Analysis of Marine Resource Conflicts in Two North Central Chilean Fishing Villages

by

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Abstract for Susan Qashu, Marine Resource Management
Analysis of Marine Resource Conflicts in Two North Central Chilean Fishing Villages

In 1992, amendments to the Fishing and Aquaculture Law required rural communities to organize into syndicates or cooperatives and to create resource management plans. Once the Chilean Fisheries Service (SERNAP) approves these plans, villages could manage designated subtidal and intertidal areas. In response to these amendments, two villages, Puerto Aldea and El Totoral, sought the advice of Northern Catholic University's (UCN) biologists. Despite the UCN's educational campaigns aimed at limiting the catch, traditional fishermen's attitudes in these villages have not changed. The artisanal fishermen find ways of skirting the regulation.

From June 1997 to December 1997, I worked with UCN's extension crew to assess the multilayered cultural conflict occurring between stakeholders of differing interests. We used participant observation, individual interviews, and rapid rural appraisal activities to identify the conflicts affecting the communities of Puerto Aldea and El Totoral. This approach revealed interpersonal conflicts among the fishermen, between the fishing communities, and among agencies and fishing communities. A conflict of values occurs: one of technical knowledge versus local, indigenous knowledge. A resolution of these conflicts might occur when all parties involved collaborate: learn to listen, to observe, and to conscientiously respond to one another.

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Introduction

The Andes and the Pacific Ocean border Chile, a long, narrow, South American country extending over three thousand kilometers. A traveler in Chile is never far from the sea or the mountains. The Pacific Ocean and Andean high plains, "the altiplano," have been integral components of Chilean culture for centuries. The Chileans have integrated the ocean into their daily lives: they tell legends, sing, and dance about the sea. This composes their sea faring culture.

The Chilean culture is like an intricately designed Andean tapestry with multilayered and multi-colored fabric where the patterns give meaning to social life. This culture has many symbolic facets, including gender, age, or country (as well as many other aspects). This specific Andean tapestry or weaving is slowly being tugged at and unraveled by a host of stakeholders and communities of interest. The tapestry represents the marine resource; the tailors or the seamstresses of the tapestry represents the Chilean fishermen and other communities of interest such as the Chilean Fisheries Service (SERNAP), the Northern Catholic University (UCN), and the Institute for the Development of Artisanal Fisherman (IFOP), who are all key weavers of this fabric. When the seamstresses do not agree on the fabric, the color, or the design, an unraveling occurs: a cultural clash of values.

Conflict arises between the Chilean fishermen and other communities of interest. Once these traditional fishermen practiced subsistence fishing, and today, because of shellfish over-harvesting, they must abide by a fishing regulation which severely limits their catch. According to the fishermen, their tapestry has been cut, ripped, and shredded by outsiders. The outsiders feel

they are repairing a component of the tapestry, the marine resource, which is an integral part of their culture. The government and non-government agencies feel they bring scientific changes and new methodologies, new colors to integrate into the weaving. Thus, the following paper analyzes the "unraveling" which is presently occurring in this cultural tapestry.

This study reports on a marine-bound culture in conflict. I conducted a series of studies employing several methodologies with various key stakeholders involved in fishing resource conflicts in two villages (consult Appendix I). From June, 1997 to December, 1997, I worked in Chile's Region IV with the UCN extension crew, whose goal was to conduct outreach education projects with artisanal fishermen. Using participant observation, individual interviews, surveys, and participatory rural appraisal activities I gathered information about the conflict. The UCN extension crew needed assessments to identify the marine resource conflicts in order to understand and to advise the rural fishing villages in managing their marine intertidal and subtidal areas.

Several conflict theorists' assessment guides were used to bring specific aspects of the conflict into focus and to acknowledge gaps in the conflict. Because the conflict is intercultural and resource specific, I followed Wilmot and Hocker (1998), who suggest the use of several questions from each of their frameworks that appear to apply to this specific conflict (179). These were combined with questions from Walker, Daniels, and Means' "A Framework for Analyzing Natural Resource Conflicts and Disputes." Combining these frameworks helped provide insights into this particular Chilean conflict.

Orientation to the Conflict

Clash of Values

In community development work, there is a juxtaposition between science and technology and indigenous values. Contemporary Andean peasants express the knowledge conflict as "losing our ancestral knowledge because the technicians only believe in modern science and cannot read the sky" (Salas, 1994: 59). In Chile, indigenous fishermen experience this dilemma when scientists impose their marine resource management techniques. Artisanal fishing and modern science are conflicting value systems.

When values clash between traditional and modern worlds, conflict occurs. Fisheries have long been a part of Chile's history and culture. In the "traditional" world, Chilean fishermen have collected seaweed and shellfish in the tidepools and in the ocean by free diving for nearly two hundred years. Within this culture, the roles of men, women, children, and the elderly are distinct. Traditionally, the men fished offshore. Today, they dive for hours with compressors in subtidal areas. Only one commercial fisherwoman resides in the country and she dives with a compressor: "Maria" is an exception.[1] (See Appendix II) Usually, the women, children, and elderly are collectors of algae in the tidepools, the intertidal areas along the coastline. Generally, if the women are not collecting, they are taking care of their children and performing domestic chores. The elderly men of the village often have the "bends," decompression sickness, so badly that they cannot dive, so they collect algae and other intertidal shellfish along the coastline (see Appendix II).

Community Profile

A community profile of Puerto Aldea helped orient me to this rural fishing culture. The Department of Social Work at the Coquimbo Municipality provided their current survey results. In 1996, the social workers interviewed 113 Puerto Aldeans belonging to 34 Puerto Aldean families whose average yearly earning was approximately $5,086 US dollars. Seven percent of the men interviewed (heads of households) had no labor activity. Ninety-three percent (93%) of the interviewed men had their own activity, either diving for shellfish or buying shellfish. The percentage of women interviewed was small, showing four of them as heads of households. Of these households, fifty percent (50%) of the women had no activity, and fifty percent (50%) were retired.

According to the Coquimbo Municipality, twelve percent (12%) of the Puerto Aldean community lies within the extreme poverty level; forty-six percent (46%) in the lower poverty level; forty-one percent (41%) in a lower middle class; and one percent (1%) in the middle class level. The agency's interviews also tabulated the number of years of schooling the respondents had passed. In Puerto Aldea, twelve percent (12%) of the villagers were illiterate; twenty-six percent (26%) had completed through fourth grade. Forty-six percent (46%) of the respondents had completed fifth through eighth grade; and sixteen percent (16%) had completed ninth through twelfth grade. Of approximately sixty families living in Puerto Aldea, the municipal social workers interviewed only thirty-four of the more educated households.

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[1] Pseudonyms have been used to respect respondent privacy.

Puerto Aldeans are squatters like many of the fishing villages or *caletas* along this semi-arid coastline. Villages, such as El Totoral, "squat" on private land, but Puerto Aldeans sit on government land—military land. This community sits in the middle of a military zone, and the fishers cannot own the land until the military relinquishes ownership of the zone. Of the thirty-four families interviewed, ninety-seven (97%) percent of the residents were squatters who resided in the military zone for at least six months. Only one family interviewed rents from the landlord without any debts, meaning, that they are probably not renting the land space, but the housing space that they live in—the hacienda on the border of the military zone which is still considered Puerto Aldea (see Appendix I).

Although the survey is not a valid sample statistically, I used it as background information that helped me formulate survey questions for rapid rural appraisal activities. Furthermore, the social workers' interview techniques sensitized me to the fishing culture and its animosity towards government agencies. The municipal interviewers did not establish rapport with the residents. They hurried through the interviews while sitting in their cars or skipped the interviews and enjoyed the beach. Thus, the Puerto Aldeans were reluctant to answer outsiders' questions, so the interviewers sometimes created their own responses to the questions because they needed to demonstrate that they interviewed "x number" of respondents. Coquimbo's social service's survey helped me identify some stakeholders involved in the community, such as the Coquimbo municipality and the military, and their techniques gave me some insight into existing intercultural conflicts. For more detailed socio-economic

data concerning the study sites, please refer to the participant observation surveys in Appendix V.

Fishing Issues

Before the "modern" regulations, fishermen used to fish all over the country, harvesting indiscriminately, diving and fishing for as much as they wanted. In 1991, the Chilean Fisheries Service began enforcing stricter guidelines limiting fishermen to harvest in their region of residency. In the face of growing export demands from Asian markets, traditional fishermen found ways of "skirting" these regulations. In 1992, SERNAP added an amendment directed towards the artisanal fishers[2]. The amendment directed rural communities wanting marine-tenured areas to form cooperatives or syndicates that would submit management plans for local marine resources. Only after submitting a plan would SERNAP award rural villages exclusive management areas. Since most rural communities had high illiteracy rates, they sought outside help to write these plans. That same year, extension crews at the Catholic University in Coquimbo, Chile began working closely with two fishing villages: Puerto Aldea and El Totoral (see Figure 1). Despite the scientists' attempts to teach the fishermen management techniques, the attitudes of the fishermen did not change.

Today, many government officials feel that traditional Chilean fishermen have harvested indiscriminately, decimating large natural areas of endemic shellfish and algae populations. Traditional fishermen feel that regulation is

[2]Much of the PRA literature uses terminology such as fishers to denote fisherfolk, traditional/artisanal fishermen.

Northern Section of Region IV

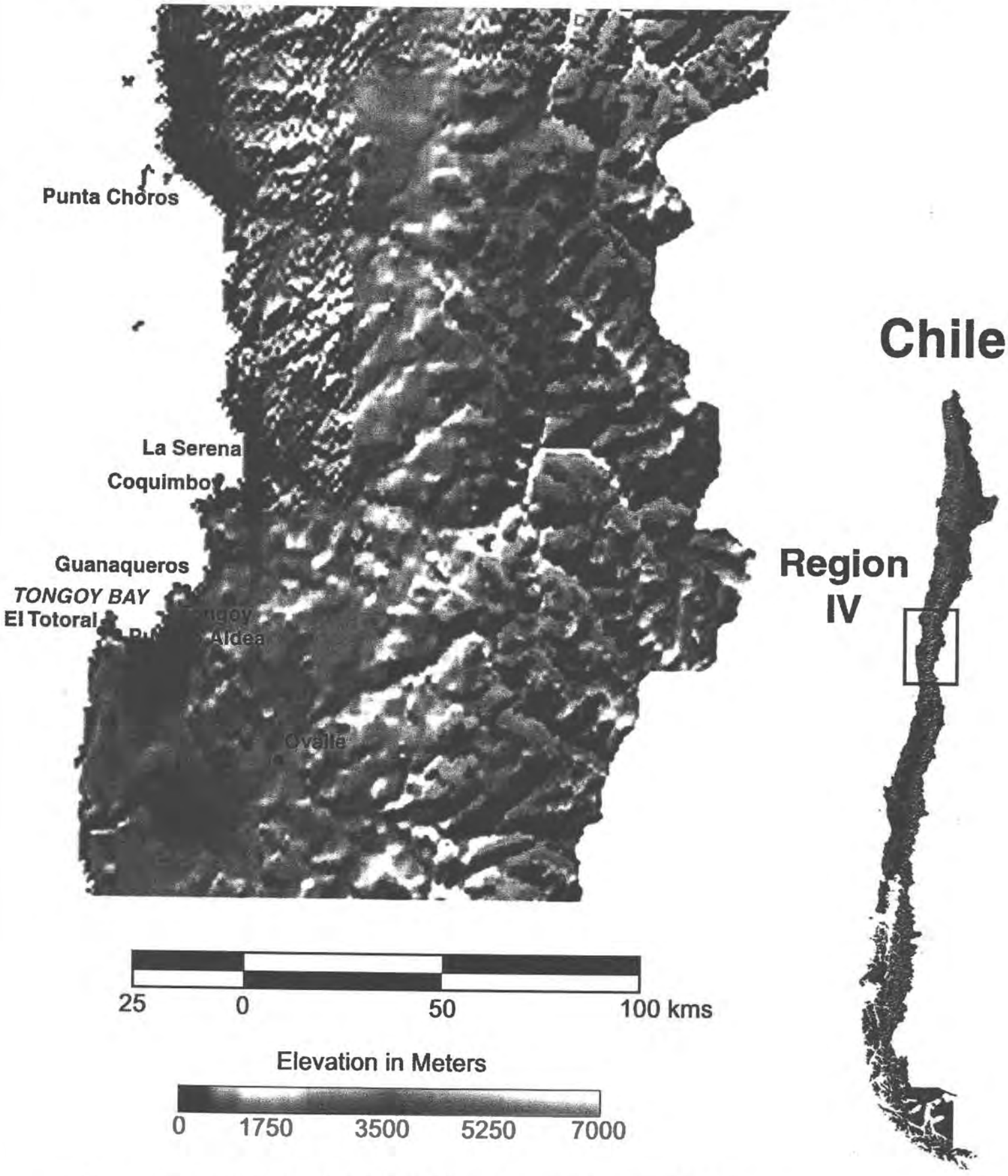

Figure 1: Location of UCN'S Study Sites: Puerto Aldea and El Totoral

unfair and should only apply to the commercial fishermen harvesting in large quantities. Through individual interviews, a survey, and participant observation, I determined that the fishermen have a negative attitude toward the 1991 fishing regulation and its 1992 amendments. They repeatedly narrated how some government official, sitting in his office, designed this regulation and did not consider the perceptions, customs, or traditions of the fisherfolk. This perception of the regulation changes with education: the more educated the fishermen, the more accepting of the regulation and the less violent the disputes.

Conflict is extremely complex in Chilean fishing villages because it is based on differing values: local indigenous knowledge versus scientific knowledge. Most of the fishermen are illiterate, with little formal education, while the scientists and government and non-government agents are educated. This creates different values among the parties. Further values analysis reveals that among the educated stakeholders, some come from military training (from Augusto Pinochet's dictatorship: 1973-1989) while others do not. This creates a clash in values among the policy makers: regimented *Pinochetistas* versus democratic *Freistas.* All these parties speak a different language: national security versus education, conservation versus preservation, and conservation versus economic gain.

