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The Long-Term Power of Common Property Resources:
Local Management of the International Demand for Shellfish in Chile

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Abstract

Of the shellfish products exported by Chile, the indigenous "abalone" (Concholepas concholepas) claims the highest local and international price. Uncontrolled harvesting of the formerly abundant resource resulted in its dramatic decline. Since 1989, the Chilean government has banned abalone extraction to enable the resource to recuperate. In addition, common property favoring sustainable extraction by small-scale fishers is now legally recognized. Shellfish Management Areas in the form of marine concessions may be obtained from the government by small-scale fishing unions. The organizational structures of four small-scale fishing unions, with and without Management Areas, were observed with respect to their abilities to control international demand favoring abalone extraction. Under heightened political pressure, when the harvest ban was lifted and prices were more favorable, well-organized unions with Management Areas chose not to extract abalone. Instead they voted to leave the resource inside of their legally recognized common property areas to accumulate value for sustained use in the future.

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Background on Chilean Fisheries

Decimation of the world's fisheries is closely linked to national policies of economic growth. In Chile, from 1973-1989 the Pinochet government's neoliberalist philosophy disallowed intervention in local, national and international free-markets, effectively stimulating the "mining" of live ocean resources as a way of fueling national economic growth. Chile's industrial and small scale fishers (1) combined, make it the most important exporter of fishery products in Latin America, providing more than 25% of the region's fishery exports
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(National Marine Fisheries Service 1994, p. 309). The accompanying cost of such short-term economic success is that Chile leads its neighbors in marine resource depletion. This is a serious dilemma, considering that the country originally had one of the most diverse and productive oceans in the world.

Chile actually has more ocean territory than land. Its fishers are distributed along more than 4,000 kms of coastline. In 1988 the total number of small-scale fishers in Chile exceeded 50,000 (Castilla, 1988). This paper focuses on small-scale fishers, principally shellfish divers. In the Benthic (shellfish, crustaceans) category alone, there are over 60 species of invertebrates that are locally consumed and approximately 10 are exported, some providing lucrative income. In 1991, the total shellfish landed was calculated to be 148,089 metric tons, with an export value exceeding $(US) 100 million. Over 95% of this total came from wild (non-cultivated) stock (Castilla, 1994). If it is not ecologically impossible, it would still prove immensely difficult to supply even half of Chile's fish stock using maricultural techniques.

Objectives: [OVERHEAD]

The task of this paper is twofold : 1) It explores small-scale Chilean fishers' independent and collective organizational responses to factors affecting their resource base and livelihoods. 2) It explores the possibility that the Chilean government's new strategy of allocating wild coastal resource Management Areas to fishing organizations is socially, economically, politically and ecologically effective. The government's efforts at recuperating a damaged natural resource base are then compared with community management efforts.

The following questions guided the research: For the resources that are currently closest to being sustainably managed (eg. abalone) and for those that are least sustainably managed (eg. crab); What are the institutional property arrangements in each small-scale fishing organization? Who made them and who is entitled to change them? How are existing rules monitored and sanctioned? What are the effects of these property arrangements on the respective resources within and outside of the Management Areas? How are these rules parallel with or resistant to government policy, enforcement, and lack of enforcement?

Frame of Investigation: [OVERHEAD]

Fishing is economically and physically risky. An immense diversity of small-scale institutional forms exist. They range from loose associations of independent fishers, to tightly institutionalized cooperatives. Some of them have distinct, unwritten rules for harvesting different resources.

A Focus on Sindicatos [OVERHEAD].

Three local organizational forms are legally recognized in Chile; the Sindicato, the Asociacion Gremial, and the Cooperativa. Sindicatos are the most common. In most cases, even when the institution is weak, sindicatos form the most important institutional intersection between government, local fishers, and marine resources. The government recognizes the sindicato as derived from industrial-scale union organizations, in which all union members report to a boss within a hierarchical structure. Although adopted on paper, the sindicatos I observed do not even approximate this situation in practice. Far from reporting to a "boss", fishers were accountable only to themselves. Even though several of them were tightly organized, each sindicato observed, represented a collection of independent workers with complex associations to one another, often clearly identifying themselves with names such as "Sindicato of Independent Fishermen".

