than the land-bound tourism wives did. In this case, I do not feel the knowledge was equal between the groups. Many of the land-bound tourism wives clearly did not understand the type of equipment that the boats used to capture shrimp and therefore could not understand the environmental consequences of allowing such boats to work in the bay. Both groups of women from fishing households understood much better how shrimp boats worked, probably because both of their households' livelihoods are threatened by these outside industrial boats. Consequently, the commercial and sports fishing wives had a better base of knowledge from which to derive their understanding of this rule.

Analyzing these variables by age does not result in any significant differences. In fact, the two groups are rather evenly split in having a greater understanding of the connections. For three of the park rules the younger group had a higher percentage of women that understood why they were in place. For the other three rules it was the older women that understood the reasoning behind the rules more.

A clearer pattern emerges when we view these variables by education level. In five of the six cases more of the women with a higher level of education understood why the rules were in place. The one instance that more of the women with less schooling

knew the meaning behind the rules was in regards to the shrimp boats. In light of the fact that fishing wives seem to have greater knowledge of how shrimp boats work and that they make up 75% of the group with a lower level of education, then this is not surprising. Two of the five cases where women with more schooling understood the connections more produced significant differences. Significantly more of them knew why compressors were illegal ($x2(1)=7.49$, $p<.01$) and why mangroves were protected ($x2(1)=5.52$, $p<.05$, Fisher's Exact Test $p<.05$).

In examining the results of the women's knowledge reviewed above, it is clear that the analysis by education level produced more significant differences. There are also other trends in the women's knowledge that may be helpful to summarize. The women from commercial fishing households and women in the lower level of education group (both having more "contact with the sea") seem to have a slightly higher level of knowledge concerning various local geographic areas, fishing equipment, and environmental details. These same groups of women also seemed to have more difficulty in forming opinions on the state of various marine resources.

In regards to park knowledge, the commercial fishing wives, the women from the younger age group, and women with a higher level of education all know more about the parks in general. But only with the higher level of education group does this greater general park knowledge coincide with knowing more about the park rules. The group of women with a higher level of education also had a 'knowledge' of conservation that was much more consistent with the 'wild', environmental meaning of the word and more of a concept of women's connection to conservation now and in the future. No other group by age or household type were this consistent with their responses to the conservation

questions in this regard. And finally, when looking at the women's understanding of the reasons behind park rules, the analysis by household type and age provided rather divided results while, again, it was the women with a higher level of education that consistently knew more.

Differences in Perceptions by Household Type, Age, and Education Level

After determining differences in knowledge by household type, age, and education level, the next step is to examine the women's perceptions of the park and of conservation. Then I will determine if there appear to be any links between the knowledge the women have of parks and conservation and their perceptions of them.

Perceptions of the Park

To determine what the women's perceptions were of the park, I asked them straight out if they thought the park was mainly beneficial, more of a disadvantage, or if there were both great advantages and disadvantages to living so near a national park. Additionally, I extracted from the photo elicitation technique interview their responses to the questions concerning their agreement with certain park rules and activities. The women that qualified their supportive remarks for particular park rules with wishing the park personnel were not so corrupt when enforcing the rules or with wishing there was even more enforcement of the rules were counted among those women who said they simply were in agreement and supported the parks regulations. Those women who were neutral or negative about the park rules were, of course, not included.

Table 6.8 displays the results to the questions concerning their perceptions of Loreto Bay National Marine Park by household type, age, and education level. Looking at the difference between household types in regards to their agreement with certain park

Table 6.8: Perceptions of Park by Household Type, Age, and Education Level

Variable Name	Household Type (n=16 for each)			Age Group (n=24 for each)		Education Level	
	Commercial Fishing	Sports Fishing	Land-Bound Tourism	18–35 Years old	36–65 Years Old	Lower Level (n=27)	Higher Level (n=21)
Agree with Turtle Prohibition	47% (7, 15)	53% (8, 15)	50% (7, 14)	57% (12, 21)	43% (10, 23)	*21% (5, 24)	*85% (17, 20)
Agree with Sea Patrol	88% (14)	100% (16)	80% (12, 15)	87% (20, 23)	92% (22)	85% (22, 26)	95% (20)
Agree with Rule Against Compressors	54% (7, 13)	77% (10, 13)	85% (11, 13)	67% (14, 21)	78% (14, 18)	*58% (11, 19)	*90% (18, 20)
Agree with Net Rules	79% (11, 14)	85% (11, 13)	67% (8, 12)	74% (14, 19)	80% (16, 20)	65% (15, 23)	94% (15, 16)
View Park As Mainly Beneficial to Loreto	*50% (8)	81% (13)	*88% (14)	71% (17)	75% (18)	70% (19)	76% (16)

* Indicates a significant difference

rules we can see that a higher percentage of the sports fishing wives than the other groups of women agrees with three of the four park rules. The commercial fishing wives never had the highest percentage that agreed with the park rules. But it is interesting to note that while on two occasions they had the lowest percentage of women that agreed with the park rules, in the other two cases it was the land-bound tourism wives' group that agreed the least.

The only significant difference among the household types is a rather important one, though not really surprising. When asked how beneficial or not beneficial the park was to them and the area, a significantly lower percentage of commercial fishing wives said that it was mainly beneficial compared with the land-bound tourism wives ($x2(1)=5.24$, $p<.05$). The commercial fishing wives stressed that though there were some benefits, there were lots of disadvantages to having the park, too. Only one commercial fishing wife said that the park was really not beneficial at all. Because the commercial fishermen are the most affected by park regulations, it is easy to see why the wives from commercial fishing households would emphasize these disadvantages more than the other groups of women.

When analyzing the variables in Table 6.8 by age group it becomes clear that there is very little difference between the two groups. While the younger group agrees more with the turtle enforcement regulations, the older group agrees more with having a sea patrol, banning compressors, and not allowing all nets to be used in the bay but none of these differences is by a large percentage. When asked about the benefits of the park the two group's responses remain strikingly similar.

Viewing these variables by education level produces some significant differences with regards to their agreement with the rules. In all four cases, the group of women with more schooling is more supportive of the park rules. A significantly higher percentage of them agreed with two of these park rules, the turtle prohibition ($x2(1)=17.97$, $p<.001$) and the compressor ban ($x2(1)= 5.27$, $p<.05$). However, when looking at whether or not they feel the park is mainly beneficial, there is very little difference between the two education levels. So while education level seems to have the greatest tie to the women's perceptions of park rules, it is household type that has the greatest link to their perceptions of the park in general.