Perhaps some of the authoritarian ideology of the military translated into the methodologies used by some agencies. Many of these institutions entered the rural villages, implemented their biological approaches in fisheries management, and ignored the role of the traditional fisherfolk. Spurred on by the 1992 Rio de Janeiro conference, scientists and development agencies became

interested in critical declines in marine biodiversity in North Central Chile. These Chilean non-government, government, and university teams wanted to diminish the decline of seaweed and scallop populations. A decline in the supply of marine resources translates into depressed incomes, which further encourages shifts to more destructive fishing techniques (Cruz, 1993). In this case, the university wanted to stop such a shift by changing the fishermen's behavior. The scientists proposed a new strategy for harvesting the marine resources in an effort to attain long-term sustainability of the marine ecosystem. During a sixteen-month period, the biologists tried to implement their management plans through non-formal education of the fishermen. For example, while diving with the fishermen, the biologists attempted to teach them to diversify their fishing practices and exploit alternate, non-traditional species. Thus, they attempted to impose their values from the "outside" world on the fishermen (local versus outside control).

Nature of the Conflict

Many government agencies have triggered interpersonal conflicts among the fishermen, among fishing communities, and among agencies and fishing communities. When the Chilean Fisheries Service detailed their 1991 regulation, the fishermen became angry because it was directed at the larger commercial fishermen, but it impacted when and what the small-scale fishermen could harvest. This legal document triggered violent fights between and within fishing communities. The regulation directed fishing cooperatives and syndicates to develop management plans, and, if approved, the respective communities could

receive their marine-tenured areas. Subsequently, the cooperatives and syndicates petitioned various government and non-government agencies for consulting services. Since the fishermen were poor, their cooperatives and syndicates had no money to pay the consulting agencies. Consequently, organizations such as the UCN and IFOP wrote grants in order to assist the fishing villages or applied for government loans for the fishing villages which sought their help. Thus, this management mandate, set by the Fisheries Service, spurred new relationships between agencies and fishing villages. The fishing syndicate of El Totoral cooperated with the University, and the relationship continues today (see Appendix II). This relationship spurred jealousy from its neighbor to the north, Puerto Aldea, because in 1997, El Totoral received a marine-tenured area, and Puerto Aldea did not (see Appendix III).

Many Puerto Aldeans feel that the UCN extension crew gave more attention to El Totoral's management plan; however, the UCN claims that this is not the case and that the underlying reason is the military maneuvers. The Puerto Aldeans "squat" on military land, yet the only road which connects El Totoral to outside markets is the road through the military zone. Once a year, the Japanese and US Navy join the Chilean Marines and Navy in what the extension crew calls "war games." During these lengthy periods, the villages again become isolated, and their shellfish rot. For the fisherfolk, the cost of transporting their product via boat to market is just too expensive. It is more cost effective to sit and wait until the military opens the roads. The isolation that the military creates rips at the tapestry, and the Navy can issue the fishing fines which create more tears in this pattern.

Fishermen feel that both the military and scientists are inflexible. These scientists continually suggested to the community how they should harvest the resource; however, they never directly asked the community members for their opinions. The community did not actively participate in the creation of the management strategies. The Puerto Aldean fisherfolk expected their lives to improve: they expected short term results such as more bountiful supplies of scallops. One fisherman interviewed describes how the university enticed the traditional fishermen to dive with the biologists. The biologists promised the fisherfolk that more of a variety of subtidal animals would appear, but the marine invertebrates and algae continue to decline.

Furthermore, interpersonal conflicts arose among the fishermen within their own village. For instance, historically, one family settled Puerto Aldea, which resulted in "nuclear" family disputes triggered by jealous relationships. This made facilitating cooperation among the stakeholders (individual fishermen and institutions) challenging. The UCN did not understand these disputes. When the biologists dove with specific fishermen, they fueled more bitter feelings among those who were not chosen. In another village, families which fell out of Puerto Aldea's "nuclear unit" immigrated to El Totoral. Consequently, El Totoral did not cooperate with its neighboring village to the north. The intercommunity conflicts are extensive in this situation, but by drawing these triggering events on a mind map (see Appendix I), I analyzed this dynamic system. The map illustrates the conflict in its multifaceted dimensions, where the communities of interest can observe the values clashes "spurred on" by triggering events, such as SERNAP's regulation, which "unravel" the conflict.

The biologists, however, are trying to shift to different ideologies and not be so rigid in their views. Today, these scientists, along with many Chilean biologists, feel that biological knowledge must integrate with other disciplines and enable fishermen to make their own decisions in order for conservation to be effective in the coastal marine environment (Stotz and Gonzalez, 1994). The UCN wants to begin this by understanding the conflict so they can adjust their strategies to change the fisherfolk's behavior.

As Wilmot and Hocker (1998) explain in Interpersonal Conflict, "rational exchanges of opposing views deteriorate in an emotion-laden interchange in which strong feelings, usually anger and fear, are aroused" (p. 41). To determine whether or not escalation in these situations is appropriate, the parties involved should analyze the conflict cycle and determine whether this cycle will be positive or negative. The UCN perceived that the conflict was spiraling out-of-control. Consequently, the extension crew felt that as a result of this growing escalation, their fisherfolk education outreach was not advancing. When I arrived in Coquimbo[3] (see Appendix III), the UCN wanted me to define the fishermen's attitudes towards the 1991 Fishing Regulation and 1992 Amendments because the biologists suspected that these documents were the source of the conflict.

I tried using Rapid Rural Appraisal (RRA), individual interviews, participant observation, and a group survey in order to quickly gather the information for the University extension crew. I found that the fisherfolk of El Totoral cooperated and collaborated throughout the RRA activities, the resource maps, time lines, and trend lines (see Appendix II). However, the Puerto Aldean fishermen were

unreceptive toward RRA methods. The only group activity that I could coerce them to complete was a group survey (see Appendix IV). Why? Several Totoraleans described how their small village needs to collaborate and cooperate in order to survive the recurring natural disasters which demolish the road. In addition, this road passes through a military zone, and the Totoraleans become isolated several times a year when the military practices their "shell-fire" sessions.

Through observation, listening, and interviewing in Puerto Aldea, I discovered that not only were there conflicts between the fishermen and the government, but conflicts also existed between the fishermen and the University. After I had established a rapport with many of the fishermen, they told me that they did not want to participate as a group because the University "always, just comes in, does the job, has the meetings when they want to, and then leaves. The marine biologists never really listen to us. They need to sit down and talk to us." Few of the fishermen associated with the Puerto Aldean fishing cooperative would try the activities. They claimed to be tired of the University's meetings which "never improved anything!" The fishers who participated in the group surveys regularly dove with the biologists. Even though the UCN views the escalation negatively, the cycle could become positive if the UCN realizes that they are a portion of the negative escalation cycle.

However, it is difficult to determine whether the escalation in any given situation is appropriate because escalation can be situation-specific. Some indicators of a negative conflict cycle are avoidance, chilling effect, and

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[3] The industrial port city about 70 kilometers north of Puerto Aldea, and the home of the UCN.

competitive escalation. Although the fishermen did not avoid the extension crew, they have become continually more reluctant to dive or to help the crew. The fishermen will think of any excuse not to join the crew when they measure the biological transects in the subtidal area in front of Puerto Aldea. Furthermore, both the fishermen and the crew "chill one another," which promotes the conflict. Both parties withhold criticism or grievances because they fear the other party's reaction. With this decreased level of communication, both parties become less committed to the project. The fishermen do not want to help monitor their proposed area with the biologists, and many of the biologists who were initially active during the onset of the program with Puerto Aldea have asked the supervisor of the crew, Dr. Wolfgang Stotz, for other assignments and projects with different fishing villages, such as El Totoral.

The communities of interest have made assumptions about the conflict that are evident by attitudes expressed during the interviews. For instance, stakeholders at SERNAP initially assumed that the fishermen would obey the law. The fishermen did observe the catch limits of their own villages, but they began raiding other villages. One such example described during interviews was Puerto Aldea's northern neighbor, Tongoy. Tongoy fishermen illegally harvest from Puerto Aldea's natural scallop embankment. Additionally, RRA resource maps reveal intercommunity conflicts occur between El Totoral and Puerto Aldea. The Totoraleans also travel outside their management area to harvest marine invertebrates and algae.

Not only did SERNAP assume that the fisherfolk would consider the law but also that the traditional fishermen's values were the same as the men who

wrote the law. Many other stakeholders make a whole range of assumptions about the fishermen. For example, the UCN extension crew assumes that the fishermen do not want to conserve the resources. Also, the middlemen who buy the shellfish assume the fishermen can not add, and they will try and cheat the fishermen out of the correct price. In both of the previously mentioned assumptions, the stakeholders presumed that because the fisherfolk had little education, they had little cognitive or analytical ability.

Many of the stakeholders have incompatible values which continue to tug at the tapestry. These attitudes comprise their goals. For instance, the UCN consists of biologists who collect data in order to support their hypotheses; many of them are ecologists who study a dynamic marine system. These marine ecologists developed a management plan which they thought would conserve the resource (if all their assumptions were taken into account). The Fisheries Managers at SERNAP received a lot of political pressure from the Chilean Ministries to maintain a viable economic resource for the export market (the Asian one). Many of the Fisheries Managers are biologists who finished their degrees at the UCN or a university with an equivalent marine biology program. These managers realized the importance of science to the management picture such as the recruitment rate of scallop larvae. They needed to know this information in order to advise the fishermen when to harvest shellfish.

Even though many fishermen do not understand the hard scientific facts like the managers and scientists do, they do understand the marine organisms because they have lived around them for a lifetime: technical knowledge versus local indigenous knowledge. What is incompatible with these parties is that the

fishermen do not understand the dynamic complexities of the system. They do not see external factors such as the Asian market or El Niño (see Appendix I). Many of them believe that the ocean will provide for them when she wants to, and this belief is an integral part of their culture.

On the opposite end of the values continuum sits the military. The military's attitude is also "off the deep end" for many well-educated people. Much of the Chilean population harbors animosity towards the military. The dictatorship affected many families: scientists, managers, and fishermen. The Navy, Marines, and Army use the military zone which Puerto Aldeans "squat on" for target practice. The Armed Forces feel that without this practice, they cannot be prepared for war times. The officers give commands, and the young Chilean militia follow orders. They want to protect their country, and the military participants have a strong sense of national pride. Some residents say the military is square and rigid, like machines.

Complicating the situation further, organizations and communities of interest have become interdependent. For instance, SERNAP depends on the Armed Forces for law enforcement; they no longer work with the fishermen. The fishing cooperative of Puerto Aldea and the syndicate of El Totoral, respectively, have become dependent on the university's help. The fishing cooperative of Puerto Aldea does not function without the presence of its president, Juan Perez. In Puerto Aldea, the former creates a lot of interpersonal conflict. When problems occur in a fishing village, such as Puerto Aldea not receiving its tenured area, the cooperative blames it on Perez. They say that he does not try hard enough, that he has left town, that he never attends the meetings, or that

he is never in the village, so he doesn't know the people's problems. Perez became so frustrated with this criticism that he and his family left the village.

Before the arrival of Silvia and Juan Perez, the village had little infrastructure, extreme poverty, and no organized fishing. With their arrival, the village's economic situation began to change. Perez formed the fishing cooperative and moved the fishermen to seek economic aid from non-governmental and governmental agencies. He became president of the cooperative, and through the UCN's help, the fishermen began working with extension crews. Juan and Rosa Perez were the intermediaries between the village and the outside world.

However, much jealousy existed towards the Perez family. In an interview, Rosa Perez explained how native Puerto Aldeans did not easily accept "outsiders." She felt her ability to overcome petty jealousies improved the lives of many people. Because of her initiative, the municipality built a medical post, a church, and a town meeting center. Today, the Perez's interest in helping the Puerto Aldeans has plummeted. Perez says that he will not spend much more of his time helping people who will not fight for themselves.

Not only have personal factors, such as these jealousies, affected the nature of the conflict, but the roles of goals, power, styles, and tactics also contribute other complexities to this intercultural conflict. When parties have differing desired outcomes (goals), differing relationships (power), and differing styles and tactics, these factors influence the dimensions of the conflict. The roles that goals, power, and styles and tactics play provide an essential framework for assessment.

Goals

From the Fisheries Service to the University to the Armed Forces to other government and non-government organizations, the goals of the various agencies differ and begin to wear at the weaving of the cultural tapestry. One community of interest, SERNAP, monitors the local rural fishermen who are illegally harvesting subtidal shellfish. SERNAP attempts to work with different government agencies such as IFOP, the Navy, the Coast Guard, the UCN, the Federation of Fishing Cooperatives, and other government and non-government organizations. For example, if SERNAP finds that the local fishermen are illegally harvesting or harvesting over their limits, they ask for help from the Coast Guard, which has the authority to fine the fishermen.

Another party, the scientists at the UCN, monitors the shellfish population and hopes to maintain biological diversity. The extension crew at the UCN also has the goal of educating the fishermen. They believe that if the fisherfolk understand the importance of biodiversity, they will help preserve the population. However, the biologists' strategies for adult education were neither interactive nor collaborative. The crew lectured to the fisherfolk with overhead transparencies (which most of the fishermen could not read) instead of using interactive teaching methods or integrating the fishers' local knowledge into lectures. The community members claim that they did not actively participate in the creation of the management strategy. This event did not improve the life of the people. Thus, the fishermen's and the scientists' views differed. However, when SERNAP released the 1992 amendment, the fishing syndicates and cooperatives realized that if they wanted their marine-tenured areas, they had to

conserve the resource or manage it with a biologically sound method. Although their initial goals differed, today, the fishermen's goals are more "in sync" with the scientists.

Many of the goals have more of an individual focus than a dynamic systems focus. Conflicts arise because many of the directors and presidents of various government and non-government organizations focus on what they want or what they feel is best for their institutions. They do not focus on what the fishermen want, nor do they focus on consensus or the community; there is little collaboration with the fishermen. Moreover, upper level officials make many of the management decisions.