National Structure and Superstructure:

The Government's Fishing Law:

Recently, the new Chilean General Law of Fisheries and Aquaculture (Ley general de Pesca y Acuicultura No. 18,892) altered open access to inshore benthic (shellfish and crustacean) resources by providing Management Areas, or communal concessions, to those small-scale fishing organizations that complete the application process. The process involves demonstrating a well-researched shellfish management plan with university-trained biologist/extension workers and submitting a detailed blueprint of the proposed area to various government bureaucracies. Each Management Area is tailored individually by the sindicato in favor of locally appropriate harvesting and conservation of the lucrative resources inside the Area. (3).

For the purposes of this paper, I have adopted McKean's categories of property (1992). **[OVERHEAD]** Using her definitions, Chilean Management Areas might be legally considered public property because they are held in trust by the State. However I refer to them as "common property", because in practice, each Management Area is regulated by a sindicato. These sindicatos treat the areas as common property by restricting access and catch on the basis of membership to the sindicato.

The Focal Resource: Abalone

Both within and outside of the Management Areas in the Fifth Region, the best managed (and unanimously focal) resource by small-scale fishers and government alike, is the lucrative "abalone" shellfish (Concholepas concholepas), commonly known as the "loco". Abalone is the only resource that provoked the government to regularly fine people. Resources like Purple crab (Homolaspis plana), and Common clam (Ameghinomya antigua) are representative of a multitude of other species which are treated like open access (or "non-property) (McKean, 1992) and extracted with minimal regard for their declining abundance. Even though they are of equal annual economic importance (but less per/unit value), these species were scarcely ever cause for government enforcement.

In part this is due to lack of ecological knowledge about species resilience. Fish and even shellfish populations are extremely difficult to assess. For example, abalone eggs and larvae may travel up to 300 miles on ocean currents, meaning it is not a static resource. Adult abalone of extractable size must reach at least 4 years of age and may grow more slowly, depending on ocean current temperature and nutrient streams (Castilla). Fishers and biologists have developed an awareness that Management Areas may also serve as important genetic reserves along the coast.

Case Study Comparing 4 Sindicatos [OVERHEAD TABLE]

This study focuses on four fishing hamlets in the small-scale sector. They are (in geographical order, with approximate distances by sea); Algarrobo which lies 3 km to the North of El Quisco, which is some 14 kms to the North of Las Cruces which is approximately 4 kms from Cartagena. [OVERHEAD MAP]. The scale of the three ecologically productive Management Areas is small. The four sindicatos mentioned are spread out along 21 kms of coastline, with diving access extending over thousands of hectares. Out of this, only approximately 180 hectares (180,000 m2) are currently protected in Management Areas.

Hamlet Living Conditions:

Living conditions in all four hamets are humble. Fishers and their families lived in privately owned houses of two or three rooms, mostly heated with kerosene in the winter weather (temperatures usually hover between 40-60 degrees. It frequently rains and can fall below 0 degrees C). Families were commonly without running water, although most had electric lighting and a small television. The average number of children was four.

Sindicato Resource Base: Private and Pooled Resources

The more strictly organized sindicatos (El Quisco and Algarrobo) had commonly owned diving sheds, an office and phone. The other two (Las Cruces and Cartagena) operated out of individual homes. El Quisco and Algarrobo also had access to individually owned but shared freezing and marketing facilities, and better ground transport than either Las Cruces or Cartagena. None of the sindicatos provided credit or regular health benefits.

The four sindicatos were composed almost exclusively of men of Hispanic descent. Women hardly ever appeared on the beach and interacted minimally in their husband's economic spheres. A small percentage held jobs but in general, they were almost exclusively housewives. Most of the families in the area were interrelated, either by blood or marriage.

Members of the four sindicatos actively sold their catch in any way they could for cash. Small portions were irregularly taken home for subsistence or enjoyment.

[OVERHEAD]

Algarrobo: 115 members; Management Area established in 1992.