Perceptions of Conservation

To try to determine the women's perceptions of formal conservation efforts in general, I examined their responses to each photo in the photo elicitation technique in their entirety. I looked at how supportive they were of the rules that the photos touched upon (these responses were examined in Table 6.8) as well as examining other remarks that either expressed a strong positive perception of conservation or a very negative one (which may or may not have been in reference to any particular park rules). In those cases where the women expressed both positive and negative conservation feelings about the subject of the photo they were placed in the neutral category since their feelings seemed to even each other out. Also in this category were the women that did not express any strong feelings one way or another.

Table 6.9 shows the percentages of women by household type, age, and education level that had a positive conservation perception of each of the ten photos in the photo elicitation technique. The analysis by household type did not produce any significant

Table 6.9: Perceptions Of Conservation by Household Type, Age, and Education Level

Variable Name	Household Type (n=16 for each)			Age Group (n=24 for each)		Education Level	
	Commercial Fishing	Sports Fishing	Land-Bound Tourism	18–35 Years Old	36–65 Years old	Lower Level (n=27)	Higher Level (n=21)
Positive Conservation Feel About:							
- Beach Protection (Vehicles)	50% (8)	50% (8)	50% (8)	46% (11)	54% (13)	44% (12)	57% (12)
- Turtle Prohibition	38% (6)	50% (8)	56% (9)	54% (13)	42% (10)	*22% (6)	*81% (17)
- Sea Vigilance	75% (12)	75% (12)	69% (11)	63% (15)	83% (20)	70% (19)	76% (16)
- Ban on Dive Compressors	38% (6)	63% (10)	75% (12)	63% (15)	54% (13)	*37% (10)	*86% (18)
- Mangrove Protection	63% (10)	44% (7)	56% (9)	46% (11)	63% (15)	44% (12)	67% (14)
- Ban on Shrimp Boats	56% (9)	56% (9)	31% (5)	46% (11)	50% (12)	48% (13)	48% (10)
- Clean-up Campaigns	81% (13)	69% (11)	75% (12)	88% (21)	63% (15)	*63% (17)	*91% (19)
- Regulating Net Use	63% (10)	69% (11)	56% (9)	54% (13)	71% (17)	56% (15)	71% (15)
- Controlling Species Allowed on Islands	38% (6)	38% (6)	44% (7)	42% (10)	38% (9)	*26% (7)	*57% (12)
- Beach Protection (Contaminants)	44% (7)	50% (8)	81% (13)	58% (14)	58% (14)	*41% (11)	*81% (17)

* Indicates a significant difference

differences between the groups of women. None of the groups appears to have a consistently more positive perception of these photos than the other groups. What is probably more interesting though is that none of them consistently had the lowest percentage either. Analysis by age does not produce any significant results either and here, as well, neither group is consistently more positive than the other.

Though household type and age do not create many interesting differences in perceptions of conservation, when these variables are divided by education level a number of significant differences are produced. For nine of the ten photos the group with a higher level of education had a greater percentage of women with a positive conservation perception while for the remaining photo the two groups had an equal percentage of women with a positive conservation perception. There are five cases where the group with more schooling had a significantly higher percentage of women with a positive conservation perception: the turtle prohibition photo ($x^2(1)=16.33$, $p<.001$), the compressor ban photo ($x^2(1)=11.52$, $p<.005$), the clean-up campaign photo ($x^2(1)=4.77$, $p<.05$), the exotic species on island photo ($x^2(1)=4.81$, $p<.05$), and the protecting beaches from contaminants photo ($x^2(1)=7.86$, $p<.01$). From these results it seems clear that there is a strong tie between education level and positive perceptions of conservation for the women in this study.

Summary of Results of Analysis

The purpose of this study was to understand the influence of the women's household type, age, and education level on their knowledge and perceptions of the environment, parks, and conservation. A brief outline of the results of this analysis is presented in Figures 6.1 and 6.2. Throughout this analysis the division by education level

Figure 6.1: Summary of Results of Analysis of Knowledge

1. Knowledge of Environment and State of Marine Resources
   A. Household type influenced:
      - Recognition of coastal areas and various fishing equipment. Wives in commercial fishing households recognized more than the wives from other households.
      - Beliefs concerning the diminishing of marine resources. Wives from commercial fishing households scored the lowest, indicating that they 'did not agree' or 'did not know' the most when asked about statements concerning diminishing resources.
   B. There was no pattern of difference by women of different ages or household types or between women and the park personnel about their beliefs concerning the functioning of the marine ecosystem in general.
2. Knowledge of Parks
   A. Household type influenced:
      - Awareness of Loreto Bay National Marine Park in general. Wives from commercial fishing households were more aware of the park than wives from the other households.
   B. Education level influenced:
      - Knowing more details about parks. The women with a higher level of education knew more.
      - Understanding complexity of park personnel's jobs. The women with a higher level of education knew more.
3. Knowledge of Conservation
   A. Household type and education level influenced:
      - The ability to imagine a future relationship between women and conservation. Women from land-bound tourism households and women with a higher level of education could conceive of a future connection between women and conservation more than women from other household types and education levels.
4. Knowledge of Connections
   A. Education level influenced:
      - Understanding the reasoning behind park regulations. The women with a higher level of education consistently understood these connections more than the women with less formal education.

produced the most consistent patterns of knowledge and perceptions of parks and conservation. A greater amount of women with more schooling knew more about national parks in general and more about particular park rules and responsibilities, had more of a 'wild', environmental view of conservation where individuals can take part, and understood the reasoning behind park regulations more. While there are some individual cases of large differences by household type or age, in general, analysis by these variables did not produce any clear patterns - the knowledge appeared more evenly divided. It is the women with a higher level of education who were also more consistently supportive of the park rules and had a very positive perception of conservation in general.