Power

In Interpersonal Conflict, Wilmot and Hocker (1998) describe power as a dynamic product of shifting relationships (p. 96). For instance, the president of the Fishing Cooperative, Juan Perez, once held a position of power, but today the mayor is the power-holder, the authority, in the fishing village. Rumors are spreading about how times were better when Perez was "in charge," and soon the authority may shift again. Wilmot and Hocker (1998) also explain how many references on power take the individualistic approach, so one assesses power by examining the resources that one party possesses. Such an example exists within Puerto Aldea. The mayor and all his children own more resources, such as boats, fishing nets, compressors, wetsuits, and other dive equipment, than any other resident in town. Thus, among the fisherfolk, the individual boat owners such as the mayor and his family hold power over their neighbors who

work as their employees in the boats. For instance, while the mayor is underwater fishing, a neighbor[4] might run the compressor, navigate, or scull the oars while waiting for the boss to ascend. Since power is the control of resources, having an under-standing of who controls what resources is important.

In addition, Wilmot and Hocker also explain that "power is a product of the social relationship, not an attribute of the individual and it grows from mutual dependencies" (p. 109). The fishermen realize that they are dependent on many parties, and these rural people were extremely open about who holds the power. Some examples which they gave were "without the military, we would have no roads"; "without the university we would not even be considered for marine tenure," "without the Regional Department of Ports and Harbors, we would have no dock or no consistent repairs"; and without SERNAP's authority, "we could not enforce their pilot marine-tenured area." While the fishermen openly express their dependencies, other government agencies hesitate to express their dependencies on other parties.

One exception among the government agencies is the Director of SERNAP's Region III and IV, Leonardo Nuñez, who openly expresses his position of power and his agency's dependencies. He describes how he and the fishermen have differing ideologies which are intangible factors affecting power. His organization enforces the law or delegates another organization such as the Coast Guard or Navy to do so. He tends to form a coalition with the Armed Forces when he enforces the law, which creates more interdependence between

[4] Among Chilean fishers, *Telegrafistas* are the employees who perform this function.

these government agencies. Although Nuñez shares the power with law enforcement activities, he individually asserts his power through his political appointment as Director. Thus, depending on the definition, power can be tied more to the individual or group-centered. Nuñez, as an authority, holds the right to command and direct. He holds political power. In this power position, the Director views his skills and knowledge as much more advanced than the fishermen do. In resolving these disputes, the Director of SERNAP has another source of power--sanctions--and through these, he can enforce obedience and compliance. To collaborate with other organizations, the Director needs to realize that his ideas are not the only ones.

Applying this idea to the two rural villages, Puerto Aldea tends to define power individually while, unlike the Puerto Aldean community, El Totoral's power is shared by the syndicate. The president of the fishing syndicate is a woman, and "Julia" believes that external hardships have forced her community to work as a group. The villagers are dependent upon one another because of a severely disabling infrastructure. In summary, a literature review shows how parties can assert power individually or collectively: Puerto Aldeans recognize it individually while Totoraleans recognize it collectively (Koester and Lustig, 1999).

Power imbalances can be also observed between fishing villages and within the organization agency which negotiates the disputes. Fishing villages with more natural resources and infrastructure will try and dominate poorer villages. For instance, rural fishermen from Tongoy, who have more plentiful infrastructure resources, such as boats, will illegally collect scallops at night from the neighboring village—Puerto Aldea's subtidal area. If the Puerto Aldean

fishermen who are on night patrol catch the Tongoy fishermen stealing from their subtidal area, violence escalates. As a result, the Puerto Aldean fishing cooperative will call for the Director of SERNAP to negotiate. In this instance, Nuñez claims that his agency practices negotiation because the conflict is violent; thus, he sends a SERNAP representative to resolve the dispute. However, the SERNAP biologist represents SERNAP's interests. Nuñez claims that he does not want to lose face, so he sends other employees.

The Director told me that he feels that in order to have authority over the fishermen, he must maintain face, and so avoiding the situation and sending a representative to do the "dirty" reprimanding is more in his favor. This way, the cooperatives of fishermen (even the ones who were illegally collecting from Tongoy) view him as a decent Director, and they are more inclined to listen to him when violent disputes occur between communities. Nevertheless, all of this delegation creates interpersonal conflicts between him and his SERNAP employees. Like many Chileans in governmental positions of power, Nuñez does not communicate well with other agency colleagues. This creates more distrust among the agencies which must work with SERNAP.

In some respects, Nuñez is balancing his position of power. He delegates his power to others in the agency so that they can exert authority. Even though he tries to maintain face with the fishing villages, he is engaging biologists in his organization to act as authorities. Nuñez is empowering the low-power party. Although SERNAP does not engage in many power-balancing techniques, the agency's power imbalances are not as destructive as those of the fishing communities. Puerto Aldea's power imbalances have become destructive

because too many intangible factors such as pride, jealousy, and anger affect interpersonal relationships, resulting in the fishing cooperative no longer functioning effectively. Within the Puerto Aldean community, a balance, like El Totoral or SERNAP, needs to occur. In summary, Wilmot and Hocker (1998) write that "power balancing can restore productive conflict management, limiting the power of the high-power party: focusing on interdependence, persisting in a calm manner, staying actively engaged, empowering the low-power party, and metacommunicating well are power balancing techniques" (p. 109). However, these conflict theorists describe their ideas of power in a different cultural context. For this marine resource conflict, the styles and tactics inherent in Chilean culture must be considered.

Styles and Tactics

Because of Chilean culture, most of the directors of government agencies with a vested interest in the marine resource try to maintain face. Saving face is a characteristic of the culture. Additionally, since power is held by multiple authorities such as the Dean of the UCN, the President of the Fishing Federation, and the Director of IFOP, these power authorities do not share "their" information (i.e., there is little, if any, "horizontal" sharing of projects/research), which results in interagency disputes.

Another strategy which the traditional fishing communities employ is resorting to violence in order to settle a dispute. For instance, Tongoy, the village to the north of Puerto Aldea, which is heavily influenced by tourism and commercial fishing, does not cooperate with surrounding villages. Tongoy's

recalcitrant fishermen have also illegally harvested neighboring villages' catches. These "neighbors" will resort to fist and knife fights if they catch the Tongoy fishermen in their territories. The Armed Forces and SERNAP use different tactics to manage violent escalations such as these.

The Director of SERNAP admitted he enjoys negotiating disputes, but he does not like playing the role of "the fish police" (whereas, the Armed Forces do not mind playing police). Nuñez said that he likes helping with these inter-village disputes; however, he does not like "busting" the individual fishermen, fishing syndicate, or fishing cooperative. He claims that he is not a mediator because he cannot remain impartial. These are conflicts he tries to avoid, and he tries to send one of the other Fisheries biologists to manage the disputes. In these instances, Nuñez saves face when he steps back from his position of "fish police" and delegates it to another in his agency.

He views conflict management as positive in violent disputes. However, with shellfish "catch" disputes, Nuñez stated that there is no long-term management, "only a definitive resolution because the law limits the quota of shellfish caught." The Director is different from many Chileans because he confronts the particular conflict frankly, and this behavior is not typically Chilean. Most Chileans "skirt" around issues and indirectly approach them through jokes. Although, as mentioned earlier, Nuñez has his own techniques for saving face, generally, he asserts his views towards a particular conflict. "This," he said, "is what got me in trouble during the military regime! I could never keep my opinions to myself." He can be, as Rubin and Sanders (1991) describe, a stubborn and argumentative Latin American negotiator (p. 252). Nuñez has

preconceived ideas about the traditional fishermen, and he is not aware of his biases and predisposition toward these people. He needs to become more aware of the norms and culture found in the rural, coastal fishing villages in order to improve his management techniques for resolving the reoccurring disputes. Power and reputation are essential parts of Nuñez's conflict and dispute resolution experiences.

Leonardo Nuñez's communication style has caused some friction. He has made enemies, and he claims that he does not care. Nuñez has alienated IFOP and the university because he does not collaborate. He describes how he wants to help the resource as best he can, and the only way that he can do this is by the authority he holds. Nuñez claims that he does not care because his appointment was political, and once the new government takes power, he will have to relinquish his position of authority to a new Director.

Nuñez explained to me that in Chile, a mediator is called *el hombre bueno,* which means the good man. *El hombre bueno* is impartial and does not side with any one party. He explained that he is not a good man, but a negotiator who will always side with the party who obeys SERNAP's policies. This, Nuñez claims, makes collaboration with other agencies challenging because many of them do not agree with SERNAP's regulations.

Methodology

During the winter and spring fishing seasons of 1997, the UCN extension crew and I conducted participant observations (refer to Appendix V), individual interviews, a group survey, and participatory rural appraisals (PRA) and rapid

rural appraisal (RRA) techniques to uncover the artisanal fisher's views concerning their marine environment. During the course of initiating these methods, not only did we learn about their local knowledge, but the activities also revealed the multi-dimensional complexities, including interpersonal, social, cultural, and organizational levels of this marine resource conflict. Therefore, identifying these conflicts through the activities should help the UCN better advise rural fishing villages so that the fishers can effectively manage their intertidal and subtidal areas.

During my brief stay in North Central Chile, I observed the people and their attitudes for four months and found the Puerto Aldeans more open to individual interviews than group activities, whereas El Totoraleans collaborated as a group. These individual interviews helped me initiate a brief group survey with the Puerto Aldean community. With the extension team's help, I conducted the survey in person because many of the fishers are illiterate. We announced the "survey night' as well as posted signs--"come answer some questions and you might win a prize!" We tried to develop non-biased questions with at least one open-ended component and limit the survey to basic information. The following is the survey (translated from Spanish) which I pre-tested on a willing range of Puerto Aldeans who represented potential respondents. Forty-one Puerto Aldeans participated in the survey, but I was trying to obtain one-hundred participants (see Figure 2).

The extension crew and I found that the directions were easier to give verbally to the Puerto Aldean participants. Throughout the interviews, I had identified the greatest conflict as one concerning management of resources,

Are you: woman___man___child___?

In what fishery do you work?
___Diver
___Compressor Operator
___Fisherman
___Fisherman's Assistant
___Shoreline Diver
___Shoreline Collector
___Other

Are you a member of the Fishing Cooperative? Yes___No___

Are you registered in Region IV? Yes___No___ (If not, in what Region?___)

Do you think the Fishing and Aquaculture Law is affecting you? Positive___Negative___No opinion___

Indicate in what way it is affecting your community:

Of all the institutions which have helped your community, which one has been the most helpful?
__Universities
__Government institutions such as the Municipality
__Non-government institutions
__Other

Figure 2: Group Survey

where at least three communities of interest are involved: the fishermen, the Chilean Fisheries Service, and the Armed Forces. The intent was to develop a needs assessment survey which would be used to solicit public opinion of community problems and some possible solutions. We designed this sample survey to avoid including emotional or biased words. The questions had to be very specific in the beginning and easy so that we could draw the respondents'

attention. Our questions also needed to produce credible information, and the respondents needed to be able to answer the questions.

We wanted the respondents to participate and provide information; for instance, what do Puerto Aldeans do, and what are some of their attributes? We also wanted to address the Puerto Aldeans' attitudes or beliefs towards the Fishing Regulation. Consequently, while designing the survey, the crew and I "built-up" to an open-ended question because we knew it would be demanding for the fisherfolk. We had decided not to use close-ended statements with ordered choices. This strategy would frustrate many Puerto Aldeans because they have difficulties weighting or ordering their choices in daily life[5]. Thus, we decided that close-ended questions with unordered responses would be more effective.

Consequently, I saved questions which referred to specific events over a long period of time for the individual interview. Likewise, the open-ended questions from the initial survey were best for future focus group activities and other exploratory questioning. Since the Puerto Aldeans tended to be a more individualistic group which did not enjoy performing activities together, I used many of these open-ended questions with another fishing community, El Totoral. Thus, the open-ended questions which evolved from the Puerto Aldea survey were incorporated into RRA activities which I used during sessions with the Fishing Syndicate of El Totoral.

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[5] The crew determined this through years of working with the fishers, and I observed this during my interviews and observations.

The second series of qualitative data collection occurred in El Totoral. All of the PRA and RRA activities began with an explanation, followed by a short work period, and concluded with a discussion section. For instance, in El Totoral, we divided the fisherfolk into four groups for an open-ended time line activity. We divided elderly and illiterate participants equally among the groups. After explaining to them that they needed to express what was important to them in the past, we asked the elders to identify events that shaped and influenced individual and community activities. These discussions stimulated exchanges concerning problems and achievements from the elders' era to present day (see Appendix V[6]).

We also used another RRA activity to determine the El Totoral residents' perception of changes in marine resources over time (see Appendix IV). Again, we divided the community members into groups, and they began a work period where they plotted their natural resource abundancies over time (see Appendix II). When the groups presented their trend line, discussions ensued concerning resource availability and its use over time. While the list of resources varied within El Totoral, depending on what the villagers and the team deemed important, a core set of trends included algae loss, combined with decreased *loco*[7], razor clam, mussel, sea urchin, and limpet populations.

Not only did the extension crew and I learn about changes over time in the natural resource sector, but we also conducted a time line of natural disasters and their degree of severity over the past fifty years (see Appendix IV). All four

[6] I translated the fisher's responses from the El Totoral Group Survey (found in Appendix V) as close to their Spanish context as possible.

of these frequency discussions identified key problems: the global conflict of fishers versus government organizations. For instance, when severe earthquakes, flooding, and mudslides occurred in 1997, the Chilean Federal Emergency Management Agency (OMNEMI) did nothing for these villages. Following these complaints, a discussion continued about how the villagers could improve the situation for themselves (see Appendix II). For instance, they proposed petitioning the Department of Transportation for construction of a road leading to El Totoral which would skirt the military zone. Another group claimed that a wealthy developer had bought the land directly east of the village, and that this man would build a road, so that in the future there was no need to worry.[8]

The time analysis is beneficial because it focuses the community's attention on historical positive and negative changes. It identified the frequency and severity of natural disasters. For instance, in terms of traditional resource practices (subsistence fishing before the demand for intertidal resources grew from Asia), the syndicate described how they continually had enough food to support their families. The fishers also illustrated how, historically, government conflicts (little help during disasters) compound negative feelings toward government agencies. These RRA trend lines are necessary in analyzing the conflict because they include the themes which people consider important. The direction of the trend is significant even if the change cannot be quantified or is statistically inaccurate because it shows how villagers view their ever-changing

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[7] The loco, *concholepas concholepas,* is endemic to Chile. It is a giant gastropod that looks like an abalone. It is a threatened species, yet there is a high demand for it in Japan and Korea.

