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Two Factors Affecting the Solution of Social Dilemmas in a Mexican Fishery

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I. Introduction

In this paper, I explore the relevance of two design principles: clearly defined boundaries and minimal recognition of fishers' rights to organize, to the emergence and maintenance of CPR institutions in the Lake Chapala fishery. First, I provide a brief description of the research and its setting. Second, I describe the boundaries of the fishery, as articulated in law and government policy, and in policy espoused by the fishers' organizations studied. Third, I discuss examples of inconsistencies in authorities' recognition of these various boundary definitions, and the effects these have on fishers. Finally, I summarize the combined effects of unclear boundary definition and incomplete recognition of fishers' efforts to coordinate resource use on their ability to resolve problems associated with that use.

II. The Setting

Lake Chapala, located 48 kilometers southeast of Guadalajara, Jalisco, is the third largest lake in Latin America. The lake is the focal point of the five-state Lerma-Chapala-Santiago watershed, and itself covers 1,100 square kilometers in two states, Jalisco and Michoacan. In addition to fishing at the lake, the watershed supports a variety of uses, including irrigation agriculture, municipal water supply, and tourism. These uses, coupled with a decade of dry weather, were responsible for substantial losses of water quality and quantity, which led to spatial crowding in the fishery, and apparent shortages and contamination of fish stocks. Although heavy rains in 1991 and the implementation of various infrastructural improvements (e.g., sewage treatment plants) have limited further deterioration of water quality and allowed the lake level to rise, these problems and others associated with use of the CPR persist.

The case study of Chapala's fishers focused on three organizations and their members. The material presented here is part of a larger study that explored the relevance of selected individual and organizational factors to cooperation in social dilemmas of CPR use. The organizations studied were: Union de Pescadores del Lago de Chapala ("the Chapala union"), Sociedad Cooperativa de Producción Pesquera Pescadores de Chapala ("the cooperative"), and Union de Pescadores San Pedro Tesistán ("the San Pedro Union"). The first two organizations have about 180 and 30 members, respectively. Both are based in Chapala, the municipality's center and the site of the regional

Fisheries Secretariat (PESCA) office. The San Pedro union has 20 members, and is based in San Pedro Tesistán, a small, south shore lake community in the municipality of Jocotepec. All three organizations fall under the jurisdiction of the regional PESCA office.¹ These organizations were chosen to represent the variety of organizational forms (union and cooperative) and for their differing proximity to the PESCA office. Data were collected during five months of fieldwork using the case study techniques, including participant observation, personal interviews, documentary and archival research, and a survey interview. The survey was conducted with a random sample of Chapala union fishers and with all fishers from the other two groups to limit overrepresentation of the considerably larger Chapala union.

The lake's small-scale commercial fishery involves an estimated 2500 fishers, two-thirds of whom are registered in 59 unions and 8 cooperatives (SEPESCA 1989).² Fishers use stationary gear, including nets, traps and longlines, to catch tilapia, carp, and catfish. They travel to and from gear sites in wooden or fiberglass skiffs, some of which are equipped with outboard motors.³ Mobile gear include the haul net or seine (*mangueadora*), and the cast net (*atarraya*), both used to catch charal. The *mangueadora* is fished by two people from a long, narrow boat; the *atarraya* may be fished from a boat, from public shoreline, or in individually concessioned federal parcels of land, known as *ranchos charaleros*.

Most Chapala and San Pedro fishers sell their tilapia, carp, and catfish to buyers who then sell the fish live, eviscerated, or in filets to the public. Although there are six stalls that sell lake fish in Chapala's central market, much of the catch is sold on the street; a small fraction of it is sold in Guadalajara, the nearest major market center. In San Pedro where there is no market, fishers sell their catch to one of two buyers, both of whom are union members.⁴ Charal is fished by Chapala fishers, but not by those in San Pedro. Charal fishers sell to one of three processors (two in Chapala, one in Petatan, Michoacan). Fishers dry some of the catch before selling it to buyers, but most is sold fresh to them for processing and local sale by street vendors or for bulk delivery to Monterrey and Mexico City.

¹ Three PESCA offices have jurisdiction over the lake fisheries. The Chapala jurisdiction is the largest, with authority over 43% of the organized fishers and (supposedly) 60% of the lake. The Ocotlan, Jalisco and Sahuayo, Michoacan offices have authority over 40% and 17% of organized fishers and 30% and 10% of the lake. The delineation of these jurisdictions is somewhat arbitrary, as neither fishers nor fish respect such boundaries.