Figure 6.2: Summary of Results of Analysis of Perceptions

1. Perceptions of the Park
   A. Household type influenced:
      - View of the benefits of the park. Wives in commercial fishing households see both the disadvantages as well as the benefits to living in a park much more than wives in the other households do. (Knowledge of wives in commercial fishing households that might have influenced this perception: they had a less clear understanding of the state of marine resources; they were more aware of the park in general)
   B. Education level influenced:
      - Perception of park rules. Women with a higher level of education had a more positive perception of park rules. (Knowledge that may have influenced this perception: they had a greater understanding of the connections underlying the rules)
2. Perceptions of Conservation
   A. Education level influenced:
      - Views of conservation in general. Women with a higher level of education had a much more positive perception of conservation in general than did women with lower levels of education. (Knowledge that may have influenced this perception: they had more consistent knowledge about parks and conservation; they had an understanding of the connections behind park regulations)

Household type did not seem to be linked closely with the women's perceptions of particular park rules or of conservation in general — commercial fishermen's wives did not have a consistently negative view of either, which some people may intuitively expect them to. However, the combination of a high level of 'contact with the sea' and a low level of 'worldliness' (which includes low level of formal education) that is found in many commercial fishing wives did lead to some unexpected conclusions about the state of the environment. Additionally, it is household type and not education level that was much more clearly tied to perceptions of the park in general. Commercial fishing wives were significantly more aware of the disadvantages of living in a national marine park. This is simply reflective of the reality of their situation. Since the commercial fishing households are the ones that the park regulations affect the most, they experience first-hand the disadvantages of living in a protected area.

Summary of Results of Hypothesis Testing

It may be helpful at this point to review the three original hypotheses with which this research began. The first hypothesis stated that the women in households that depended directly on marine resources, the women in both commercial and recreational fishing households, would have more knowledge about the environment and would perceive the diminishing resources more than the women in the land bound tourism households. This hypothesis was not supported by this research. The women from the commercial fishing households were slightly more knowledgeable about fishing equipment and coastal areas than the women from the other two households but there was no significant difference in knowledge about the environment in general. Additionally,

the women in commercial fishing households seemingly were the least aware of the diminishing resources. This seems to contradict other studies that have shown the people that are closest to the resources will be most aware of the state of those resources (Momsen 1993), and anecdotal evidence from the women. As was discussed earlier, this outcome can probably be associated with the group's low level of 'worldliness' combined with their high level of 'contact with the sea.'

The second hypothesis stated that the women in tourism related households, both sports fishing and land-bound tourism, would have a more positive perception of conservation efforts than women in commercial fishing households. This hypothesis was supported by this research only insofar as the view that living in a park is mainly beneficial as opposed to having both advantages and disadvantages can be considered a more positive perception of formal conservation efforts. This hypothesis was not supported when one views the households' perceptions of conservation in general. Women from commercial fishing households did not have more consistently negative views of formal conservation efforts. However, significant differences in women's perceptions of formal conservation efforts were found between women by education level.

The third hypothesis stated that the women of Loreto would possess an environmental knowledge that was qualitatively different than that of the park service. This hypothesis was also not supported by this research. While there was a great deal of variation on beliefs about the marine environment, there was no pattern to the variation. The women of Loreto and the park service personnel strongly shared their beliefs concerning the marine environment.

In summary, one can see from this analysis that it is, in fact, the women's level of formal education and not household type or age that appears to have the greatest affect on their support for and perceptions of conservation efforts. Unfortunately for the park service, there is a high percentage of women in the community with little to no formal education, especially among commercial fishermen's wives. The following chapter will discuss how formal education may be linked to perceptions of conservation and examine what the implications may be for the park service's efforts to include local women in conservation activities

CHAPTER 7

DISCUSSION AND CONCLUSION

The research conducted for this project indicates that the women of Loreto's perceptions of formal conservation efforts are associated more with their level of formal education than either their age or main household livelihood. Perceptions of formal conservation efforts were determined through the photo elicitation technique, a method that does not require any formal education experience on the part of the participants. This made it a very appropriate method to use with the women in this study due to the extreme differences in their educational backgrounds. The photo elicitation technique was not only the most reliable formal method used in this research project but was also the method that produced the most significant results. The following discussion concerning formal education and perceptions of formal conservation efforts is not intended to imply that education level is the only important variable in determining a woman's perceptions of these efforts. This connection is being explored further since it is the most significant variable of the ones examined for this project.

The results of this study support other research that concluded education level was an important factor in people's views of the environment (see Hsu and Roth 1996, Kellert and Berry 1987, and Kottack and Costa 1993). It is therefore worthwhile to question how educational differences may affect people's perceptions of conservation. The following discussion will review a number of skills that researchers believe are acquired through formal education. I will continue the discussion by examining how these skills, or lack

thereof, may influence an individual's views of formal conservation efforts and what the implications may be for protected area community outreach programs.

Skills Learned in School

There are a number of skills that people often associate with inherent intelligence that are actually learned in school (Cromley 2000). Formal schooling teaches people different thinking strategies and by doing so influences their cognitive development. Cognitive development involves not only learning various thinking strategies but learning how and when to use them, eventually learning better strategies and how to use them more effectively. People tend to develop cognitively as they practice these thinking strategies; this is not simply a process that happens naturally as people get older.

One key cognitive development strategy is to increase knowledge content. Background knowledge is vitally important for creating mental models and schemas, both of which are cognitive devices used to make sense of what we see and hear. A person's ability to reason is also enhanced by learning background knowledge and being exposed to a wide variety of experiences (Cromley 2000).

Schemas are "mental recognition devices which create a complex interpretation from minimal inputs" (D'Andrade 1995: 136). For example, most Americans have a schema for 'making coffee.' One need only be asked to 'make coffee' and the entire process comes to mind: put a new filter in the coffee machine, fill the machine with water, put a specific number of spoonfuls of ground coffee into the filter, etc. However, schemas are not universal. While most Costa Ricans would certainly have a schema for 'making coffee,' instead of a coffee machine it would likely involve boiling water in a pot on a stove and a cotton, sock-like cloth into which one puts the coffee grounds. Even

people within one community can have very different schemas since schemas are influenced by people's backgrounds and experiences.

Mental models are networks of information that are often made up of schemas. Mental models, like schemas, are tied to background knowledge and allow the person receiving information to make inferences from it (Cromley 2000). For example, if Person #1 tells Person #2 that she will be late for a meeting because she is having breakfast, Person #2 is likely to conjure up a mental model for 'breakfast.' This mental model may include schemas for 'making coffee,' 'making eggs,' 'making toast,' etc. This model may also include the types of food that are appropriate for eating at breakfast (not fish, for example, at least for Americans), who makes the breakfast (the wife or mother, perhaps), what goes on at breakfast (dad reads the newspaper, maybe), how long breakfast will last, and so on. Mental models can obviously get rather elaborate. Person #2 may go on to estimate about how late Person #1 will be based on his own mental model of 'breakfast.'