[8] Along the Region IV's coastline, unrestricted resort development occurs along beach areas. If the development begins at El Totoral, the developer will need to build a road from the Pan-American Highway 5 west towards the Pacific.

situation. Finally, the process of discussing the trends of resource use and the trends of natural disasters in different groups brought out important interorganizational management issues.

Results

The global events and microevents that best characterize this conflict are fishermen versus government, and within these events are nested interpersonal conflicts among the fishing communities, the disputes from village to village, within the village itself, and between "outsiders" and "insiders." Furthermore, many stakeholders who have worked with the villages claim that the escalation, sometimes, has spanned decades, and feuds among families make the conflicts difficult to resolve. These stakeholders claim that the tone of the conflict erupts in violent disputes between villages if one fishing community crosses into the territory of an adjacent one without permission.

Not only did the individual interviews with stakeholders uncover issues concerning power, but problematic styles and tactics surfaced in these interviews and throughout the PRA activities, especially during discussions of the time line of natural disasters. For example, when violent weather conditions occur as a result of El Nino, the Director of the Department of Ports and Harbors does not want the fishers to view him negatively, so he sends a co-worker. The Director saves face; however, this event fuels more anger of the fishers toward government organizations.

For Chileans, maintaining face is essential with conflict at work, at home, and at play. Saving face is an integral component of Chilean culture, especially

where conflict management is concerned. According to the Director of SERNAP, the President of the Puerto Aldean Fishing Cooperative, and the Dean of the UCN's Biological Sciences, *face* may be important, but so is acknowledging other people's culture when issues are in dispute. As Jacob Bercovitch (1991) explains, disputes can be ideological, which can exemplify disagreements over basic values or beliefs (p. 24). The fishermen's beliefs and values constitute their culture. Many of these communities of interest neglect this dimension during what Bercovitch terms "negotiation". They should not neglect their culture because it could affect the negotiation's outcome. As Rubin and Sanders (1991) describe, "culture is a profoundly powerful organizing prism, through which we tend to view and integrate all kinds of disparate interpersonal information" (p. 249). In these rural *caletas,* the communities of interest have neglected the fisher's local culture.

The outside stakeholders forget that these rural people perceive events differently. The RRA group activity and PRA participant observation results illustrate some of the Totoraleans' primary problems such as "fishing access being limited during military war games where their boats cannot even pass" (see Appendix V). Furthermore, the PRA resource map activity triggered discussions concerning nebulous boundaries and illegal access and confusion (see Appendix IV). The fishers explained that the government agencies in charge of enforcement do not calmly and patiently teach the fishers where their designated territories begin and end. Some of the Totoralean elderly fishers described how the ocean should have no bounds for the poor, rural fisher trying to survive for subsistence. During some of the focus sessions, they exclaimed,

"Those boundaries should not be for us, but for the commercial fisher, doing business with people across the Pacific!" Although these resource maps are not accurate geographically, they are important because they initiated lengthy discussions among the fishers concerning territorial resource conflicts. The activities demonstrate the fishers' perceptions of events, resources, and territories affecting inter-community conflicts.

Through the PRA and RRA activities in El Totoral and the individual interviews in both villages, the UCN crew and I hoped to identify the resource management conflicts in these North Central Chilean *caletas.* Throughout these qualitative methods, we thought we could obtain accurate data concerning fishers' attitudes towards the 1991 Regulation; however, we found this not to be the case. Many difficulties arose with the survey. First, the sample size consisted mainly of women who were not members of the Puerto Aldean fishing cooperative. Second, the Puerto Aldeans did not understand the phrase "affecting you positively or negatively." Moreover, although we tried not to bias the survey, the last question placed the University as the first choice among the options (see Fig. 2).

Even though the Puerto Aldea survey results were unreliable, they helped me identify more open-ended interview questions for subsequent activities with the fishers (see Appendix V). I used many of these questions while conducting observations and interviews. By using these questions, I learned who were the stakeholders, how they were organized into various communities of interest, and what their relations and conflicts were with the fishers (see Appendix I). For instance, the fishermen are organized into a fishing cooperative in Puerto Aldea

in order to manage their marine resources. The short survey conducted in Puerto Aldea was directed toward the fishing cooperative members because of their reticent attitude towards government intervention and *outsiders*. Even though the survey was brief, it revealed some of the fishers' values such as a *maximizer* attitude towards resource extraction. In addition, the survey added anonymity, which allowed women to openly express opinions which they might not otherwise have done (Thomas-Slayter and Rocheleau, 1995).

In summary, the short survey began leading me on the trail of an assessment of resource conflicts in Puerto Aldea. Unfortunately, this community was not willing to participate in group activities like the other village, El Totoral. With my limited time, I was only able to conduct one survey.[9] A productive result from the survey was the open-ended question. This question was demanding for the respondents, and it required more thought and time. The question produced many different responses which only briefly mentioned any one topic. From these "brief" topics, I was able to expand on the themes during subsequent interviews with some of the more "talkative" fishers. Even though the open-ended question did not provide accurate measurements of consistent, comparable information across the sample of Puerto Aldeans, it did open avenues for more questions during the individual interviews and PRA activities. The crew and I found that the fishers responded more effectively to social science participant activities conducted verbally than the survey. The fishers

[9] I tabulated the responses from this survey, and a stacked bar graph illustrates the results (see Appendix IV).

were inclined to share their opinions concerning the conflict because they felt their voices were being heard.

Attempted Solutions and Recommendations

Some of the poorest communities in Chile are the fishing villages that lie next to large urban growth areas.[10] As much of the literature suggests, there is a high correlation between population, growth, poverty, and resource degradation (Ferry, Brakes, MCI, and Acheson, 1990). These variables have pushed the concept of sustainable development in marine resource use in Chile. The need to ensure that renewable resources are not overexploited and are rationally managed has led to increased efforts to find innovative solutions for improved marine resource use. In fisheries, much attention has been focused on increasing the involvement of participant users, and, who are the major beneficiaries of critical decisions, in determining how and at what rate marine resources should be exploited (Dodulman, 1983). Although Dr. Stotz and his team proposed introducing new strategies for harvesting the marine resources in an effort to attain long-term sustainability of the marine ecosystem, they did not build on traditional customs and practice. Some Social Science literature suggests that such an approach is more likely to be accepted in fishing communities and give increased legitimacy (Cordell, 1992; Pastner, 1977).

The extension crew became frustrated with the adult fisherfolk, and they became influenced by UNESCO's Agenda 21, believing that their focus should be future generations and environmental education. Before environmental

[10] El Totoral, Puerto Aldea, Tongoy, and Guanaqueros lie near Coquimbo (refer to Appendix III).

education begins with schoolchildren, the marine biologists should try a more participatory method for understanding conflicts in order to design management strategies among adult fishermen. Much of the literature reviewed suggests it is rare for fisheries management to be defined solely in biological terms; as this Chilean example suggests, social and economic factors should also be included (Pommeroy, 1991; McGoodwin,1990). The reason is obvious, this capture fisheries management--as opposed to aquaculture--is aimed at people, not fish. As a result, it is fishermen who are subject to regulatory measures and who must live with their consequences (Jentoff and MacCay, 1995).

Current literature cites participation as an essential ingredient of effective conservation and natural resources management. Participatory methods of social assessment are fundamental to a project's success (Byers, 1996). This addresses a flaw in the Puerto Aldea Project: without community participation, a behavioral change may not occur. The artisanal fishermen are more likely to manage their resources wisely if they are given an active role in the planning and implementation process (Jacobson, 1995). With increasing pressures in North Central Chilean coastal fisheries, conservation of marine ecosystems will depend on community participation and support.

Last year at the UCN, I had the opportunity to attend a forum held for the traditional fishermen. This workshop was an opportunity for the fishermen to voice their opinions about the various communities of interest. Many of the traditional fishermen, represented by the Fishing Federation, listened patiently to the different stakeholders from the agencies; however, when the fishermen tried to speak directly to that particular agency's stakeholder, he did not listen. As an

observer, I watched this occur repeatedly during the three-day workshop. When the workshop ended, one of the cooperative fishing presidents turned to me and said, "You see, they do not listen to us!"

The organizations that work with the villages should collaborate with the fishermen. One solution might include a cooperative management plan whereby the communities of interest, such as the UCN, SERNAP, IFOP, the Armed Forces, and the Fishing Federation, collaborate with one another. Since the communities of interest do not listen to the fishermen, I propose that these agencies meet with the Artisanal Fishing Federation and a non-partisan facilitator. Furthermore, the stakeholders and communities of interest should require a workshop whereby all stakeholders learn better communication skills or refine the ones they have. For instance, at this workshop, they could refine their listening skills and attend cultural sensitivity and conflict resolution seminars. In addition, at the proposed workshop, partnerships could be proposed in an open forum (to minimize jealousies). Unlike the UCN workshop where the fisherfolk sat facing an overhead projector and the government and non-government leaders sat in the front row, this workshop could be organized for equality, seating all participants in a circle.

Although surveys have demonstrated that the perceptions of the 1991 regulation by traditional fishermen change with education, the education of the adult fishermen is problematic because many of them are illiterate. When the university teaches them management practices with overheads or videos, they cannot read the charts and diagrams, so they do not understand. Thus, the

university and other organizations need to perform more interactive and participatory activities.

Finally, communities of interest cannot implement any of these proposed recommendations without funding. A neutral funding source is necessary, yet finding a Chilean source of funding which is not tied to the fishing industry will be challenging. Perhaps an outside agency such as Inter-America could supply purse strings for funding facilitation, workshops, and continued seminars for all affected people.

Conclusion

Solutions to the conflict are problematic because of institutional versus individual differences.[11] Chilean stakeholders and communities of interest have tried many management options, but these options have been filled with tremendous conflict. Because of differing goals and differing balances of power within the various agencies, consensus building has not been possible. Much of this is due to maintaining face and not sharing information among the communities of interest.

The stakeholders and communities of interest perceive differing options for change. For instance, the uneducated "traditional" fishermen feel that the fishing regulation needs to apply only to the commercial fishermen and not to the small-scale traditional fishermen. Both educated and uneducated fishermen feel that their views need to be acknowledged. Further, the philosophy that characterizes the conflict is one of power imbalances. Thus far, regulations and

sanctions are the only system regulations that have been used. The technique of cooperative management might be used productively by the system; however, the greatest obstacle the Chilean people will have for the successful implementation of a cooperative management program is a horizontal sharing of information among the communities of interest. In Chile, little of this horizontal information sharing occurs because people are envious and jealous that someone else might advance ahead of them on the career ladder. Anger could be managed more productively if the communities of interest met in open forums with a facilitator to discuss the conflicts. The traditional fishermen are not shy, and they do not have difficulties expressing their feelings, given the opportunity. This way, many parties will feel that they are being heard and that their opinions might be considered. Perhaps through these measures a consensus could be met among the communities of interest.

A cooperative management plan will have to be slowly adjusted to this Chilean reality. An Applegate Partnership, Alaskan Native Whaling, or Swedish Fisheries models are, perhaps, further down the road. Cooperative values in this cultural context will be challenging to implement because of existing power imbalances. However, now that Chileans have experienced nearly ten years of growing democracy, workshop participants could establish an equality of voices, share power and responsibility, and respect the values of others. Perhaps with the evolving democracy, beliefs will change, and attitudes will shift along the values continuum from individual to group, from self to community, enabling more equitable systems of resource management.

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[11] Chilean women refer to this continuum as Chilean *machismo* pride.

The fabric and threads of this inter-cultural tapestry need to be saved by the many stakeholders and communities of interest. They need to try re-integrating these pieces into the fabric. Perhaps the different parties could choose different colors or different materials; this way they could reach a consensus so that an integrated, whole tapestry could be created. As mentioned earlier, the essence of this marine resource conflict is a clash in values between the various stakeholders. Because of the many hands pulling at the fabric, no absolute resolution can be met; however, a consensus or cooperation might be reached.

By thinking of the conflict metaphorically and creating a relationship between a tangible object, the fabric, and an intangible concept such as culture, I was able to distinguish interpersonal relationships between the scientists, the fishermen, the fisherwomen, the schoolteachers, the military, the land developers, the commercial fishermen, and the governmental and non-governmental agencies. I also observed a host of intercommunity conflicts from fishing village to fishing village and from the UCN and other community institutions toward the fishing villages.

This conflict is a multilayered, cultural one where the participants range along a spectrum of well-educated scientists and managers to illiterate fishermen. Furthermore, the cultural context is polychronic and high context where the stakeholders are individualistic. When conflict arises, they practice avoidance to save face. A path toward resolution of the conflicts will begin when all of the stakeholders working on the tapestry learn to listen, to observe, and to conscientiously respond. Currently, a methodology needs to be implemented

whereby scientists observe, listen, and learn the rural fisherfolks' values through participatory rural appraisal techniques. Choosing a particular method depends upon the goal, the situation, and the participants. Hopefully, the use of a wide range of methods will help scientists and government and non-government officials understand which factors influence critical behaviors, including neglected socio-cultural ones within this Chilean tapestry.