² Sources estimate anywhere from 900 to 3000 unregistered or "free" fishers (Pare 1987;).

³ Each species has its high and low production and consumption periods. Nonselective gear, such as traps and nets, enable fishers to catch throughout the year. The *atarraya* and *mangueadora* are species-specific, and are used best during high production periods of January through April and July and August.

⁴ One buyer, who also is a fisher, takes the catch to Guadalajara by bus to sell it. The other, a former fisher, runs a stall in the nearby Jocotepec market.

III. Clearly Defined Boundaries

Clear definition of resource boundaries, and who may and may not use the resource constitute the first step in organizing for collective action (Ostrom 1990). Boundary definition makes exclusion of potential resource users possible, and helps assure resource users that they will be able to continue to derive benefits from the resource. Boundaries create a sense of control and efficacy (Edney 1981). Users' efforts to coordinate resource use are encouraged by a sense of control over investments they make in caring for the resource or otherwise coordinating its use. Without boundaries, a high demand for the resource increases the possibility of its destruction because users adopt a 100% discount rate (Ostrom 1990). There is no assurance or guarantee that the resource will be there tomorrow if one forgoes taking it today.

Boundaries of the Lake Chapala fishery are prescribed variously by law and in policy at different levels. These prescriptions are then interpreted and applied by authorities and fishers' organizations. The variety of prescriptions and interpretations means that boundaries are, in fact, **not** clearly defined, and thus adds to the uncertainty associated with the use of a renewable resource.

The Chapala fishery is a complex system that includes mainland and island shoreline where some fishing occurs, as well as open water and the fish targeted for capture.⁵ Each of these elements is relevant to boundary definition. Legally defined, the fishery resource is not common, but state property, to be managed by the Fisheries Secretariat. According to federal law, inland waters, unless they lie within private property, are federal property (SEPESCA 1988). Fish are likewise federal property; they become private property upon capture by legitimate appropriators. Because fish are mobile, it is not possible to define areas within the lake for certain stocks or species⁶. Any adult Mexican citizen who has registered himself and his fishing equipment with the National Fishing Registry, and has obtained permits and concessions required by federal, state, and local fishery authorities, may fish commercially (SEPESCA 1988).⁷

The territorially based rancho charalero fishery has legally specified boundaries tied to the concession and use of federal land. The ranchos fall under the jurisdiction of the Secretariat of Agriculture and Water Resources (SARH). To insure his exclusive right to a rancho, a fisher obtains a concession to a plot of shoreline land and its submerged extension from SARH, through the National Water Commission (CNA). The concession is secured for a fee and by contract, which

⁵ This shoreline has retreated and advanced as human and natural forces have withdrawn and added water.

⁶ That fish are a flow resource adds to the difficulty of defining resource boundaries.

⁷ Some species are reserved for fishing cooperatives, but none of these species is found at the lake. Permits are required for three fisheries: 1) tilapia, carp and catfish 2) charal and 3) whitefish (a prized, but nearly extinct fish).

presently guarantees the holder to a one-year exclusive right of usufruct (CNA 1991). Fishers value this exclusive right because they make improvements to the area to attract spawning charal, and feel exclusively entitled to the benefits to be derived from this effort. As Ostrom notes, without defining boundaries and closing the resource to outsiders, local users face the risk that the benefits produced by their efforts will be reaped by others who have not contributed.

Policy, established primarily by the state PESCA delegation, provides a second set of resource and user boundary definitions.⁸ Policy is the result of authorities' interpretations of the law for application to its jurisdiction. Furthermore, policy and its enactment reflect the extent of authorities' recognition of fishers' rights to devise their own institutions. (See discussion below.) Given sufficient and accurate information, policy and its interpretation can result in good fitting rules and enforcement that build assurance of resource users. In the Chapala case, policy espoused by the state office in Guadalajara is one interpretation; that voiced by the Chapala office is another. There is no policy coordination between the three regional PESCA offices (two in Jalisco, one in Michoacan) that share jurisdiction over lake fisheries.