Misunderstandings can occur when people use different schemas or mental models when talking about the same topic. A person with more background knowledge and more exposure to various experiences of similar or related types is more likely to be better equipped to imagine mental models or schemas that differ from his or her own. Additionally, strategies for attaining more knowledge are key for the creation of mental models and formal education facilitates the development of such strategies. While it may be difficult to imagine not having a schema for 'making coffee' or a mental model for 'breakfast,' what about a schema for 'seal blubber processing' or a mental model for 'animal-based fuels?' People do not automatically have schemas or mental models for

activities with which they have no personal experience. However, they can create mental models even for these seemingly foreign topics by teaching themselves with information gathering techniques learned at school.

A person with little background information on a topic will not have a very developed mental model of that topic (Cromley 2000). On the other hand, a person that is well versed in a topic will have a mental model that is detailed and thus more complex. Upon receiving new information about a topic, the people with well-developed mental models are more likely to know where to place the data in their cognitive structure and therefore will have an easier time learning it. People with shallow mental models or no mental models about a topic are much more likely to have a harder time learning new information about it due to the absence of an accommodating mental framework and strategies for expanding on the model. Consequently, this new information is often times lost or ignored since the information recipient has no cognitive structure in which to put it (Cantrill 1992).

One of the results of having an undeveloped mental model for a topic is that it is difficult for people to know what it is they do not understand about it (Cromley 2000). People with detailed mental models for a topic will likely recognize when they receive a piece of information that they do not understand because they will have difficulty placing it within the model. They have the opportunity then to ask about it and clarify, thereby increasing their knowledge content even more.

Gaining background knowledge and exposure to experiences beyond one's own not only aids in the creation of mental models but also helps in the process of evaluating conclusions (Cromley 2000). People without the experience and skills to increase their

own knowledge content about a particular topic have a very small number of alternative situations with which to make comparisons and often end up relying only on their own personal experiences or the experiences of those close to them. The cognitive tools they posses may make it difficult for them to be able to imagine a scenario different from the one they know. In this situation people will try to argue their point using one example from personal experience, not realizing how unique individual experiences can be (Cromley 2000). They do not recognize that one must go beyond individual personal experiences in order to evaluate arguments effectively. This leads to 'local interpretation' which is when "one piece of evidence is taken as supportive because it is considered out of context of a broader pattern of which it is a part" (Kuhn 1999: 23).

Having well-constructed mental models in which to put new information and the depth and breadth of relevant knowledge necessary for effective evaluation of that information are both essential components of the process of critical thinking. Critical thinking is defined by GED Testing Service as "being able to comprehend, apply, analyze, evaluate, and synthesize information, avoid jumping to conclusions, avoid guessing" (quoted in Cromley 2000:144). Research has shown that while people's critical thinking skills improve with both age and education until the age of 20, after that education level is more closely associated with critical thinking skills (Kitchner 1983). Formal education expands people's abilities to think critically and teaches them to apply this skill to an increasing number of situations.

Kuhn has described a process of cognitive development that is based on evolving epistemological views and suggests these are the foundations for critical thinking (1999). I present her ideas here because I believe they present an interesting way of

conceptualizing differences in cognition. It is but one of a number of ways to think about these issues. In this process, there are four stages of development: the pre-absolutist, absolutist, multiplist, and evaluativist epistemological stances. In the pre-absolutist stance assertions are equated with reality. In general, this is the stage where we find very young children. This is not as common a stage to remain in as the absolutist stage in which it is realized that "assertions can conflict but disagreements are resolved by appeal to direct observations or authority" (Kuhn 1999: 22). From this epistemological viewpoint it is assumed that there is an observable truth in the world and that we can know it.

The next stage is referred to as the multiplist epistemological stance. A person may reach this stage when they are exposed to a number of conflicting opinions, even among the 'experts.' Since these situations cannot be resolved by 'an appeal to authority' a person may think that every belief is just an opinion. Since everyone is entitled to an opinion, an opinion cannot really be proven wrong so, therefore, "all opinions are equally right" (Kuhn 1999: 22). From this epistemological viewpoint people see the subjective aspect of knowledge above all else and do not have the tools to make objective comparisons.

The evaluativist epistemological stance is the final stage a person reaches in cognitive development. In this view, "all opinions are not equal and knowing is understood as a process that entails judgment, evaluation, and argument" (Kuhn 1999: 22). This stage integrates the objective and subjective components of knowledge that are exclusively adhered to in the absolutist and multiplist stages respectively.

People do not necessarily progress from one stage to another. They can remain at the absolutist stage throughout their lives but once exposed to the variety of opinions in the world people are likely to progress to the mulitiplist stage. This is where we often find adolescents who have been presented with a great deal of information but do not have the skills yet to evaluate it. Fewer people make it beyond the mulitplist to the evaluativist stage (Kuhn 1999). It is education that forces individuals to reexamine their assumptions when they view new evidence and form new ones accordingly (Kitchner 1983). This is the process of critical thinking, effectively coordinating the subjective and objective aspects of knowledge. Therefore, education facilitates the evolution from the mulitiplist to the evaluativist stage and hence lays the foundations that are necessary for an individual to think critically. Without having an evaluativist epistemological stance, critical thinking is a mute point.

Education is also associated with people's beliefs in how much power they have to initiate changes. Research has been done, most notably in the field of psychology, concerning the extent to which people believe they have control over events in their lives. If a person has an internal locus of control she believes that her personal actions affect her situation while a person with an external locus of control believes that life events are at the mercy of fate, luck, or other powerful people or institutions (see Rotter 1972). Locus of control is seen as a personality trait that is influenced by social circumstances. For instance, a number of studies have been done that associate a lower socio-economic level with an external locus of control (Battle and Rotter 1972, Rotter 1972). Education has a complex association with locus of control. While a person is more likely to advance in his or her education if they have an internal locus of control, education is also

one of the key ways a person may alter his or her locus of control from external to internal. Because people with a higher level of education are more likely to have an 'internal locus of control,' believing that their actions have some affect on the situation around them, they may be more likely to take "personal responsibility for ameliorative action" (Cantrill 1992: 38).