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APPENDIX I

DIAGRAMS AND TABLES

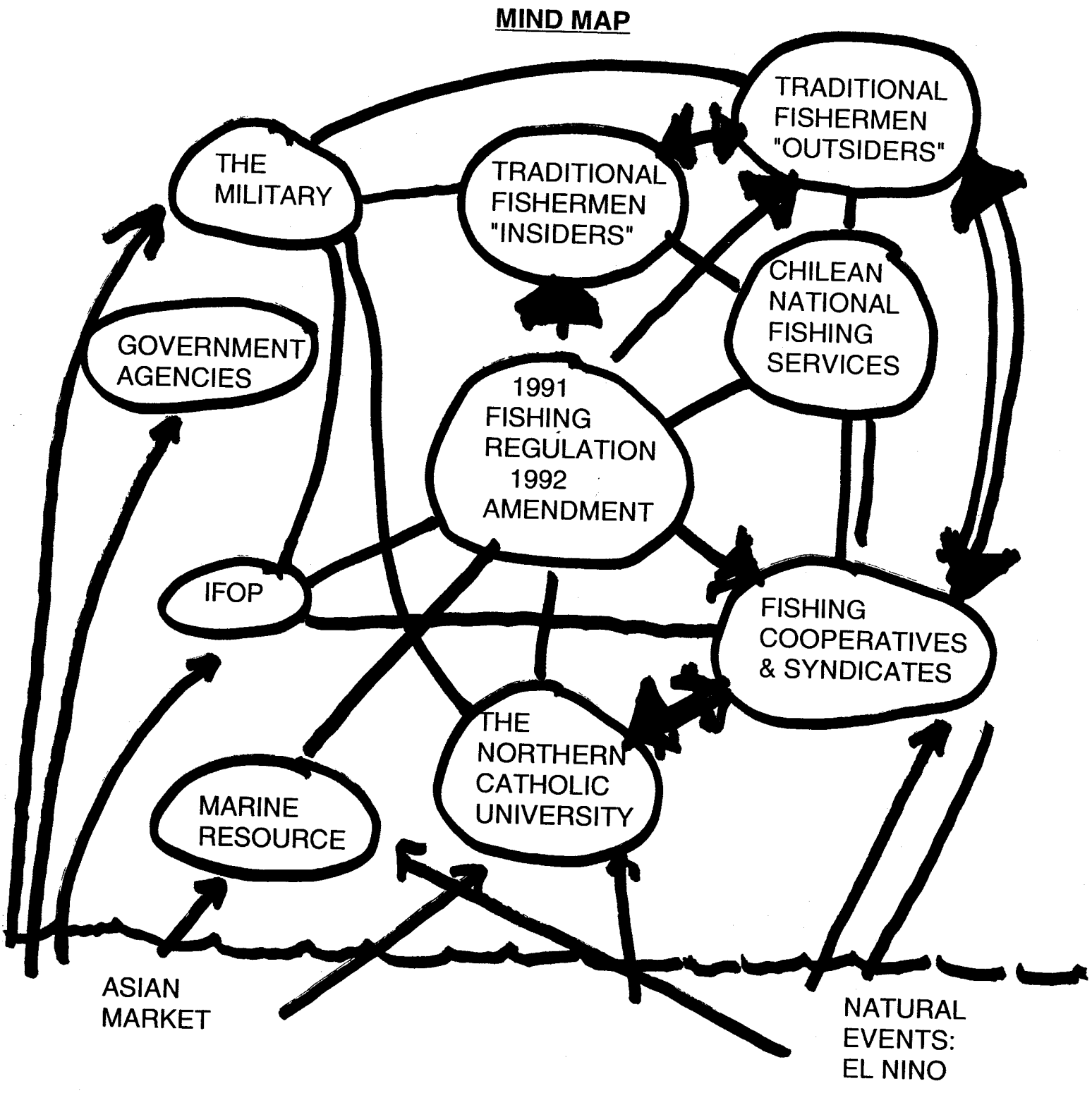


Figure I illustrates players in the marine resource conflict.
The red arrows denote trigger events which prompted additional intercultural conflicts.

Table I. Puerto Aldea's infrastructure results from the Municipality of Coquimbo's Social Services survey. This table summarizes the final portion of the Coquimbo municipality's survey, which examined the towns' infrastructure. (34 out of 62 families interviewed, n=113 Puerto Aldeans)

Transport and access to water:

Municipality delivers potable water	80% families			
Individual water transport from unknown sources	18%			
No answer	2%			
Bath/shower (no hot water)	3%			
No bath /shower	97%			
Sewage Disposal	7% chemical latrine	48% hole in ground (individual family)	4% share hole with neighbors	41% no system

Homes' Infrastructure:

With electricity	9% families				
Without electricity[1]	91%				
Structural materials	Walls			Roof	
	71% combination of materials	26% plywood (new-comers)	3%[2] mud, rock, & straw (insiders)	83% corrugated metal plates	17% straw or cane plants (*totora*)

Source: Municipality of Coquimbo's Social Services Survey, Coquimbo, IV Region, Chile, 1996.

[1] The military's ownership of the land is a contentious topic with most Puerto Aldeans. As long as the military owns the land, the Puerto Aaldeans believe that they will never have access to electricity.

[2] Older families, *insiders* that settled this coastal area came from interior agricultural areas, and they brought some of their traditions such as construction with them.

Table II. Communities of Interest and their goals.

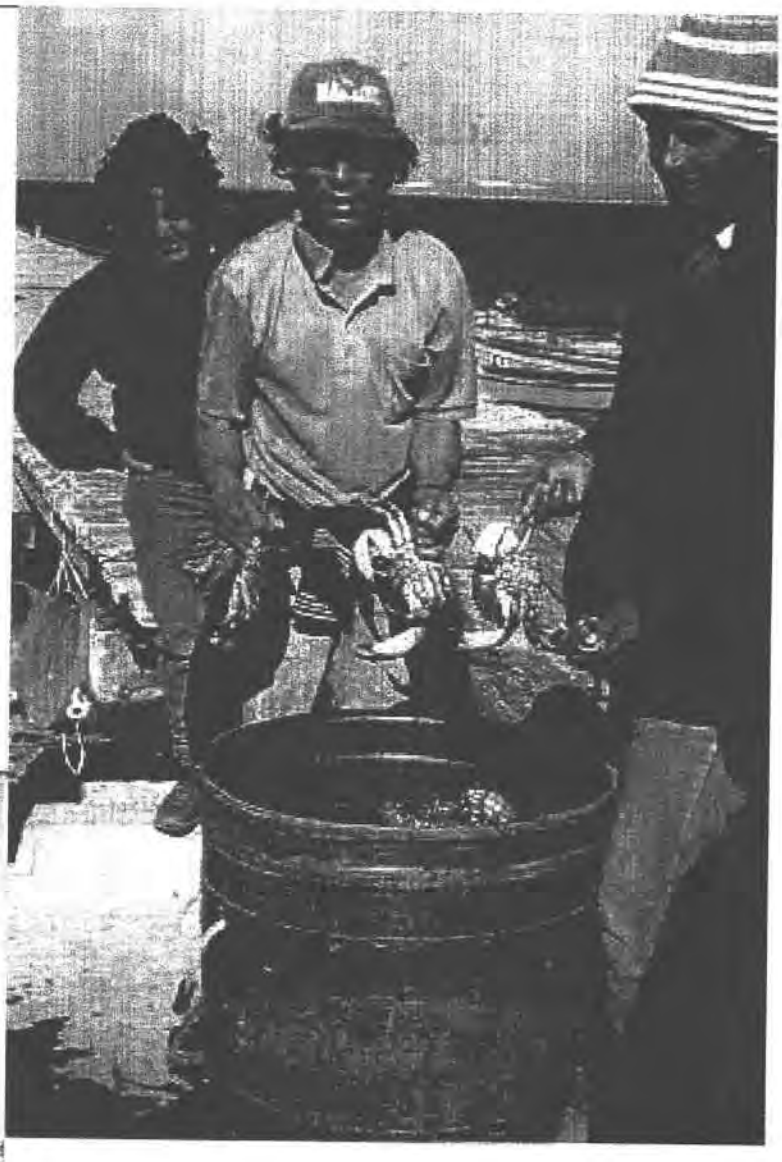
Communities of Interest	Goal
CORFO: III &IV (Regional Direction of the Institute for Fishing Development), Director and Fisheries Managers	Government Organization (under the Economics Ministry) directed towards artisanal fisheries development
FFPA (Funds for the Advancement of the Artisanal Fishery)	Provides funds for artisanal fishers, syndicates, and cooperatives
FNDR (National Regional Development Fund)	Provides funding for rural development projects
FOSIS (Solidarity Fund and Social Research)	Provides funds for extension projects & artisanal fishers projects
FUNCAP (National Foundation for Artisanal Fisherman Training's)	Provides Workshops and Training s for fishers.
IFOP (Institute for the Development of the Artisanal Fishermen), Director and Fisheries Managers	Provide training for coastal fishers.
SERCOTEC (The Technical Cooperation Service)	Provides funding for technical training, workshops, and seminars.
SERNAP (Chilean Regional Fisheries Service), Region III and IV Director and Biologists	To enforce regulations, and administer coastal territories.
UCN (Northern Catholic University) Biological Sciences Dean and Head of Extension Crew	Extension crew provides outreach education to coastal, rural fishers
Department of Ports and Harbors, Director	Constructs and maintains ports and docks in urban and rural areas.
Ministry of Defense: Maritime Governor and port Captains	Register fishers and enforce fishing regulations out to Exclusive Economic Zone.
Department of Transportation	Construction and Maintenance of Roads
The Artisanal Fishing Federation Traditional Fishers and Representative Syndicate & Cooperative Presidents	Union for Artisanal Fishers. Regional and National representative organization for local syndicates and cooperatives.
Puerto Aldean Fishing Cooperative President of Cooperative	To unite the fishers of the Puerto Aldean community.
The Regional and Provincial Ministries of Education,Regional Director, Supervisors, & Teachers	Provides formal education for k-6 in rural communities.
The El Totoral Syndicate, President of Syndicate, Mayor	To unite the fishers of the El Totoral community.
Tongoy, Guanaqueros, and Fishing Cooperatives north to Punta Choros Mayors, Members of Cooperatives	Artisanal Cooperative meet to inform their members of changing regulations

Source: "Estrategia Regional de Desarrollo De la Pesca Artesanal IV Region 1996-2000," Intendencia IV Region, Coquimbo, Chile, March, 1996.

APPENDIX II

PHOTOS

Puerta Aldea Fishers with crab (jaiva)



Region IV's fisherwoman holding crab (jaiva) at Puerto Aldea

Extension crew biologist with fisher and drying algae (champa) at El Totoral

2

3

1

Puerto Aldean fishermen collecting white snail (caracol rubio) - photo 1
Fishers setting snail traps with crab - photo 2
Middlemen (buyers) loading marine invertebrate (piure) - photo 3

El Totoral fishing syndicate

1

2

Puerto Aldean artisanal fishing boats - photo 1 Fishing in Tongoy Bay with Puerto Aldea in the background - photos 2 and 3

3

1

2

3

RRA activities at El Totoral December 1997 - photos 1,2, and 3

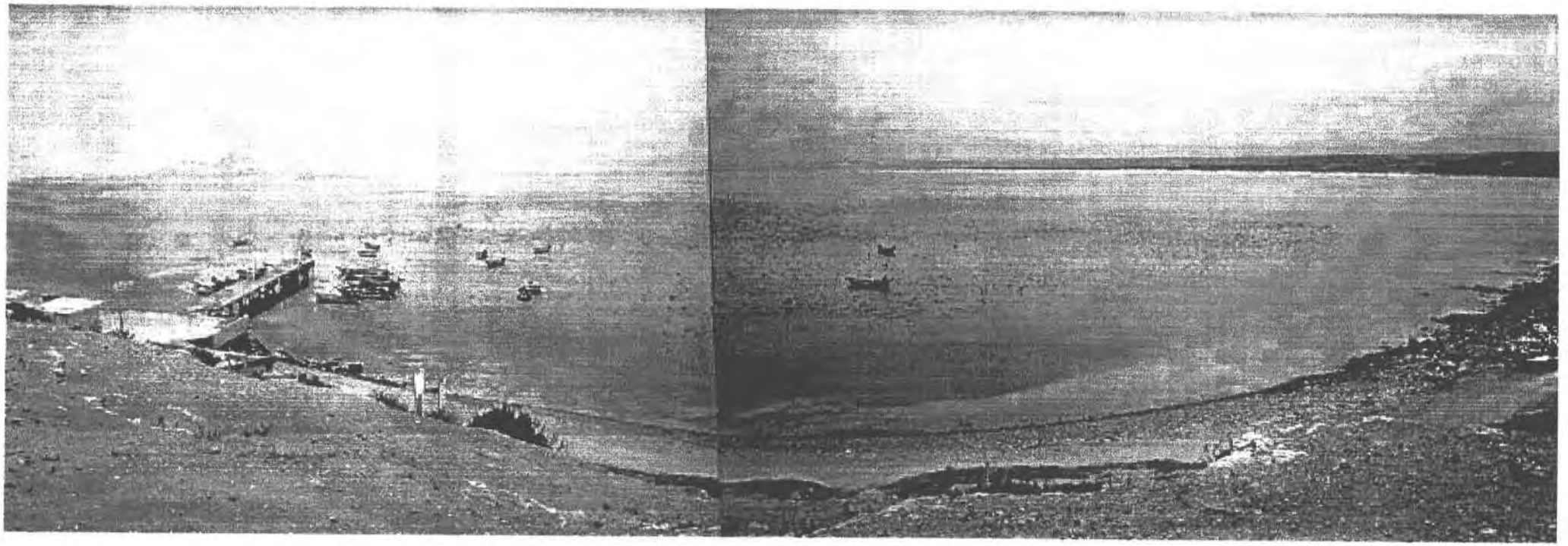
1

2

3

Planning RRA activities at El Totoral - photo and 2
President of El Totoral's fishing syndicate, Teresa, explaining trend line activity - photo 3