Policy pertaining to the definition of the resource upholds law designating the lake and its submerged lands as federal territory. At the same time, local Pesca chief Ortiz acknowledges the tacit territorial division between Jalisco and Michoacan. That territorial distinction means that policy formulation and application by Ortiz and his superiors is confined to Jalisco territory and its fishers. A more vague resource boundary exists between the jurisdictions of the two regional offices within the state. Within the Chapala office's region, which covers about 60% of the lake, Ortiz has condoned and at times promoted community boundaries. He and his staff encourage fishers to ask permission from another community's fishers if they want to fish within 500 meters of that community's shoreline. The policy has been backed, if weakly, by their occasional visits to communities where fishers complain of intruders. Ortiz' suggestion that fishers ask permission if they want to fish in non-home communities has come to be taken by some to be a rule, if not encoded law. Many fishers speak of a group's or community's zones, where resident fishers have preference in setting their gear. The delineation of such zones creates both social and physical conditions that assure fishers of their exclusive right and promotes coordination of resource use among them. Many fishers view the establishment of community zones as a way to reduce conflict by limiting the number of and differences among fishers, thus facilitating their efforts to coordinate resource use. These effects of small group size and homogeneity have been found elsewhere to be associated with increased cooperation in social dilemmas (Edney 1981). By excluding outsiders, insiders are more likely to develop a sense of interdependency within the community, which can make dominant free riding implausible and enhance assurance (Runge 1986). The recognition and reduction of physical

⁸ The Jalisco office is located in Guadalajara, with regional offices in Chapala and Ocotlan (at the northeast end of the lake). The Michoacan Pesca Delegation is based in Zamora; its office responsible for Lake Chapala is in Sahuayo, southeast of Lake Chapala.

boundaries (e.g., to coincide with a community's upland) promotes greater visibility of resource conditions and use, facilitating monitoring and enforcement (Jorgensen and Papciak 1981, Cass and Edney 1978).

PESCA's policy defining who may and may not fish commercially departs from the legal definition, and is ambiguous and inconsistently applied. In 1984, PESCA began to pursue the policy of requiring fishers to form unions and cooperatives. This policy was adopted as an expedient for management (Pare 1989). It also allowed Pesca to break the power base of the Chapala union, which had been established in 1960 by a local cacique (Ortiz pers. comm.).⁹ The rationale offered to fishers for forming more localized organizations was that attending meetings would be easier and less costly. PESCA created an additional incentive by offering aid (e.g., gear, easier access to loans) to newly formed groups to replace what had long been supplied by the president of the original Chapala union. It was hoped and assumed that fishers would use the organizations as a mechanism for coordinating resource use, including commercialization, and for achieving social objectives (e.g., improved well-being of fishers and their families through mutual aid) (Soto pers. comm.). Permits, which had been required since 1971, continued to be issued to individuals. Since 1989, the state office has pursued a policy of granting permits only to organizations, thus requiring commercial fishers to join a group to obtain permits and fish legally.

Local PESCA policy does not explicitly limit entry to the fishery. Rather, Chapala PESCA chief Ortiz has deferred the decision to admit new fishers to fishing organizations. An individual permit can be obtained by going directly to the Guadalajara office, but this procedure is costly and time consuming. In addition to spending time and money to go to Guadalajara, one must pay the \$114,000 (about \$47 US) fee per permit. By joining a group, one saves the former costs because a group representative obtains the required permits locally; the latter cost is significantly diminished because permit costs are divided among group members.

A third set of boundary definitions is found among fishers and in group policy on admitting and excluding members. Most fishers share the opinion that the lake is free; one can fish where he pleases, provided he respects others' gear. Anyone who has obtained required permits and carries a credential, or identification card, may use the resource; all others are excluded. As most understand the rules, one can obtain these things only by joining a group. The resource is perceived as common property of all fishers who are members of a union or cooperative. Group membership entails the

⁹ The emergence of this policy is tied to the prior designation and subsequent development of Pesca as the fishery management authority. This local cacique formed an extensive organization of fishers to assure his dominance as the principal middleman in Chapala. Until 1984, fishers were assured protection from potentially abusive authorities and opportunities for equipment, loans and other types of aid. The cacique also exercised considerable control over local and state fishery authorities.

costs of monthly dues, permit fees, and meeting attendance.¹⁰ Benefits are the legal protection of coverage by a group fishing permit and assistance if one is in economic or legal trouble. Organized fishers who regularly attended meetings criticize absent members for being "de pura conveniencia," or free riders.

Boundary definition is more explicit in San Pedro, where fishers say that as union members, they should have the exclusive right to fish the zone adjacent to their community. This idea derives in part from their past association with a coalition of fishers' organizations which espoused group- or community-specific territories, and presented the idea to Pesca as a means of rationalizing the fishery (Pare 1989). San Pedro fishers report intrusions by outsiders from distant communities, and complain of the unfairness of local "free fishers," those who are not members of a union or cooperative, and/or lack a permit. Union fishers feel they are abiding by the rules and paying the costs to fish, while these others are not. Free fishers are free riders, who secure benefits from the fishery (i.e., access to the resource and income from its sale) without contributing to the costs (i.e., permit fees, group participation) (Oakerson 1986).