The concept of locus of control is important to understand when it comes to trying to persuade people to take part in environmentally responsible behavior. Research done in environmental behavior has shown that an internal locus of control has a significantly large affect on intention to act which is seen as the precursor to taking part in responsible environmental behavior (Hwang et al. 2000). Other research has also tied locus of control with perceptions of environmental hazards; people with an external locus of control feel less able to cope with them (Riechard and Peterson 1998). Consequently, education levels affect not only how an individual makes sense of an argument but also the likelihood that he or she will feel the personal ability to make changes accordingly.

In summary, people with little schooling are likely to have less developed schemas and mental models for topics with which they have little personal experience, are more likely to resort to 'local interpretation,' and also to remain in the absolutist or multiplist epistemological stance. The extent to which people develop cognitively is therefore strongly associated with formal education. Students not only learn background knowledge and learn about the experiences of others but they learn strategies for acquiring more background knowledge. This knowledge is vitally important for building mental models that will help them to absorb new information. Higher levels of cognitive development allow people to analyze and evaluate arguments, practicing and honing their

critical thinking skills. Once an individual critically assesses an argument and finds it to be valid and perhaps worthwhile, having a higher level of education may even make her more likely to change her behavior accordingly since she is more likely to posses an internal locus of control.

Cognition and Information Processing

An individual's level of cognitive development affects how he or she processes incoming information. Arguments that are communicated are affected by all sorts of "information-processing biases" resulting from cognitive factors (Cantrill 1996: 76). For people that have the necessary education and experience about a topic, it does not take much effort at all to make sense of an argument. On the other hand, those without relevant background information, education, or experience either ignore the argument or the information all together or reduce it to the simplistic subjectivity reviewed earlier. In many cases people are expected to make judgments and perhaps act upon receipt of this information, yet their response depends on their cognitive understanding of the situation, which may be faulty. This may be, in part, why people do not always act in the manner expected since the information is filtered through a variety of individual cognitive styles.

As environmental advocates put forth seemingly logical arguments about the environment to the public, they may find it a frustrating experience and wonder why it seems to fall on deaf ears. They are assuming that the 'facts' they are disseminating or the arguments they are putting forth are easily understood (Cantrill 1996). However, it is obviously not simply having access to more information that causes people to act on environmental concerns. Not only is the data received being mediated through varying cognitive styles but it is also affected by the individual's perception of where she fits in

relation to the environment; her image of her 'environmental self' (Cantrill 1996). Perceptions of the 'environmental self' include how closely a person feels she is associated with the environment and whether she believes individual actions make a significant impact on the environment. These individual filters can determine whether the information even makes it into an individual's realm of concerns. What may appear to be a dire environmental problem to one individual may not appear like a problem at all to another. Until a person perceives it as a problem she will not take action to ameliorate it. How an individual processes an argument cognitively, in large part, determines how she perceives of the problem.

One researcher has suggested that "[to be successful, environmental advocates] need to know what factors influence perception, where these cognitive biases originate and how they affect the processing of communication" (Cantrill 1996: 76). The previous discussion supports the argument that some cognitive biases may be traced to the absence of certain skills that are learned through school when one attends beyond the basic levels. It may be more difficult to clearly view these biases in adults in a place like the United States where citizens have, in general, a rather high level of education as they have completed an average of 12.3 years of schooling (Flores 2000: 242). In a country like Mexico, however, there are extreme differences in education levels among its citizens and a very low level of education in general. Mexicans, on average, have completed only 4.7 years of education (Flores 2000: 242).

Cognition and Environmentalism in Loreto

When one views the data collected in Loreto in light of the information reviewed above concerning cognitive skills learned through schooling, the women's responses to

interview questions in this research project are more understandable. In the discussion that follows I will examine some instances in which information disseminated by the park was reduced to simplistic subjectivity by some of the women in the study who have had little or no schooling.

As is true throughout Mexico, most of Loreto has a low level of formal education. Over half of the women in the study sample for this project had completed only a sixth grade education or less, some had no formal education at all. Because they have had so little schooling most of these women have not had the opportunity to make very large strides in their cognitive development and may be considered what Cromley calls 'beginner thinkers' (2000).

All of the effects that limited schooling may have on the cognition skills of these women are probably exacerbated by the fact that they are likely to have a very low level of 'worldliness' as well. This is due to the fact that the women in this study with lower level of education were significantly poorer than their more educated counterparts and participated significantly less in remunerative work. Saying that some of these women are 'beginner thinkers' or have low levels of 'worldliness' is not putting a value judgment on their inherent intelligence. This is simply a way to make comparisons concerning their experience with particular ways of thinking about things and their exposure to events and ideas outside their daily realm. Households that are quite stressed economically are likely to have an inward, short-term focus that is necessary for survival. This means information gathering about less pertinent issues may take a back seat to their day-to-day activities, not only out of cognitive necessity but because they often have less contact with others outside of their close circle of family and friends. One woman in the

study, for example, said she had not seen the beach in years even though she lives about two hundred yards from it. She added that she really never leaves the house because her main form of socializing is with her daughters who come to see her. Women such as this may rarely be exposed to varying opinions and experiences — both of which are important components of cognitive development.

The dearth of background knowledge and exposure to varied experiences that results from both low levels of education and low levels of 'worldliness' means that these women may lack well-developed mental models for topics outside the realm of their daily experiences. Because conservation and protected areas are a relatively new phenomenon in Loreto, very few residents have had much experience with these topics. Consequently, most women with little schooling are unlikely to have well-developed mental models for the topics associated with environmentalism, if they have any mental models for them at all. Because of this, much information is probably lost on them. They simply do not have the cognitive structure in which to put the information. Even if they do take in the information they have difficulty placing it in any relevant context so it just becomes part of a jumble of data. When this occurs they may have the 'facts' in their heads but specific connections are not made making it difficult for them to arrive at seemingly logical conclusions.

In many instances when women did not appear to understand the reasoning behind park rules it can be seen from the text of their interviews that they were not making the necessary connections between certain pieces of information. An example of this process occurred with the responses a number of women gave to questions in the study about sea turtles. While they had heard that it was illegal to capture turtle and they

also had heard that there were so few turtles they were in danger of extinction, many women did not make the appropriate (if any) connection between these two bits of information. Consequently when asked if they knew *why* it was illegal to capture sea turtles, these women said they did not know. It is understandable that they may not have mental models concerning formal conservation efforts to preserve species in danger of extinction. With such a mental model, though, it would be easier for them to plug in the facts and conclude that it is illegal to capture turtle *because* there are so few of them they are in danger of extinction. As it is, the women may not even realize there is a connection they are missing so they will not even know to ask for clarification. So while the women are not ignoring the information all together, they are not organizing it in an effective manner either.