Puerto Aldea facing Tongoy Bay



2

3

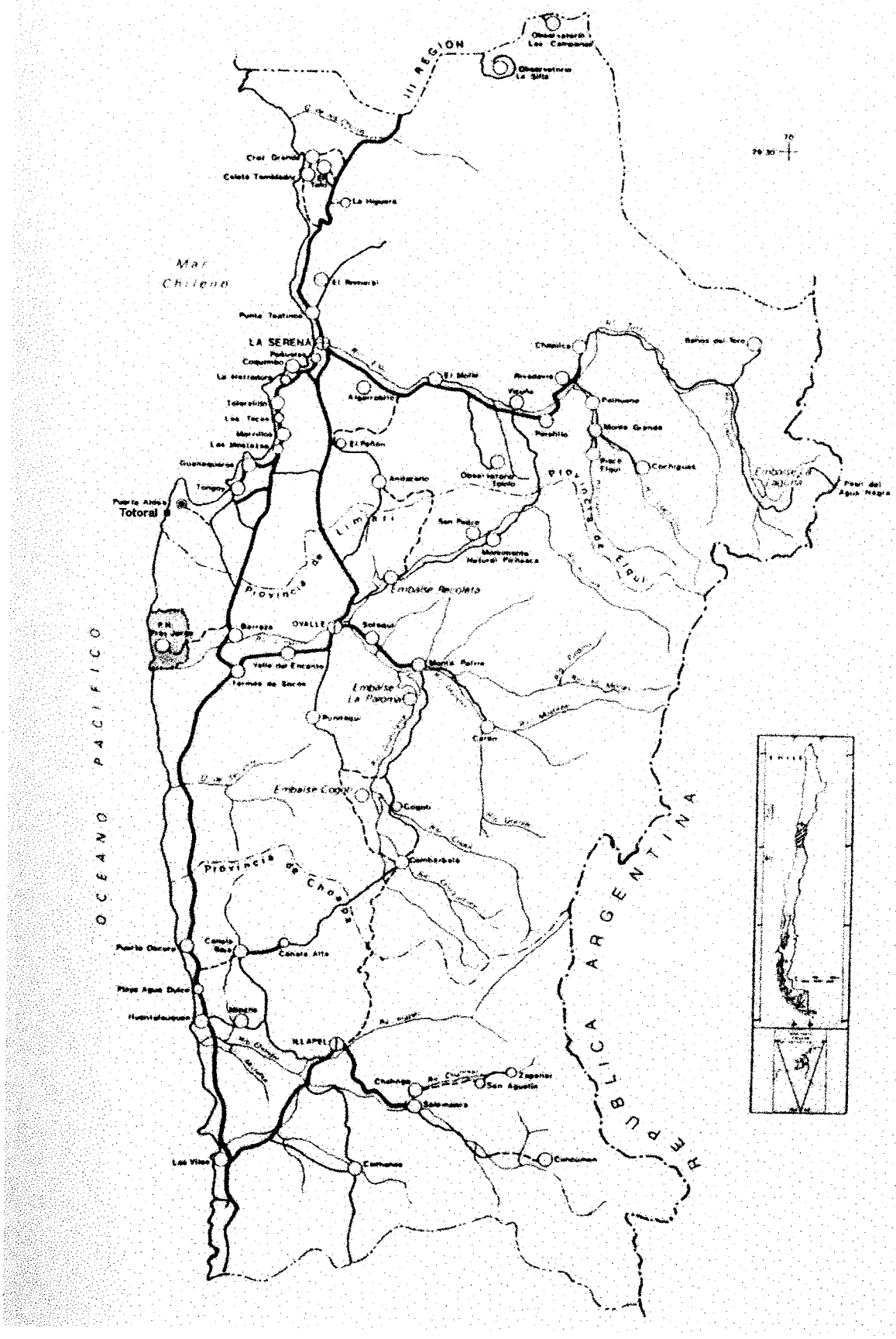
1

RRA activities with El Totoral's syndicate - photos 1 and 2
Artisanal fishing group presents their resource map - photo 3

APPENDIX III

MAP OF REGION IV, CHILE

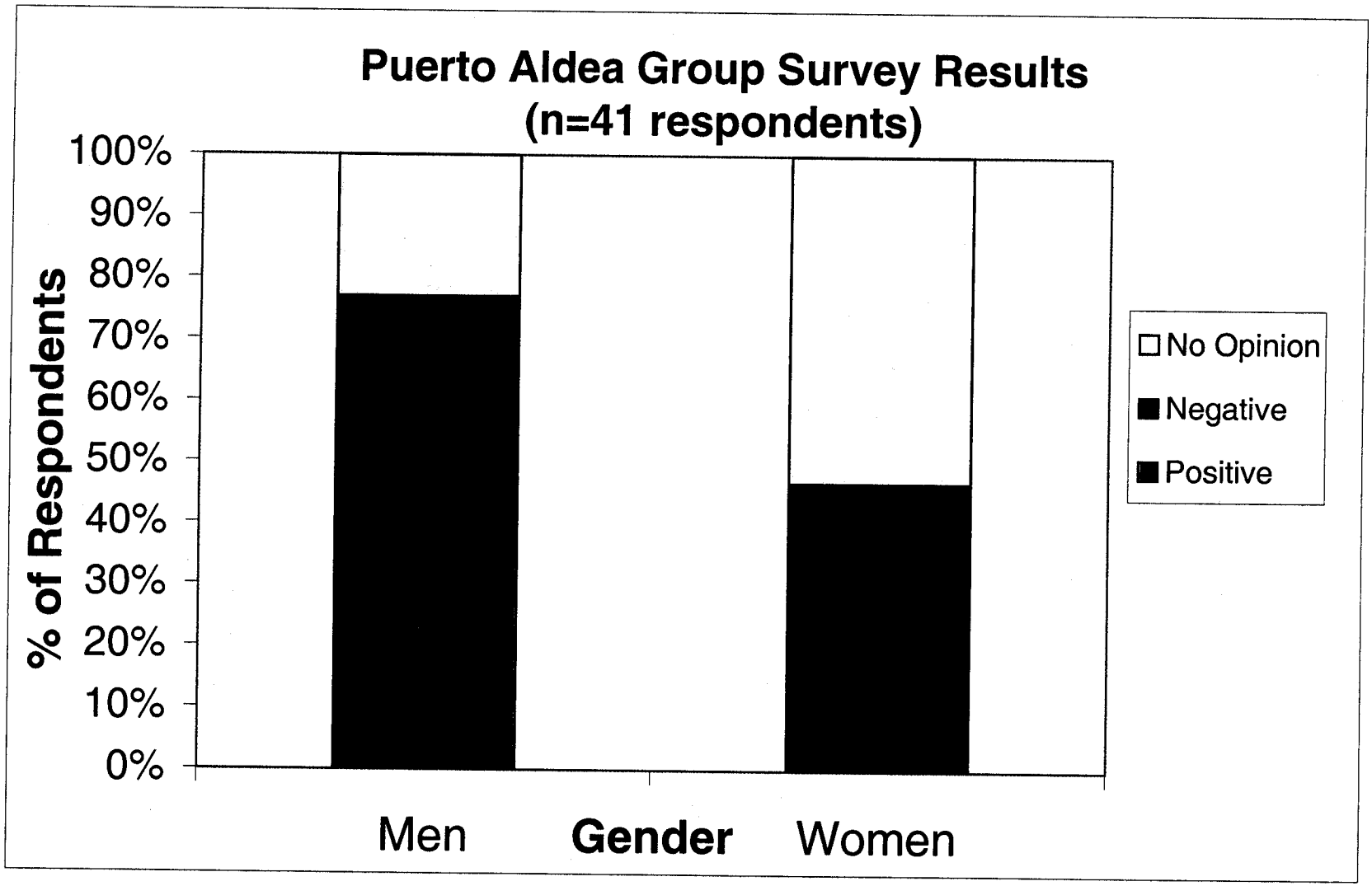
REGION DE COQUIMBO



Map of Chile's Region IV

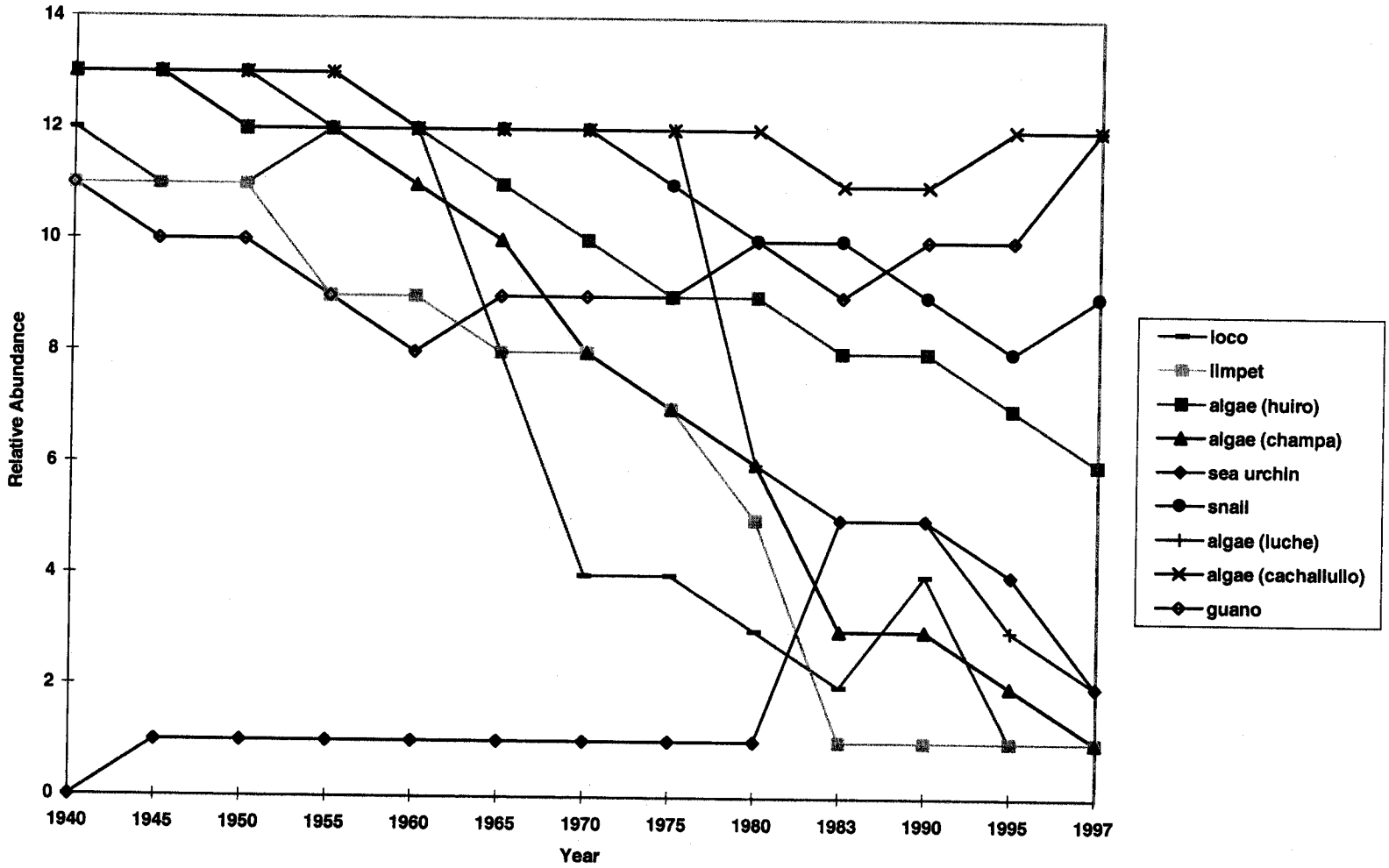
APPENDIX IV

METHODS USED IN PUERTO ALDEA AND EL TOTORAL: RAPID RURAL APPRAISAL AND PARTICIPATORY RURAL APPRAISAL ACTIVITIES



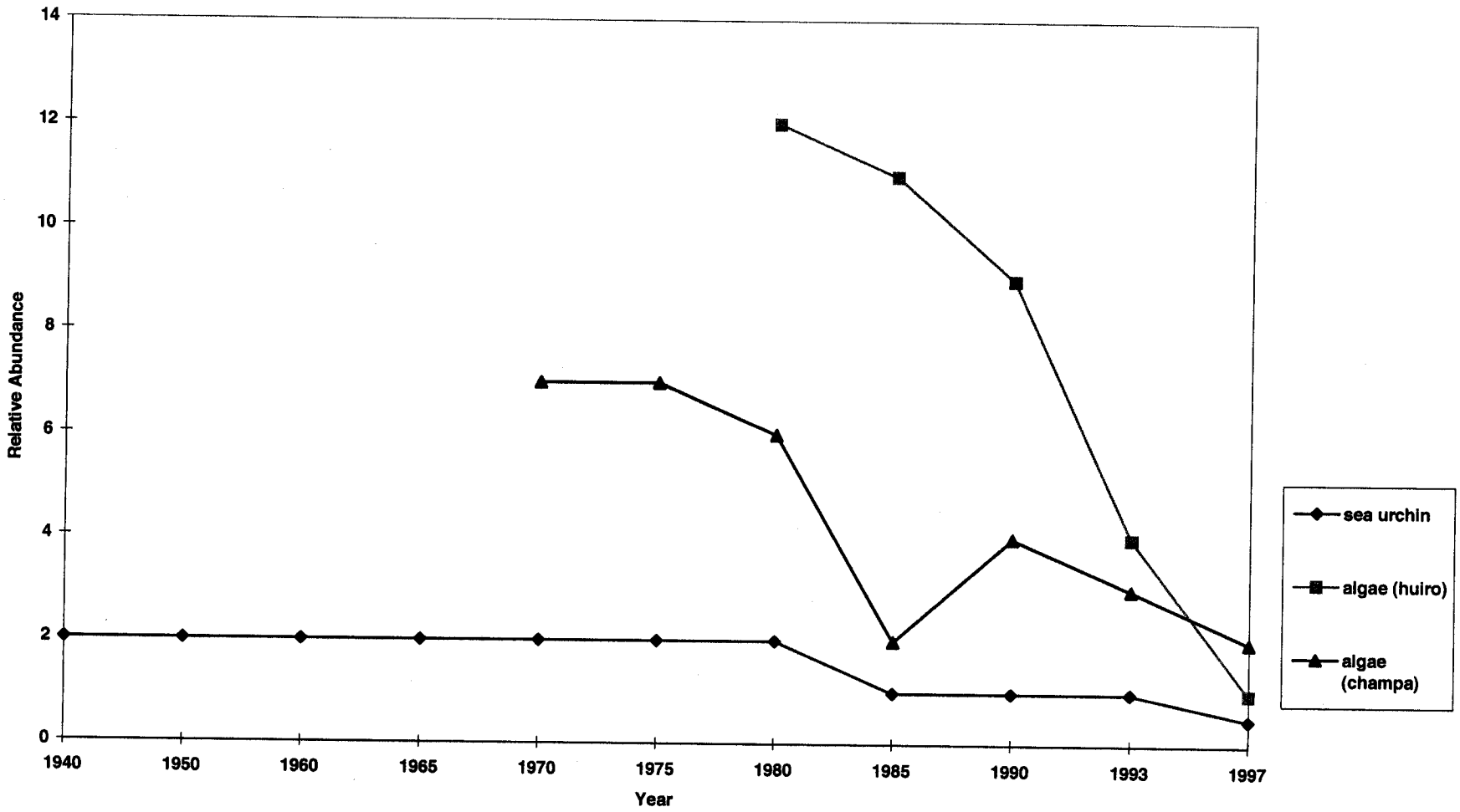
Stacked bar graph indicating attitudes towards 1991 fishing regulation.