Algarrobo held the privilege of a well-protected harbor and an unloading dock. These facilities were shared by El Quisco's sword fishing crews, who regularly took Algarrobo fishers with them in exchange. As in El Quisco, wealthy vacationing homeowners inhabit Algarrobo's attractive beach front, and the fishers live in the houses furthest from their means of production, on property of lesser value.

El Quisco: 139 members; Management Area established in 1991.

El Quisco had the most extensive infrastructure of the four sindicatos. Notably, they had 9 sword fishing boats with just enough equipment for seven fishers to stay out for a month. Due to the exorbitant market

value of sword fish, these ventures often provided a strong source of capital for the crews involved. Many of the sword fishers also doubled as shellfish divers - the effect being that busy sword fishers were neither able, nor concerned with diving for shellfish, and left the resource to the ones on shore.

Sindicato El Quisco also had a winch for hawling small boats up the beach, something that would have greatly benefitted the Las Cruces fishers, (who regularly burnt out the clutch of an old pick-up truck, hawling their boats).

In terms of superstructure, El Quisco benefitted from the consistent presence of a dedicated extension worker who participated in helping organize Management Area and other aspects.

Las Cruces: 44 members; Management Area established in 1993.

In some respects, Las Cruces was the poorest of the sindicatos. The town is very small and although it houses wealthy retired vacationers, there is scarcely ever a market opportunity on their landing beach, which is steep, rocky and far from town and the closest throughway. One great advantage that this sindicato has (especially over Cartagena, which is also very poor), is the interaction with the Estacion Costera de Investigaciones Maritimas (ECIM), a coastal research station of the Pontificia Universidad Catolica de Chile, Santiago). ECIM is located approximately a mile from the boat landing and an extension worker regularly works with the sindicato members. For example, with the help of ECIM, Sindicato Las Cruces surveyed, applied for, and was awarded a Management Area.

Cartagena: 27 members (variable enrollment); No Management Area

Cartagena, the southernmost hamlet in the study, was also very poor, like Las Cruces. This sindicato was in the large town of Cartagena, which is largely a tourist resort for Chile's poorer local tourists. There were many rumors that this town was frequented by drug runners and buyers. Cartagena borders on the busy port of San Antonio, which lies 3 kms to the south and can be regularly accessed by boat and minibus. The members of Sindicato Cartagena were in the process of applying for a Management Area, but were frustrated by low

numbers of abalone along their particular area of coast. Biologists felt this may have been natural, or perhaps due to extensive human depletion of stocks in the area.

Case Study of Abalone Management

Government Management:

In the 1970's, stimulated by Japanese sushi markets and an enthusiastic Chilean government, small-scale fishers began intensively harvesting abalone along then entire coast of Chile. For a decade, abalone was known as "Chile's gold" (Schurman & Sheehan, 1992). Like any good resource, abalone was unable to withstand the pressure of exploitation and in the 1980's the resource dramatically declined.

Since 1989, abalone has been under a complete and prohibitive government ban, disallowing any form of extraction, as controlled by the Ministry of the Economy. Periodically, the ban may be lifted, with size and quota restrictions, according to government plan. In 1994, it was lifted twice (once in August, during my study, and once again in November), to allow extraction of abalone of over 10 cm diameter along the entire coast. Each of Chile's regions set a limit on the number of abalone allowed per diver. All divers had to register with Servicio Nacional de Pesca (SERNAP), a regional government agency. Government law enables divers to register, regardless of their permanence in the area, or their membership in a sindicato. After a certain number have registered, the government closes the diving register for the year. As explored in "Conclusions", this revealed a fundamental difference between government and sindicato interests.

Sindicato Management:

Each sindicato with a Management Area could control the number of abalone extracted within their Area once the ban was lifted. And they could control access to all living resources in their Area by membership to the sindicato and enforcement of established sindicato rules. Outside of the Management Areas, abalone were open access to all registered divers when the ban was not in effect. Similarly, all other resources were open access to

all registered small-scale fishers and seemed to follow the same "all or nothing" regime: Inside the Management Areas, everything was protected. Outside, everything lucrative was extracted.