In regards to certain topics, the cognitive biases of some of the women with little schooling may not be a result of having no mental models or poor mental models for a topic but a result of having different mental models than what is intended. This is clearly the case with 'conservation' and 'national parks.' All but one woman had mental models associated with each of these words. However, they were not necessarily the appropriate mental models given the situation. For some women, when asked what they thought of when they heard the word conservation, a mental model concerning food preservation came to their minds. Likewise, when asked to describe what came to mind when they heard the word 'national park' many women automatically referred to mental models that concerned children's recreation (a neighborhood park), not a protected area. Of course, misunderstandings can result when the person receiving the information is using a different mental model than the person delivering the information. Additionally, it is also

likely that when a woman hears bits of information that so obviously do not fit within her most salient and well-constructed mental model for that topic, she will just put the information aside deeming it irrelevant.

Even when an individual possesses a basic understanding of conservation with regards to natural resources, the value of conservation may be a particularly difficult concept to appreciate. By exposing students to historical and contemporary experiences, opinions, and knowledge, education helps to construct a certain geographical and temporal 'big picture' in their minds. People with more schooling can grasp the fact that places are connected (e.g. my fishing village is not an 'island') and they can comprehend that past generations affected the present generation and this generation will, in turn, affect future generations. This is essentially the foundation for an appreciation of the value of conservation. In the absence of an appropriate mental picture concerning where an individual fits in the bigger scheme of things, it is truly difficult to grasp the importance of conservation.

A number of responses given by women to questions throughout the study seem to demonstrate this absence of a bigger picture. Women with low levels of education were very likely to rely on 'local interpretation,' using one personal experience to prove an argument. For instance, a few women tried to support their argument that turtles were not in danger of extinction by explaining that they had seen two just the day before. By relying on this single experience it is obvious that there was no attempt to view where this situation fit in the 'big picture' to see if this was a valid argument. The cognitive process did not take into account that it would have been probable to see 40 turtles in a day in the past or to extrapolate to what this means for the future. Nor does it consider

what seeing this number in Loreto, an area of relative abundance, might indicate about the number of turtles elsewhere.

Many women with little schooling but lots of experience with the sea resorted to 'local interpretation' numerous times when asked about the state of marine resources. They had a variety of both first and second hand experience with these resources but the information the experiences afforded them was not organized in a way that made it possible to come to a decisive conclusion about it. In this situation the women used one experience to prove an argument even though it was not a representative experience or, alternatively, they threw their cognitive hands up and simply said they did not know. Having a grasp of the 'bigger picture' would have facilitated the process of making sense of it all.

Heavy reliance on 'local interpretation' is probably associated with an absolutist epistemological stance. People with this epistemological viewpoint believe there is a truth that can be known and it is often discovered through direct observation or an appeal to authority. Often times the conclusion that conflicts with their own is the park service's and although one might consider the park service the 'authority' in this case, the women do not generally yield to it. This is because many women do not perceive of the park service personnel as being authorities on the subject of marine resources. The park service personnel are considered by many to be 'arm chair biologists' without much experience and the complexity of their jobs is not well understood. So when someone else's view conflicts with the women's own, they resort to personal direct observation to conclude which view reflects the truth.

Lack of much schooling and 'worldliness' makes it less likely these women will progress to the multiplist epistemological stance. Many have not been exposed to enough of a variety of opinions to comprehend the subjective aspect of knowledge. This leaves the evaluativist epistemological stance, where the coordination and evaluation of knowledge and theory goes on, truly out of reach for them. Yet the cognitive activities pursued in this last stage of cognitive development is what is often expected of them from people disseminating environmental information.

Unfortunately for the park service then, the level of cognitive development for many women in the community probably inhibits them from ordering and evaluating information like the park service expects. Another expectation of the park is that people should alter their behavior in accordance with these environmental arguments. Again, people with little formal schooling may not respond in such a manner since they are less likely to possess the internal locus of control that would help encourage such behavior. They are less likely to be able to appreciate their power to help ameliorate the situation. This is not only because they may posses an external locus of control but also because they simply cannot imagine the variety of activities people can take part in that contribute to conservation. Once again this is a consequence of the women's scant exposure to the variety of experiences in the world. When asked if they felt that women had a role to play in conservation, a number of women said no because they thought the park service did not generally hire women. To these women, working for the park was the one and only way to take part in conservation activities.

While the park service is seeking the support of all types of women in the community, it is especially important for them to have the support of the commercial

fishing wives. Of the three types of households involved in this project, the commercial fishing households were, on average, the least well educated, the poorest, and had the least experience working in remunerative positions. This means that they are the least likely to have the cognitive skills necessary to effectively process the environmental information in a way that is consistent with the park's view of these environmental issues. Additionally, their combination of a low level of cognitive development and a high level of contact with the sea resulted in a somewhat skewed perception of the risk to marine resources. This situation is not ideal for fostering support for the park's formal conservation efforts.

The support of the commercial fishing wives is nonetheless quite important for the park since it is the members of commercial fishing households that will be required to alter their behavior the most. Most environmentalists can attest to the fact that it is difficult to persuade people to change their behavior. Buddhist teachings speak of five steps needed to bring about change: education, conviction, determination, action and effort (H.H. Dalai Lama and H. C. Cutter 1998). These are indeed the steps that individuals need to take in order to change their behavior towards the environment. However, just because it can be summed up in five steps does not mean it is a simple process. In fact the very first step, education, is arguably the most difficult. In this step it is essential to create a sense of urgency about the issue within the individual. Without this, it is difficult to initiate the remaining steps necessary for change. Of course, if the issue is not understandable to the individual to begin with due to cognitive biases, the pathway to change is cut rather short.