RRA: Group I: Natural Resource Abundance

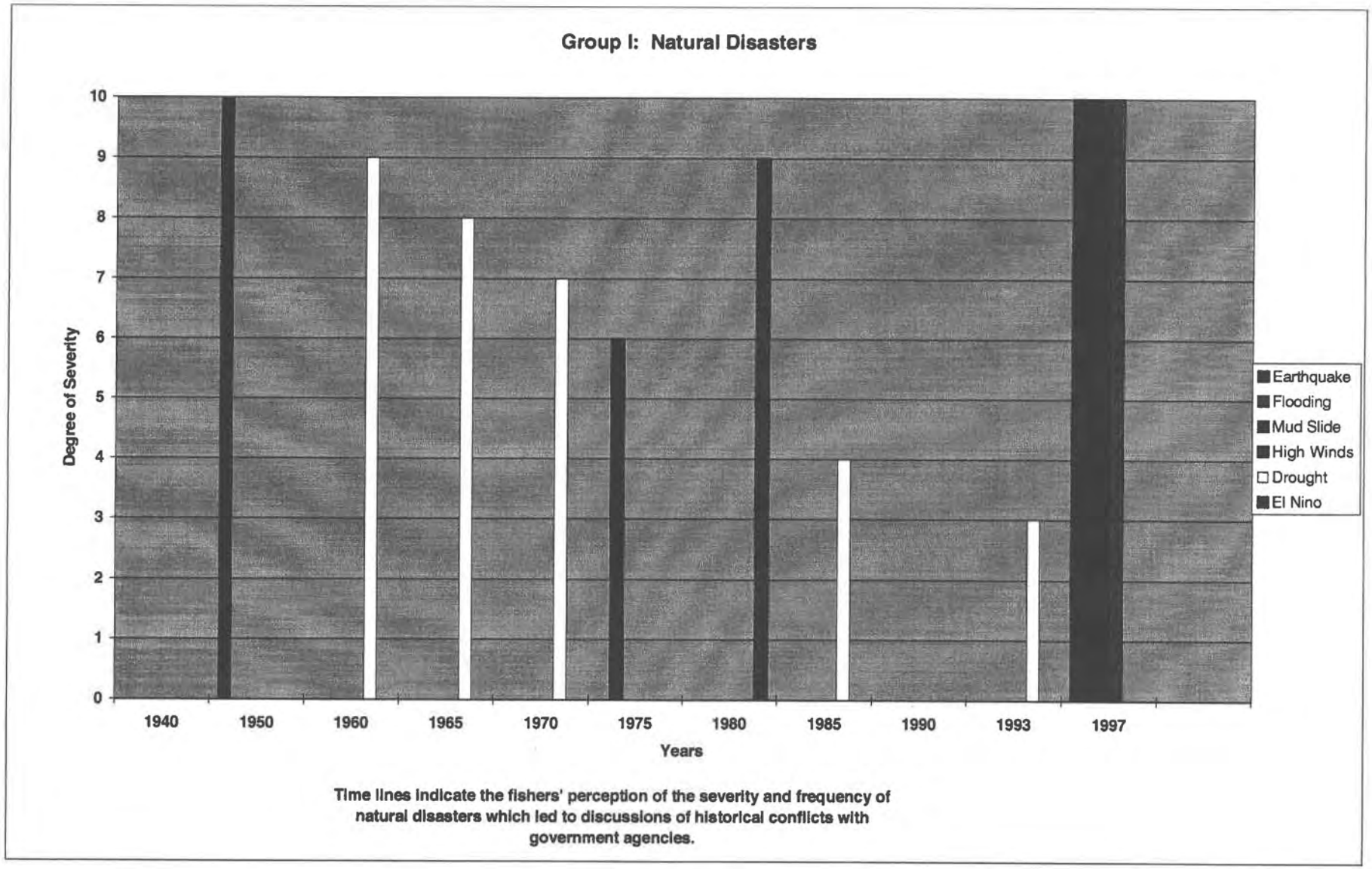


Trend lines illustrate the fishers' perception of abundances over time. Fishers measured relative abundance as number of filled truckbeds and filled burlap sacks.

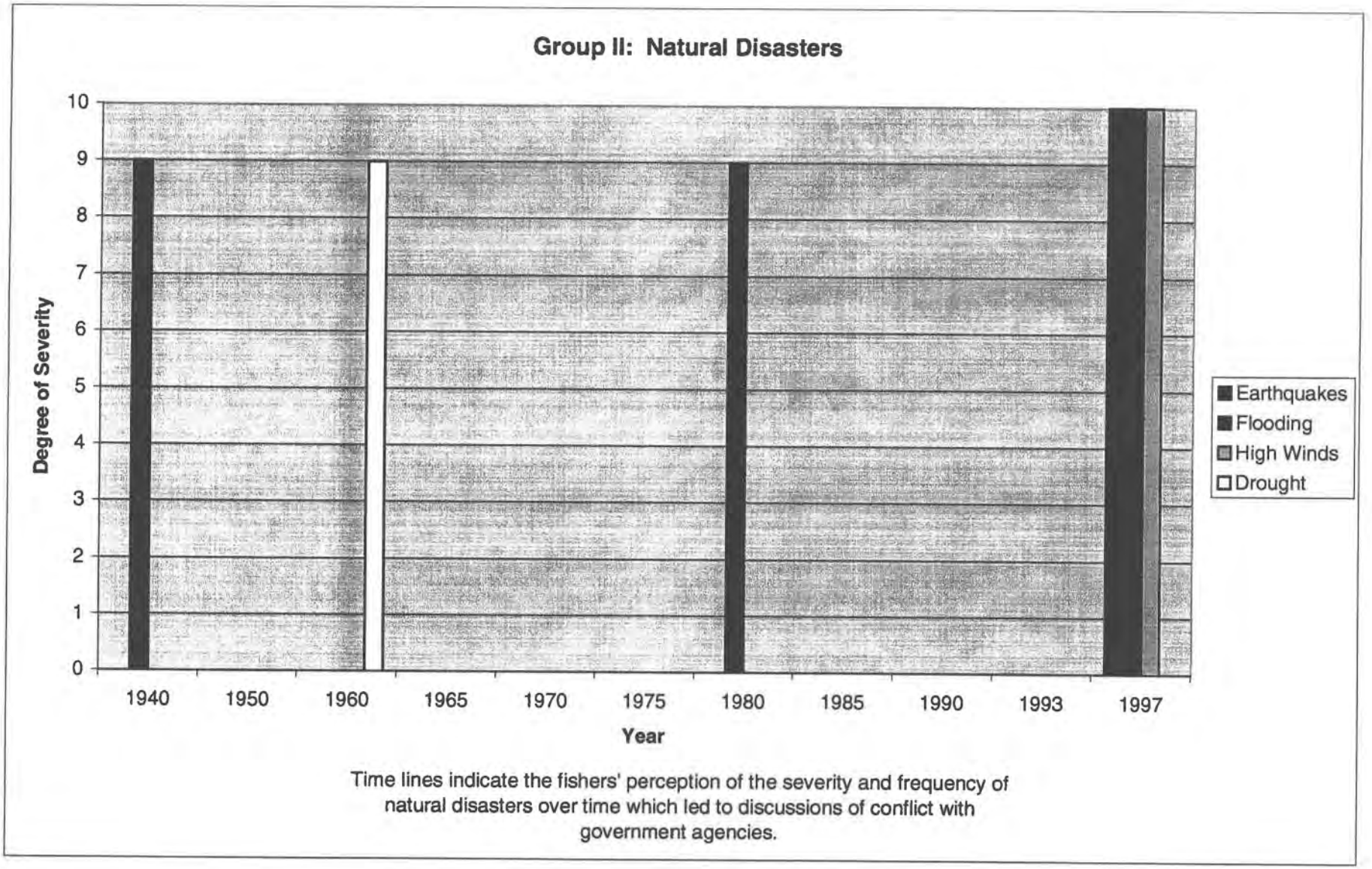
RRA: Group II Natural Resource Abundance



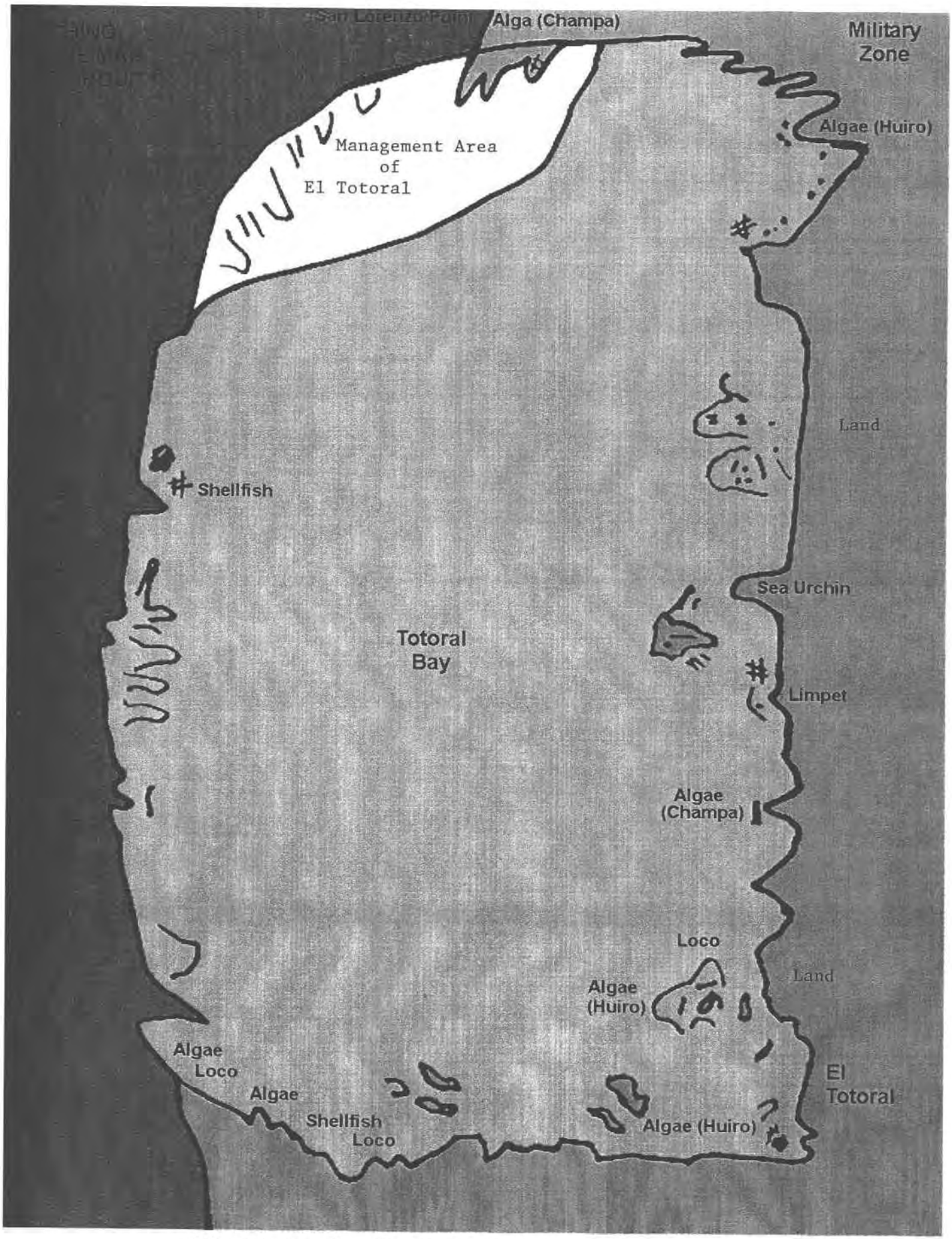
Trend lines illustrate the fishers' perception of abundance over time. Fishers measured relative abundance as number of filled truckbeds.