The feeling that a Management Area could be or was successful, depended in part on the known and perceived productivity of the designated area. Most of the fishers had a strong sense of the productivity of neighboring Management Areas, and a watchful tension punctuated conversations surrounding the productivity (as well as average abalone size) of each Area. The fishers in Cartagena for example, felt that they had minimal chances of benefitting from a Management Area, due to the low productivity of their section of coastline.

Success of the Government Ban When In Effect :

Outside of the Management Areas:

Outside the management areas abalone are regularly predated by members of all four sindicatos, regardless of whether or not the ban is in effect. Although discouraged by fellow members in the three organized sindicatos, this is still seen as an individual decision, and there were no sanctions against it in their respective constitutions. However there are distinct differences among the sindicatos in the ways that poaching is performed.

Open Poaching:

Weather permitting, this was regular practice by members of Cartagena, the poorest, least well-organized union (the only one of the 4 observed, without a Management Area). Since abalone do not reach large sizes outside of management areas in this region, fishers frequently attempt to pirate the resource from neighboring Management Areas during the night, in foggy weather and sometimes even on clear days. The territorially defensive unions (Las Cruces, El Quisco and Algarrobo) are increasingly well organized against this behavior. Protective violence was increasing, for example many fishers reported pummeling the marauding boats with rocks, and one man had lost his eye in defense of his Management Area during a raid. The

Cartagena offender was fined by the government's marine authority and lost his license, his boat and equipment, but was allowed to go free.(4)

Discreet Poaching:

This style of resource acquisition was well-known in all the unions. The three organized sindicatos rarely pirated from each other although on occasion it had happened. Their activities centered around the extraction of abalone outside of the Management Areas. In general, the further away they were from home port, the larger the abalone available. Discreet poaching activities were carefully premeditated and organized under the guise of harvesting other resources. Because of the illegal nature of this activity, I cannot make any strong conclusions about the "rules" of poaching. However, the most interesting distinction (or trend) observed, was that members of sindicatos with Management Areas who poached, only extracted abalone of legal size, outside of their Areas. If the behavior witnessed is generally representative of this "class" of poacher, I am speculating that the act of managing their own resources has created an increased awareness of abalone ecology, provoking the fishers, even under illegal circumstances, to abide by certain "natural" laws. It can be noted that I was only aware of this risky behavior a handful of times, when a contract had been made between the pirating crew and a known buyer (often a local restaurant), to fill a certain quota at a pre-paid price. (5)

When the Ban was Lifted: **[OVERHEAD]**

When the abalone ban was legally lifted, the government allowed all registered divers to fill a limited quota of legal-sized abalone. At this time, increasing numbers of non-sindicato divers arrived at the coast. The government's Marine Authority greatly increased its presence using helicopters and speed boats to set up enforcement, in part by routine check points at disembarcation points.

At this time, the three organized sindicatos greatly increased group discussions, extra meetings involving the divers and their crews, and general assembly meetings. The meetings all addressed the decision to extract abalone from the Management Areas, the agreed harvest quantities, and which sindicato members would be allowed to dive. Anyone enrolled in SERNAP's register could dive outside of the management area

during this time. But within the Areas, all three sindicatos had strict guidelines and graduated sanctions for members who had failed to show up to meetings and perform sindicato management duties.

When the ban was lifted, the price for abalone rose steeply, due to legal international sales. However during the time I was there (May - August, 1994), the international price was lower than expected, relative to other years. Paradoxically, when the ban was first lifted, all abalone extraction ceased, both within and outside of the Management Areas. During the entire period of legal harvest, noone, including the Cartagena members, harvested outside of the Management Areas. The reason was due to a jockeying between sindicatos and buyers for favorable prices. Even at a better price than the poached abalone, two of the three sindicatos (El Quisco and Algarrobo) chose not to harvest abalone during that legal season. Instead they increased enforcement both day and night, to protect their resources for the next season. The Las Cruces divers eventually harvested their quota, in part due to a greater abundance of large abalone within their Area. Members of Cartagena focussed their efforts on pirating the larger abalone in Las Cruces' Management Area, which, once landed, could be sold legally at the highest available price. Their task was made difficult and increasingly dangerous by the reinforced round-the-clock vigilance by the Las Cruces sindicato members. And by increased diurnal government enforcement, including the occasional presence of military patrol helicopters.