Saying that cognitive biases affect people's perceptions of conservation in no way precludes the fact that people also have particular personal interests that influence their views of formal conservation efforts. The perceptions of formal conservation efforts held by members of commercial fishing households are most certainly influenced by the fact that the park's regulations will affect, at times quite severely, the way they go about making a living. Not surprisingly, people have been shown to be less likely to support conservation measures that threaten their self-interests (Cantrill 1992, Hsu and Roth 1996). Of course, what is seen as threatening to one's self-interest may be quite different when either viewed in the short-term or the long-term. The likelihood of an individual effectively considering long-term interests is probably associated with both wealth and education. This suggests that women in commercial fishing households may have a number of obstacles in the way of their support for formal conservation efforts.

Implications for Protected Area Outreach Programs

For park personnel that are trying to disseminate environmental information and encourage community participation in conservation activities it may be quite useful to understand the importance of formal education in influencing people's perceptions of conservation. This knowledge should encourage parks to question some assumptions that have traditionally guided the development of community outreach programs. More effective strategies and programs can be created with the benefit of knowing some of the specific cognitive biases the target audience may have.

One of the main assumptions of conservation and development projects and environmental advocates in general has been that environmental education will influence people to act to conserve resources (Cantrill 1992, Margoluis and Salafsky 1998). There

is a general thrust to simply provide more information about the environment with the belief that once the public hears about these issues the conclusions of what will be best for society and our planet will be forthcoming. In countries with a high average level of education, this hope may be more justified since in general there is not an extreme difference in education between those receiving the information and those disseminating it. However, these strategies are exported to countries with very different social situations. When an environmental education program that was created for the United States is transplanted in its entirety to a country where the public has a very low average level of education, more than just the language needs to be adjusted.

If the ultimate goal of environmental education is to encourage people to change behaviors, then simply distributing more information may not be the most effective means of doing this. Skills are needed for applying and evaluating information and turning it into environmentally responsible behavior (Pomerantz 1991). These are critical thinking skills. In countries or areas of countries with low levels of formal education, it cannot be taken for granted that the majority of the park's target audience will possess these skills and process the information in the way that was expected or intended.

While discussing an environmental exchange program in rural Ecuador, one researcher noted that the participants in the program (i.e. scientists and teachers) were quite surprised that most of the local residents knew very little about the protected areas in their own communities even though the reserves had been there for years (Colvin 1993). The researcher remarked that there was a need for better communication between the park management and the local residents. She then cited some of the resident's rather unorthodox ideas of what the parks were used for to emphasize the fact that the locals

really had very little knowledge of what protected areas actually are (Colvin 1993). One can assume from the location of the reserves in rural Ecuador that the local residents probably did not have a high average level of education.

The environmental education program at the focus of the article was adjusted to be more suitable for the Ecuadorian environment. This meant that Ecuadorian plants, animals, and examples were incorporated into the lessons. The adjustment did not include altering the manner in which the messages were delivered in order to be more suitable for the rural Ecuadorian social environment. Because the environmental education program that was being discussed at this workshop was targeted for school children, however, we can assume the students will be learning cognitive skills simultaneously.

Though it is certainly critical for the success of conservation efforts to be educating children about the environment, it is the parents and grandparents of these children who are currently using natural resources to support their households. Parents and grandparents are among the people that know so little about the reserves in their own communities. This is not an unusual situation and has led managers of protected areas to use environmental education strategies in their efforts to educate the adult public. However, their target population includes generations of adults that may have had little opportunity to attend school and therefore have even less education than their school age children. In this situation it may be beneficial to alter environmental education strategies so they can effectively compensate as much as possible for the low level of education in the community.

Understanding the specific cognitive skills that are learned in school is helpful for identifying what is missing from messages that are targeted toward groups with low levels of education or groups that have very little experience with the topic in question. These "…less-experienced thinkers tend to: need concrete examples, understand words literally, have trouble reasoning with opinions they disagree with" (Cromley 2000: 100). Therefore, parks should examine the information they are disseminating to the public to see how they can make things more clear and understandable. They need to use vocabulary that makes sense to the target public and, if necessary, add descriptive information. The messages need to show how the information that is presented is associated with what the people already know and how the bits of information are linked to each other. Essentially, messages need to be presented using whole mental models (Cromley 2000). This means that instead of disseminating information piece by piece and expecting the public to organize it as they receive it, the information should be delivered in a well-organized manner so the connections are made for the public.

This is a difficult task since, paradoxically, disseminating information in this manner probably does not come naturally to people who are well educated, as are many of the people that work in parks. Because well-educated people use these skills without much effort, it is not a transparent process to them. They are probably not conscious of the skills they are using since the connections seem so obvious to them. Nevertheless, it is worthwhile to put forth the effort to work with whole mental models since it would then be less likely for the information to be ignored or lost in a cognitive sea of flotsam and jetsam.

Realizing this link between education level and perceptions of conservation also suggests that protected area managers are not as justified in throwing up their hands and saying "well the livelihood of commercial fishing households is the most regulated, of course its members will not support conservation measures." The fishing households will certainly protect their interests but it is important to keep in mind that commercial fishing groups around the world traditionally have the lowest levels of formal education in their communities. So while some environmental advocates feel that commercial fishing groups do not see environmentalists' arguments because they do not want to see them, there may be other factors influencing their understanding of the arguments. This means that while it may be more difficult to garner the support of commercial fishing households compared with other groups, there are efforts that park management can make that may help if they address it, in part, as an educational issue.

Conclusion

The results of this study have shown that there are differences among the women of Loreto in terms of their levels of knowledge and perceptions about parks and conservation. Most of the significant differences were associated with the women's level of formal education, though analysis by women's household type did result in some differences, especially concerning their views of the advantages of having a park in Loreto. Analysis by age was only remarkable because of the apparent similarities between the two age groups.

Theoretically these results are interesting since they support the theory of feminist political ecology that states that even *among* women there are differences in environmental knowledge, perceptions, and opportunities due to the women's varying

socio-economic characteristics. In this general sense, the results supported the original assumptions of this project. However, this research began with the hypothesis that household type would be the most influential factor in the women's knowledge and perceptions of parks and conservation. While there were some differences in knowledge and perceptions associated with household type, these were, for the most part, overshadowed by the differences associated with formal education. Cognitive skills learned in school appear to be a powerful force in the women's ability to absorb and understand new environmental information and subsequently construct their perceptions of conservation. With respect to the women in this study, education seems to be more important than even personal interests stemming from household livelihoods in influencing their perceptions of formal conservation efforts.