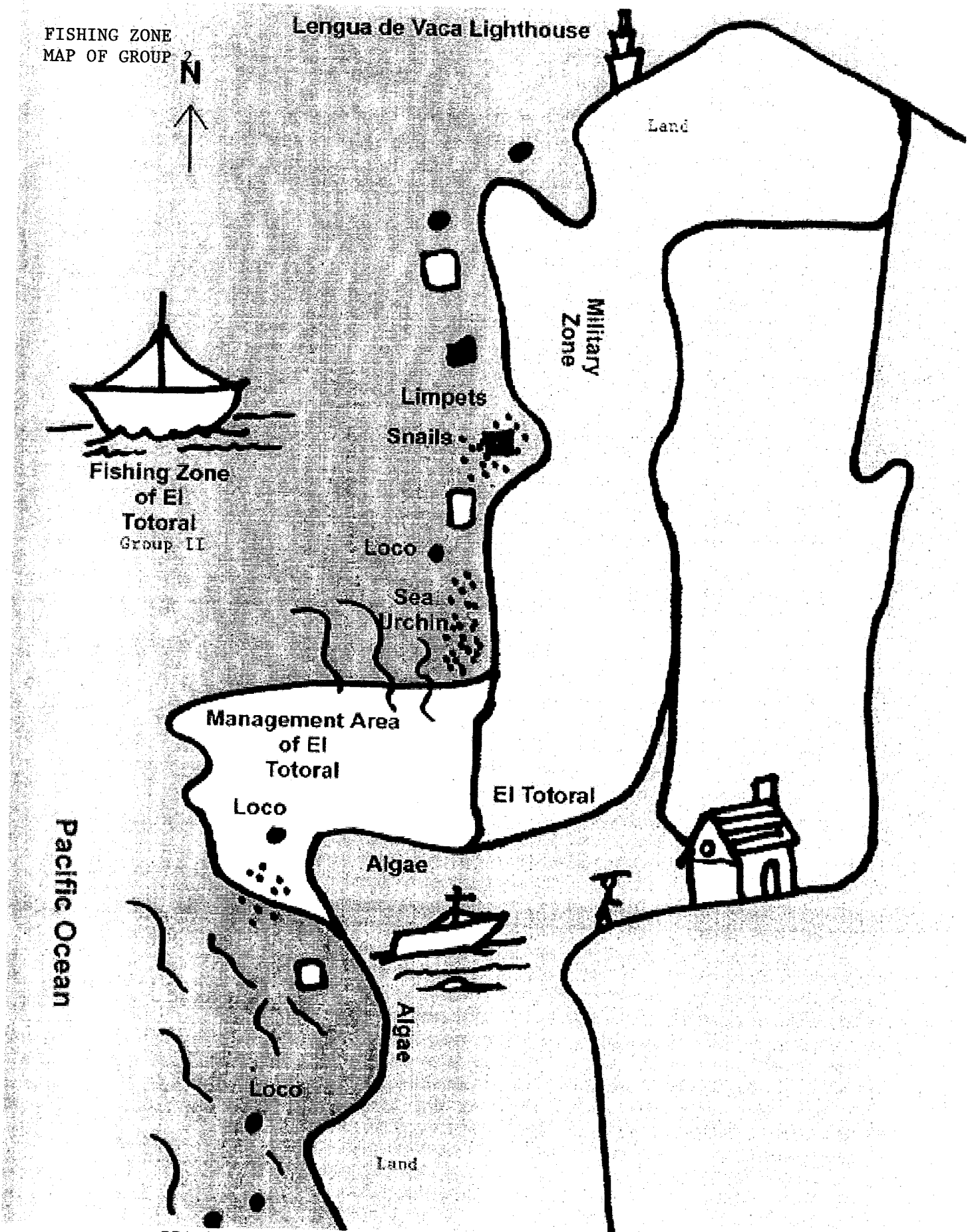
Time lines indicate the fishers' perception of the severity and frequency of natural disasters which led to discussions of historical conflicts with government agencies.



Time lines indicate the fishers' perception of the severity and frequency of natural disasters over time which led to discussions of conflict with government agencies.



RRA Activity I: Marine Resource Map Illustrating Algae and Shellfish Locations



RRA Activity I: Marine Resource Map Illustrating Territorial Fishing Areas

APPENDIX V

PARTICIPANT OBSERVATION SURVEYS
(Used in Puerto Aldea and El Totoral)
and
PARTICIPATORY RURAL APPRAISAL QUESTIONNAIRE
(A group activity initiated with El Totoral)

Participant Observation Survey

I used the following survey as a guide while observing the communities of Puerto Aldea and El Totoral. I conducted the observations informally while living amongst the Puerto Aldeans and Totoraleans.

Example: Fishing Community Interview—Household Data Form

Position in Household:

Male: Female: Marital Status:

A majority of the husbands had second or third families from the transient nature of their work.

Highest level of education attained for husband and wife:

husband: wife:

Most of the married couples before 1952 had no elementary school education. Most of the married couples after 1952, when the first school and teacher arrived to Puerto Aldea had an elementary school education. Today many of the younger couples have completed at least an eighth grade education.

Place of origins of parents and grandparents:

Many of these Puerto Aldean families were from shepherding families which lived towards the Andes, inland, they migrated to the coast and learned the fishing practices from other family members who had settled on the coast.

How many children have been born to you?

Many of the elders in both towns had eight to twelve children, and today many of the families have four or five.

How many children are living here?

Generally all the children live with their parents until they are married, and some even live with their parent s after they are married.

How many children help you fish?

Do you own a boat?

Most families do not own a boat, but the "nuclear" family does own the boat.

How many people share your boat?

Sometimes as many as five related family members will share a boat. In the Totoral the fishing cooperative owns a boat, and the villagers work together to pay the monthly quota.

Does anyone in the family have a job outside Puerto Aldea? In other nearby larger fishing villages? In larger cities: Coquimbo /La Serena?

Many of the fishing families in Puerto Aldea have family in the larger Port City of Coquimbo, and they also have families in smaller villages north, including north of the IV Region, the III and II Regions.

The villagers from the Totoral have family members in a larger town north of Puerto Aldea, Tongoy.

Do they help with school fees or money for the boat's gasoline?

Many times the mothers do not have money for the children's school items because there is a high rate of alcoholism among the fishermen, so the fees go towards the gasoline for the boat and the alcohol.

Example: Fishing Interview—Questionnaire Guidelines

1. SOCIO-ECONOMIC STATUS

Type of housing: Walls (adobe, wood, tin), roof, floor (dirt), windows.

(Please refer to the Municipalities infrastructure percentages for Puerto Aldea in Appendix I.)

In the Totoral, the roofs are mainly corrugated metal and some straw with cement or adobe walls, and dirt floors.

Type of fishing implements owned: boat, nets, dive suit:

The fishermen in the cooperative own among family members a boat, multiple types of nets, and a dive suit for each member who is a registered "huka" diver.

---

2. RESOURCES AND RESOURCE USE

In good years, do you harvest surplus fish for sale? Which fish?

The fish is usually rockfish, however, it depends what fishing village and fishing area.

Who are your main sources of advice on marine resource use and marine management practices?

The Northern Catholic University and the Institute for the Development of the Artisanal fisherman.

What are your marine resource problems? What solutions do you propose?

What do you think are the causes of marine use problems?

What are some possible solutions?

Generally, most interviews among lesser educated fishermen indicated that the fishing regulation was the main source of their problems, and that the fishing ministry should listen to the traditional fishermen and their practices. Some fishers responded, "the Secretariat of Fishing could probably learn a thing or two from our harvesting practices, and if the government would regulate the larger industries better the small fishermen would have a better chance at making a living off of the marine resources."

The response from the fishermen with higher education generally was that the restrictions on shellfish harvest were good because it let the shellfish develop so that the fishermen could harvest them the following year, however, they also believe that stronger restrictions should be placed on the larger fishing practices. They believed by uniting all villages that the government might listen to them. (They tended to be more optimistic.)

How do you obtain your firewood supply? (collect freely or limited opportunity to collect or buy, (specify details):

The IV Region has an advancing desertification problem. Firewood is scarce because the goats have eaten most of the flora, and the people have harvested all of the trees. People mainly use containers of gas.

What do you do to save energy?

The people in these village constantly save energy, by using candles, and walking. Sometimes they extravagantly use a generator to watch a soccer game for an hour or two on the television.

What specific problems and opportunities do you see in the area of energy?

The firewood supply is a problem, and there are plans to transport underground gas from Argentina over to the IV Region, so that people might have gas inside their homes instead of using the containers of gas.

---

3. WATER

Households water supply:

Distance (in km): 70

Quality: potable

Personal well?

None of the people in Puerto Aldea or the Totoral have this.

Roof catchment (capacity in liters)?

Some have basins

Fog trappers?

None

Community water well or spring? Is it dry?

The community water well is dry and the municipality brings the water to the villages.

What distance do you have to travel to collect water?

The municipality travels approximately 70 kilometers to the Totoral and 35 kilometers to Puerto Aldea.

Are the sources permanent or seasonal?

There can be seasonal sources from the rain.

Does the local municipality bring potable water to the community? How often?

The Municipality brings the water once a week.

What water conservation measures have you practiced in your household?

The people in both communities know a lot of water saving measure, almost every one of them in the "book."

What changes in water access would be most helpful to you?

The water truck needs to come more often, and it would be helpful if the Municipality would provide the community with a pump for a well.

What problems have you encountered in water access? What opportunities do you see?

The drought will continue after the El Niño leaves, so water access is a continual problem.

---

4. INFRASTRUCTURE AND SERVICES

Health

Which sicknesses are common in this area? Frequency?

The bends among the fishermen.

Is malnutrition a problem in this area? (specify nature)

No, however, the women complain that not enough vegetables are eaten (too much fried fish and shellfish).

Where is the nearest health facility? How many kilometers away from your home?

Puerto Aldea has a medical outpost in their town, and the villagers from the Totoral have to travel 40km to this post.

Do you have family planning services available?

Once a month a nurse, paramedic, doctor, and a midwife attend the community. The midwife and nurse offer family planning.

Do you know if people use these services willingly? Why or why not?

Generally the pregnant women use these services once a month.

What problems and opportunities exist for health?

If there is an emergency, the nearest hospital is in Coquimbo. Many times in life threatening circumstances the people die because they cannot reach the hospital in time. Also, for a severe case of the bends, the nearest

decompression chamber is in Coquimbo, and many times it does not work. When this occurs, the closest chamber is in Valparaiso which is seven hours away. Another problem is when the military begins their war games, they do not allow the people or vehicles to pass from the Totoral to Puerto Aldea - through the military zone.

Education

Do you think the schools in this area are adequate?

Many villagers believe the school in Puerto Aldea is not adequate. The Totoral has no school.

How far do your children have to travel to school?

There is an elementary school is Puerto Aldea. For middle and high school, the children travel to Tongoy, 20km, or to Coquimbo, 40km.

Are there adult education classes or other programs in the area?

In Puerto Aldea there are hydroponics classes, and the members of the fishing cooperative, the men, have frequent training from outside organizations.

Do you or any of your family members attend classes at the technical trade schools in Coquimbo/La Serena?

A small percentage attend these schools. Most of the community members continue their fishing practices.

What are the most important problems in education? What are the best ways to address them?

Many parents would like to see higher levels of education offered in Puerto Aldea.

Has the school in Puerto Aldea begun any marine education programs?

The professor began marine education programs five years ago with his students. In 1997, the Catholic University began an extension education program with the school.

Are your children involved in trying to conserve marine resources?

Generally, the children have a poor attitude towards conservation because they observe role models such as other family members.

Transportation and Communications

What is your principal mode of transport?

Hitchhiking walking, boating, or driving.

How do you get your fish and algae to market?

Generally, a "middle man" comes to the village to buy it. Sometimes some family members drive their own product to the larger port of Coquimbo.

Who maintains your rural access roads?

The Military.

Have you undertaken any communal road repair activities?

No because the military maintains it.

What are your significant problems in terms of transport? What is the best way to address these problems?

The fishermen commonly complain about the road access during military activities. The community members frequently complain about vehicle passage being restricted. The community of the Totoral continually discusses the military blocking their passages. They describe how the military will randomly block the passage without notifying the community, and then the villagers are "stuck" until the military exercises finish, meanwhile, their shellfish harvest rots.

Institutions

What are the different institutions and groups in this area?

The University Catolica del Norte, the women's organization, the organization for the development of the artisanal fishermen, the fishing cooperative in Puerto Aldea, and the fishing syndicate in the Totoral.
Out of these, which ones have the most positive impact on people's lives? (specify)

Many commented on the University, but a portion mentioned the Municipality (because of the health services and the water) while some mentioned the church.

Do you belong to any of these organizations or groups? Why or why not?

All of the fishermen belong to the cooperative in Puerto Aldea, and all belong to the syndicate in the Totoral. A portion of the women in Puerto Aldea belong to preschool parents group.

What activities are carried out by these groups?

What activities would you like to have undertaken by these groups?

What problems do institutions face in this area? What opportunities do you see for addressing these problems?

Rapid Rural Appraisal
Group Activity: El Totoral

The groups' responses for question (3), (4), and (5) were similar, so I synthesized their answers. I mention this activity in the Methods and Results Sections.

(1) How did the fishing village form? Why? and for what reason?

Group 1: The village formed with a group of 27 people who registered in a cooperative to improve their way of life.

Group 2: Twenty seven people make up this village and we all work together, united. We work together for the future of our children so that our children will also have work in the future.

Group 3: With 27 members the village formed, we created it, thinking of our children, and we created the association of fishermen because we knew if we continued alone the we would destroy the marine resources.

Group 4: In 1962 two divers came and fished off the coast of the Totoral and settled here. (The remainder of group 4's answer was illegible because they did not know how to write). The remainder of their response is detailed in a few of the individual interviews conducted with the elders.

(2) What was one of the main problems in the past?

Group 1: In the past the government gave a lot of liberties, and there was not a lot of violence, and for that reason the people from here immigrated.

Group 2: The main problem in the past was that the road was so bad that no one would come into our village to buy shellfish and alga.

Group 3: We did not have community property areas in the subtidal, offshore areas, and now we do.

Group 4: There were few people, few roads, and little communication. Our products traveled to market 80 kilometers by donkey.

(3) What was the first important event that you can remember in the Totoral?

Many of the elders of the Totoral say that the event was the road through the military zone to the North of the village. Some of the younger generations say that it is now the radio room the municipality built.

(4) Have many people moved into or out of your community?

Now more people are moving to the Totoral because they have their own fishing area in their bay--friends of family members and relatives.

(5) What are some of the greatest things your community has done? What have been some of the happiest times?

Some of the greatest times for our community have been working with the University so that today we have been able to manage our own fishing zone. The Fishing Ministry finally handed over the zone to our village.

(6) What is the community's main problem today?

Group 1: The main problem we have today is the northern access. The Maritime authority will not even let our boats pass when they play their military games in the area.

Group 2: The authorities have not recognized the village on a regional level. The restrictions on road access when the military plays its games.

Group 3: When the armed forces restrict land passage that is our principal problem, and the armed forces are our main problem and that is why we cannot do anything.

Group 4: (The remainder again was illegible, however, their answers were also covered during the individual interviews).

(7) What way do you think the fishing regulation could affect the fisherman or their community?

Group 1: Until now it does not affect us.

Group 2: It affects us by controlling the products we fish from the sea. It affects the fishermen and the low retrieval rates of our products from the ocean

Group 3: The fishing law affects the fishermen by restricting the extraction of the marine products. This law diminishes the fishing areas: they should change the laws.

Group 4: The law affects us by not letting us travel to other zones to fish.