Ortiz' deferral of decisions to admit new fishers to the unions and cooperatives has given the groups an opportunity, albeit limited, to define who may or may not use the resource. Each group has its own criteria for admitting and excluding (both by denying entry and expelling) members. All expel members for stealing others' fish or gear, and for other disruptive behavior. In San Pedro, anyone who demonstrates an interest in the fishery and the group is likely to be admitted. He must agree to attend meetings, pay his share of the permit and other group dues, and may be called on from time to time to contribute labor or money to a group or community project. While the union did not receive requests for admission during the study, a core of active members was trying to redefine group boundaries by excluding noncomplying members. Noncomplying members are those who 1) have moved to the United States without giving notice to the group or paying fees to cover their absence or 2) have stopped attending meetings and remain in the community, some of them continuing to fish. Previously, a member was excluded for alleged abuse of group funds and aggressiveness toward other members. To exclude members, the union gave the local PESCA officer a list of active members, including two members who had given notice and paid fees before going to the US for several months. Union members also provided the PESCA officer with the names of noncomplying members, as well as others who they say are free fishers, specifically those not affiliated with a group and lacking permits.¹¹ Fishers removed from the list no longer are covered

¹⁰ In additional cost in some unions is participation in local political events. The rationale is that political support today provides at least some assurance of help tomorrow if the need should arise.

¹¹ The alleged free fishers are actually had obtained membership in another group, in another community. The local Pesca office has been in conflict with this other group, in connection with past efforts to organize south shore fishers into a coalition. In late April, the local Pesca office was trying to re-establish more congenial relations with this group.

by a permit, and would be fishing illegally.

As in San Pedro, the Chapala cooperative is trying to redefine group boundaries by excluding noncomplying members. Admitting and excluding members from the cooperative, however, is more complicated, owing to the Federal Cooperative Law (1938) and regulations which establish explicit criteria and relatively complex procedures for admission and exclusion of members. Changes in group membership must be submitted to the Secretariat of Labor and Social Provision (STPS) in Guadalajara and Mexico City, and to the state Federation of Fishing Cooperatives ("the Federation"), the non-government coalition of fishing cooperatives, for approval. This procedure occurs entirely apart from PESCA, although the cooperative is supposed to notify the local PESCA office for purposes of permitting and keeping track of fishers. In monthly meetings from November through April, a core of active members tried to redefine group boundaries by excluding members who had stopped participating in group activities.¹² Daunted by the procedure outlined by cooperative regulations, they sought help from the Federation. Although the cooperative leadership sent the Federation a revised list of members, and later pursued the matter at its headquarters in Barra de Navidad, no progress had been made by the end of April.

The Chapala union's policy is to admit sons of fishers, virtually without limit, to provisionally accept other fishers, and to reject those who intend to enter the fishery for only a brief period.¹³ This policy departs notably from that of the previous union leadership, which actively sought new members. New members admitted during the study were two fishers who had had problems with the leadership of a nearby union, and four fishers from another lake who are related to several union members. Entry was denied to a man who wanted to fish during Lent, but had no prior experience or intention of fishing at other times. Union members explained that his interest was "purely for convenience." By gaining temporary membership, he would derive the short term benefits of the brief high market season and the legal protection afforded by group membership, without paying the

¹² This core had succeeded partially in redefining the group and resource use boundaries through the annual renewal of the cooperative's rancho concession ("el islote") adjacent to Isla de los Alecranes. Unlike the UPLC rancho concessions, the cooperative holds a single concession of federal land, the use of which is available to all dues paying members. This is consistent with the law governing cooperatives (1938), which states that all means of production are common property of the group. The president of the cooperative, who represents the group before SARH, has redistributed some of the subdivided parcels to complying members, as an additional means of redefining group membership and resource use.

¹³ A few UPLC members are not fishers, but fish buyers and vendors. The UPLC president is a former fisher and restaurant owner; the secretary has not fished commercially, but is one of two charal buyers/processors in Chapala, and the son of the original UPLC founder.