Management Implications for Other Species:

At the time of the study, the sindicatos prohibited the harvest of all species inside of their Management Areas. The explanation was that they were reinforcing sindicato member discipline while allowing stocks of all economically viable resources (like abalone, sea urchin, limpets) to recover. With the maturation of sindicato management strategies, intricate strategies will probably materialize in relation to each economically feasible species.

Conclusions

Management Areas:

Shellfish management in Chile is still in the early stages. Because of their recency, the social, political and economic durability of Management Areas is still untested.

Economically, Management Areas have the capacity to yield steady returns over the long term if the resources are carefully regulated. Exploitation of a single species (abalone) within the Areas is precarious, especially in the face of fluctuating international prices. Should the market drop, (for example as a result of alternative sources of abalone, via mariculture projects), Management Areas would prove institutionally weak. It is no surprise that the implementation of Management Areas for abalone has stimulated discussion of improved management of other shellfish (red sea urchins and limpets) among sindicato representatives. Unfortunately for the poorer sindicatos like Cartagena, the costs of hiring a fulltime biologist/extension worker to assess each sindicato's resource base, can stall them from applying for Management Areas.

Politically, Management Areas may represent the biggest step. The government abalone ban has had virtually no effect on the abalone population outside of the Management Areas. The only time this resource was not extracted outside of the Management Areas, was when it is legal to do so. But for abalone within the Management Areas, managed by the three sindicatos, the government ban served a complex, largely positive purpose. Fluctuations in international market values of lucrative shellfish resources like abalone, were locally tolerated by fishers, through careful harvest management, at least over the short term. Despite their seemingly insignificant size, Management Areas represent the first step towards providing small-scale fishers with rights of access to their own resources.

Policy Recommendations:

Chile's first attempt to legally address the needs of its fisheries and natural resource base has been admirable. However the Fisheries and Aquaculture Law of 1991 has some serious shortcomings. The lack of accompanying regulations has made it difficult for small-scale fishers to feel secure about the future of Management Areas. Currently, after a period of two years, Management Areas legally convert to mariculture concessions at which point they may be leased by the government. This could have two effects: 1) Intensification of mariculture even when a wild management scheme may be more appropriate, and; 2) conversion of Management Areas into private property to be leased to those who can pay. Needless to say, the second effect would exclude the vast majority of small-scale fishers as they are some of Chile's poorest citizens.

Management Areas cannot currently (for some obscure reason), include what the government designates "Natural Banks". These are areas of sandy soil with high densities of a variety of clam species. Resulting open access harvesting strategies threaten the future of these species.

The contradiction between state priorities and local needs extends to the government's provision of a generous number of diving licenses to unspecified citizens, in effect disempowering small scale collective efforts like sindicatos, in favor of the individual. Obviously the government is torn between environmental sustainability and providing short-term job opportunities especially suited to terms of election. Although much improved since the implementation of the Fisheries Law, the communication between members of small-scale fishing communities and the government still emerges out of a "cultural border zone" (Zerner, 1994), in which each of the cultures tends to blame the other for their constraints. To create truly effective co-management, government will have to listen ever more carefully to the needs of those directly dependent on commonly managed natural resources.

FOOTNOTES

1. Small-scale fishers are classified as having embarcations of up to 18 meters length and 50 tons gross capacity (Ley de Pesca, 1994). Technological complexity varies in the sector; the simplest is hook and line and the most complex are the deep sea sword fishing boats. The shellfishing rigs are small outboard-powered boats of 5 - 9 meters in length, equipped with primitive air compressors and "hookahs" (breathing hoses). Crews usually vary from 2 - 5 fishers.

2. Salmon are an alien species to Chile, which is automatically a cause for concern. The salmon farms are input and technology intensive. They are subject to many problems of disease, as well as pollution from too much fertilizer and antibiotic applications. The ecology surrounding a fish farm is usually altered from its surroundings. For example, Ecuador shrimp farms are notably responsible for the large scale degradation of fragile mangrove ecology. The side effects include the destruction of natural ecosystems critical to offshore fish populations and subsequent economic and social damage to dependent human communities.