While some of the women's anecdotes seemed to show that they were aware of diminishing resources, the mental models for conservation for many of these women are significantly different than those of the park service. It seems that experience plays an interesting and complex role in forming perceptions of conservation. Having extensive local experience and little formal education does not appear to be helpful in creating cognitive models of conservation that are consistent with or supportive of those of the park service. Level of education, however, does seem to be a good predictor of having an enriched notion of conservation consistent with that of the Mexican National Park Service, one that is based on an abstract concept that is imbedded within the larger temporal and geographic 'big picture.' This is likely due then, in part, to the wider scope of understanding formal education encourages in an individual.

For the successful promotion of conservation efforts it continues to be necessary to address the very real economic impacts of protected area regulations on commercial fishing households by investigating, for instance, appropriate alternative sources of income and offering effective training opportunities and financial incentives to alter livelihoods. However, creating a true understanding of the park and its mission and integrating local residents in the process of natural resource protection are other essential components of effective conservation programs. Practically, this research conducted in Loreto is useful for suggesting concrete steps the park service can take to more effectively disseminate environmental and park information and engage the community in conservation activities as is the park's mandate.

Obviously, it is not practical to submit all of the local women with little schooling to more formal education. But by understanding what cognitive skills may be undeveloped, the women's lack of schooling may be compensated for with careful construction of the environmental messages being delivered. This would increase the probability that the messages concerning parks and conservation would be received in the manner that was intended.

One of the most significant changes that could be made is to use the forms of information dissemination to which the women are most likely to pay attention. The forms the park service currently uses (i.e. signs, posters, and newspaper) are not very useful since the women often ignore these written forms of information. It would be more useful to use radio or car announcers (the television would be impractical since the stations are based elsewhere and almost never air local news). Better yet, the park employees could invite people to participate in activities through personal networking.

For this to happen it would be important for the park personnel to increase their involvement in the community in order to become a part of the local social fabric. Once a few people are recruited to take part in an activity, more will go and the information about the activity will spread by word of mouth through family and friends; this is the most effective form of information dissemination in Loreto.

By involving women in conservation activities and bringing them out on 'field trips' they can be shown useful information that will be recorded as 'experiential data.' As less experienced thinkers are more likely to mentally refer to personal experiences to arrive at conclusions, broadening their range of experiences may lessen the chance that the women will resort to 'local interpretation' and come to faulty conclusions about the environment. Therefore, it would be more effective for the park to *show* the women what they want them to learn rather than to tell them.

Many women in Loreto did, in fact, express an interest in going on 'field trips' and described 'field trip'-like scenarios without even having been asked about it. However, even simply exposing them to visual information seems to be quite effective. During the interviews for this project, a number of women repeatedly referred to a National Geographic video about sharks that they had seen at the GEA eco-museum with their children. It made such an impression that the women were talking about it in detail months later.

Any information shown to the women should be organized in a way that will make sense to them. The pieces of information should be linked to each other and a concerted effort should be made to use vocabulary that the women know or that is effectively explained. This information should then be placed in the 'big picture' for

them, i.e. the broader context should be included. Essentially, the meaning behind the messages should be spelled out for the women.

Changing the information dissemination strategies in these ways will help the women understand what a park is, what its purpose is, and what people who work for a park do. It may also guide them to understand the risks to certain resources in the 'big picture.' This may lead them to begin to see why certain park regulations are in place, the ramifications of personal behavior, and, consequently, how an individual can be involved in conservation activities. In the end, all of these efforts may help the women to make the appropriate connections and perceive the environmental problems and issues in the bigger picture that park personnel have been trying to tell them about. Cognitively seeing that there is a problem is the first step toward developing a positive perception of the formal conservation efforts implemented to mitigate the problem.

Of course, even with a thorough understanding of parks and conservation not all of the women will want to be involved in formal conservation efforts. However, increasing the Loreto women's level of understanding concerning environmental issues would, at the very least, facilitate involving them in conservation activities since the lack of understanding about these issues is clearly a formidable obstacle to involving them in any meaningful way.

Attempting to engender a positive perception of conservation efforts among the women of Loreto can have far reaching effects. Women who are already knowledgeable supporters of conservation efforts have been important in teaching or influencing the activities of others in their families. For example, the woman who works as the secretary at GEA (one of the local non-governmental conservation organizations) has inadvertently

taught her son a great deal about parks and conservation. One day as she, her son, her nephew and I walked along the boardwalk we came along one of the park signs. Upon viewing the sign I heard her nine-year-old nephew ask her son what a national park was. Her son explained, quite articulately for a seven-year-old, what it was, adding in some helpful examples. The woman herself seemed quite surprised her son knew so much and admitted to me that she did not know much, if anything, about environmental issues before she starting working at GEA, she was simply looking for a job. The knowledge she learned over the years had passed on to her son as she spoke about her work with her family.

Another important example of the influence of women's environmental perceptions concerns one of the commercial fishing wives in Loreto. She herself was staunchly pro-conservation and was rather outspoken about it during the interviews I conducted with her. I was rather surprised, then, to find out that her husband was one of the worst offenders of park regulations since he regularly used unquestionably illegal fishing gear within the park boundaries. Interestingly, over the year I witnessed her husband go from being a commercial fisherman who worked as a security guard now and again to becoming a security guard who commercial fished now and again. The text of our interviews along with informal conversations with her and her husband showed her direct influence over the situation as she pushed him little by little to make that decision.

While this research project has produced some intriguing results, education level was not even one of the primary variables for choosing the study sample. Further research that focuses more on educational differences especially within commercial fishing households would be quite useful to tease apart the perceptions influenced by

cognitive biases and those influenced by personal household interests. Also, since this study was really concerned with understanding which women shared or at least understood and supported the park's cognitive models of conservation, an important follow-up study to the research done here would be to investigate the mental models of conservation of the women who did not seem to share or support the park's models. In this case that would be the women with lower levels of education. For practical reasons it would also be helpful to research the use of different methods of information dissemination with the purpose of targeting people with low levels of cognitive development to understand what methods are the most effective.

The effort expended by the park service to inform women about environmental issues and involve them in conservation activities is worthwhile as it should certainly facilitate the development of community support for formal conservation efforts. The results of this project encourage the questioning of some of the traditional community outreach theories and strategies as it points to the importance of the target audience's education level as an important factor in the communication process. Consequently, this research should be useful for protected area managers for developing effective community outreach programs and ultimately for involving women in conservation activities.

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