3. Government species harvesting bans apply within the Management Areas as well.

4. These sorts of skirmishes are reminiscent of the literature on the "lobster fiefs" of Maine (Acheson, 1987), in which the local fishers are either lightly reprimanded by the marine authority, or (more commonly) they are left to their own methods of enforcing locally recognized lobstering territories.

5. Informants agreed however that the price was arranged by unit, and not contingent on the size of each "loco".

Classification of Property Types

I. Unowned Property (or "Non-Property")

Open access; noone excluded
eg. high seas

II. Public Property

Held in trust by the State for general public access
eg. national territorial seas

III. State Property

Exclusively owned; no public access
eg. military areas

IV. Jointly Owned Private Property

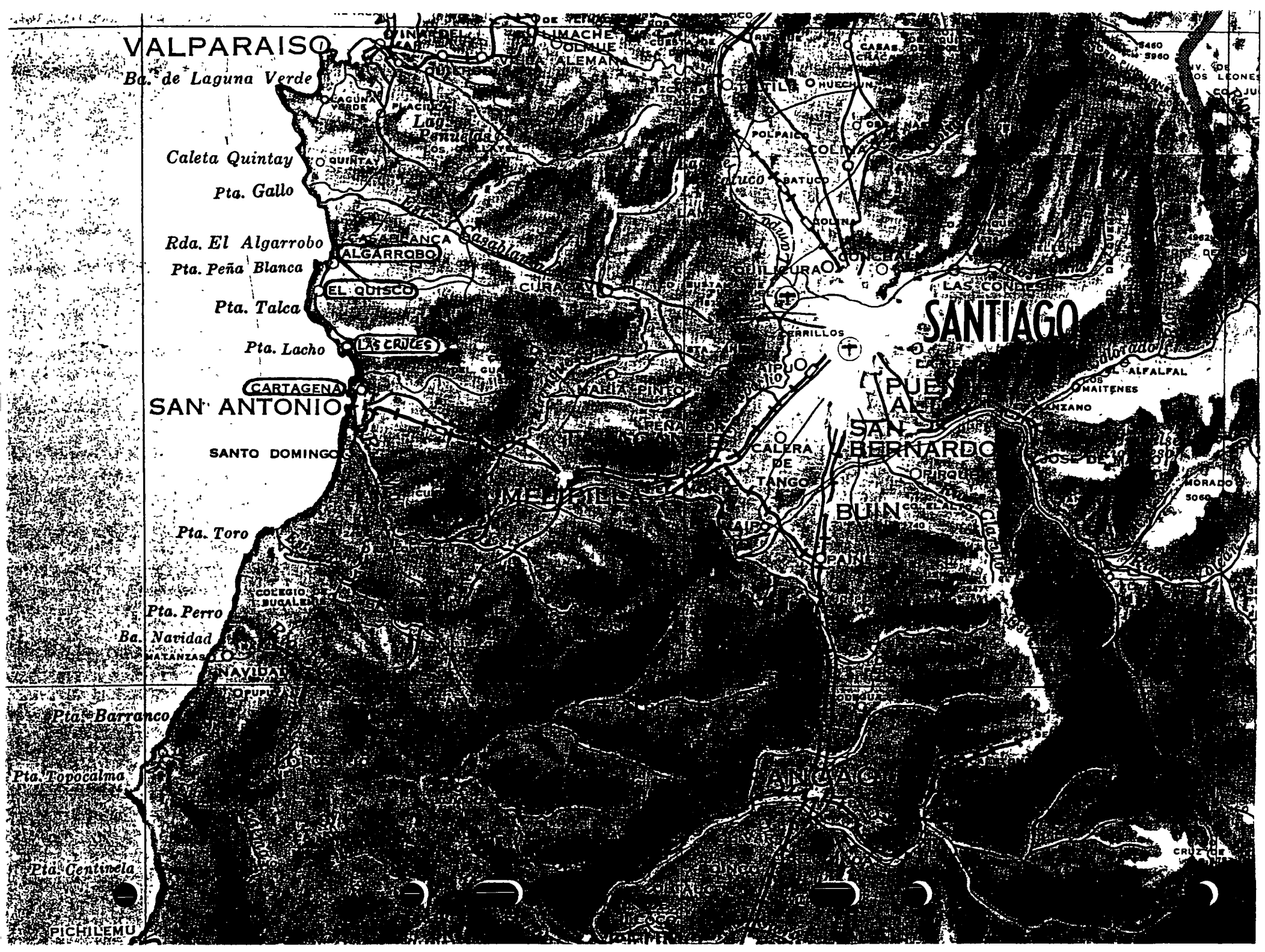
Exclusively owned; no public access
Without negotiating, individual co-owners may sell their private shares
eg. coastal resorts, some mariculture enterprises

V. Common Property (or "Communal Property")

Jointly owned private property; no public access
No unilaterally tradeable shares
Co-owners may only agree to sell by simultaneous vote;
Individual co-owners may sell, trade, lease only in accordance with strict group rules
eg. some coastal concessions

VI. Individually Owned Private Property

Exclusive individual ownership except as attenuated by government regulation; no public access
eg. private boats


VALPARAISO
Ba. de Laguna Verde
Caleta Quintay
Pta. Gallo
Rda. El Algarrobo
Pta. Peña Blanca
Pta. Talca
Pta. Lacho
CARTAGENA
SAN ANTONIO
SANTO DOMINGO
Pta. Toro
Pta. Perro
Ba. Navidad
Pta. Barranco
Pta. Topocalma
Pta. Centinela
PICHILEMU
LAGUNA VERDE
QUINTAY
CASABLANCA
ALGARROBO
EL QUISCO
LAS CRUCES
LIMACHE
QUILPUE
VILLA ALEMANA
TILIL
HUECHUN
POLPAICO
COLINA
BATUCO
GUILGURA
LAS CONDES
SANTIAGO
CERRILLOS
MARIA PINTO
CALERA DE TANGO
SAN BERNARDO
BUIN
PAINE
MELIPILLA
ANCUD
ALFALFAL
MAITENES
MORADO
COLEGIO DE BUGALEU
NAVIDAD
MATANZAS

Socio-economic Comparison of Four Sindicatos

	CARTAGENA	LAS CRUCES	EL QUISCO	ALGARROBO
SINDICATO LABOR FORCE				
Members	(50) 27	33	139	117
Age ranges	most young	most young	mixed young-old	mixed young-old
Shellfish divers	30?	17	43	36
SINDICATO FACILITIES				
Office with phone	no	no	yes	yes
Social hall	yes	no	yes	yes (small)
Diving equipment sheds	yes	no	yes	yes
BOAT RIGS				
Outboard motor rigs	16	11	32	36
Inboard deep sea rigs	0	0	9	0
MARKETING				
Access (easy-diff)	easy (from dock)	difficult	easy	easy
Demand - offseason	constant	unpredictable	weekends	weekends
Demand-holidays	constant	unpredictable	constant	constant
Restaurant (concession)	no	no	yes	no
Fish shop	no	no	yes (concession)	yes (sindicato)
VACATION HOMEOWNERS				
Wealthy-poor	poor	wealthy	wealthy	very wealthy

Comparison of Internal Rules in Four Sindicatos

	CARTAGENA	LAS CRUCES	EL QUISCO	ALGARROBO
MEMBERSHIP REQUIREMENTS				
Diving licence	yes	yes	no	no
Hamlet resident	debated	debated	yes	yes
Related to others	no-but most are	no-but most are	yes	yes
Other	Clean record			
Life membership fee	15,000 pesos	70,000 pesos	62,000 pesos	61,000 pesos
Membership fee for sons		half for sons	half for sons	half for sons
Monthly dues	500 pesos	1,200 pesos	1,000 pesos	1,500 pesos
Monthly meeting attendance	obligatory	obligatory (fine)	obligatory (3,000 fine)	obligatory (3,000 fine)
MEMBER BENEFITS				
Health Insurance	No	No	No	Limited coverage
Funeral services	No	No	No	Yes
MANAGEMENT AREA ACCESS REQUIREMENTS				
Membership duration	n/a	Member for 2 years	Member for 2 ban-lifts	Member for 1 year
Relationship	n/a	new=only sons	new=only sons	new=only sons

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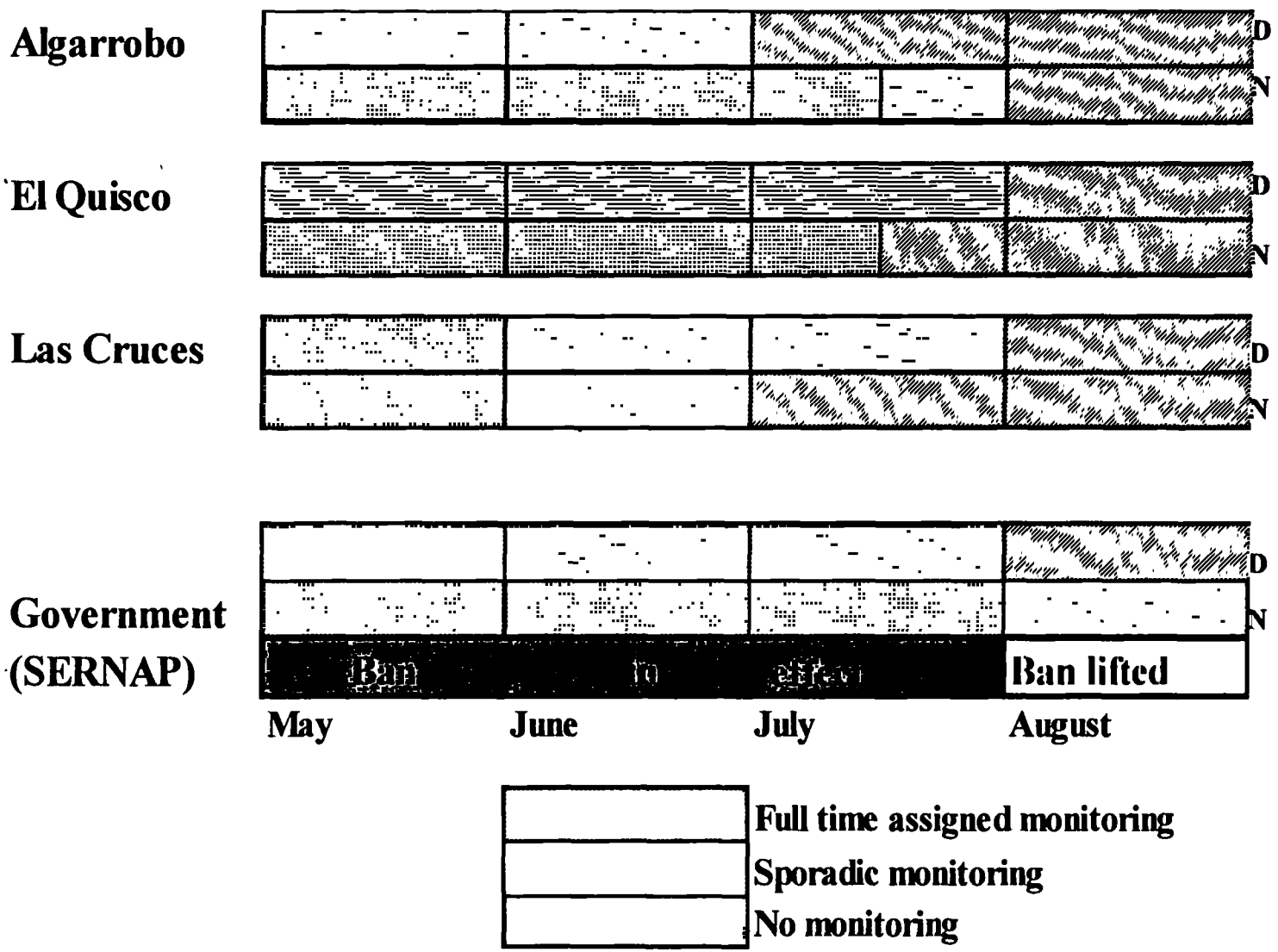
Abalone Monitoring by Three Sindicatos and the Government



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