Many fishers join when it is "convenient," as in Lent when there are benefits supposedly to be gained from a high demand for fish and its resultant higher price. Their entry not only crowds the fishery, but floods the market, and eliminates any profit windfall created by the higher demand for fish. In reality, the additional benefits to be realized during Lent are few. One fisher commented that there is actually less demand for fish during the 6-week period. People tend to buy fish only on Fridays, when religious custom prohibits the consumption of meat.

full costs of group participation. Like the other two organizations studied, the Chapala union has begun to exclude members for failing to comply with group rules (e.g., attending monthly meetings, paying dues). At the November 1991 union meeting, the treasurer read a list of members to be excluded for their failure to contribute to an annual religious festival in which fishers play a large part. Over the next several months, fishers were given the chance to pay the fee. The list was finalized in March to be delivered to Pesca, which could then enforce the permit requirement, and effectively exclude some resource users.¹⁴

IV. Minimal Recognition of Rights to Organize

The lack of clearly defined boundaries is closely related to inconsistencies in another area, namely the design principle of minimal recognition of rights to organize. According to Ostrom, minimal recognition means that "the rights of appropriators to devise their own institutions are not challenged by external government authorities" (1990:101). Resource users may make their own rules or modify externally designed rules to best fit local conditions. Whatever locally devised or adapted rules emerge must be recognized by government resource management authorities as legitimate, to then enable their enforcement. If government limits fishers' enforcement authority, it must then provide a consistent and workable alternative. Otherwise, the bounded system will become open access, and assurance problems will persist.

At Chapala, inconsistencies in authorities' recognition of fishers' rights to organize has destabilized boundary definitions and further inhibited the emergence and maintenance of local institutions for CPR use. Some examples are: 1) the legal recognition of the rancho system, 2) the definition of fishing zones for each organization, 3) support of groups' efforts to redefine user boundaries and 4) the recognition of a coalition of fishers' organizations.

Ranchos charaleros were first developed in the late 1800s as an extension of lakeshore cultivation. Following the Mexican Revolution, the government required individuals to obtain concessions to this federal land. The rancho charalero system was legally recognized in the 1930 Fishery Code, which specified the exclusive right of concession holders to fish these areas (Departamento Forestal de Caza y Pesca 1939). The 1930 Code exempted rancho fishers from the charal closure, based on an argument that they enhanced charal reproduction by creating and maintaining spawning habitat, and by scaring away predators. In the revised 1985 code, however, recognition of these exclusive rights is absent, as is any reference to freshwater fisheries. Ortiz (pers. comm.) suggests that simplification of the fishery code over the intervening years is responsible for the omission.

¹⁴ By the end of fieldwork in late April, the list of 27 UPLC members to be dropped from the group had not been passed on to the Pesca office.

Ortiz points out the discrepancy between the 1930 and 1985 codes, and used it as a basis for his professional thesis (Ortiz 1985) and subsequent efforts to gain legal recognition for the rancho system. He makes two arguments in favor of legalizing the ranchos. First, it makes more administrative and practical sense to legitimize and rationalize this fishery than to fight it (which would be costly to both PESCA and fishers). Recognition of the rancho system would enable PESCA to exercise some control over it as well (e.g., define boundaries, collect revenues). Second, the ranchos are an extensive aquaculture system; fishers create spawning habitat and drive predators away while tending and fishing their ranchos. By enhancing production in their ranchos, fishers assume some of PESCA's resource management responsibilities. A third argument in favor of the rancho system relates to its history. As a local institution that developed informally among resource users, it entails a set of rules and mechanisms for monitoring and enforcement, which have been adapted to changing conditions in the fishery. This system can be and is often used without recourse to authorities, and thus is more cost effective than government management. The value of such territorially based systems has been documented in other fisheries (e.g., Panayotou 1983, LeVeiel 1987).

The present status of the charal system, however, is precarious. Under current water resource and fishery laws, the ranchos are not legalized, nor is fishers' right to work them during the charal closure. The contract for a federal zone concession was designed for farmers who wanted to lease fertile lakebed land. The contract prohibits changes to the landscape other than seasonal ones. The modifications rancheros make to enhance charal production and reproduction (e.g., constructing jetties, clearing lake bottom of debris, planting shade trees) are more permanent, intended to create good, enduring charal habitat. Although state and local PESCA authorities have sought revisions of the contract, no adjustments have been made to recognize fishers' customary right to make these modifications. SARH and the Secretariat of Development and Urban Ecology (SEDUE) are empowered to revoke the concession for violation of contract terms (CNA 1991). Also, in 1989, SARH canceled all 99-year concessions, and replaced them with a one-year contract, to increase revenues and control over federal zone land tenure. Federal PESCA authorities do not acknowledge the ranchos' value as an aquaculture project, nor the customary right of rancheros to fish during the charal closure. Thus the exclusiveness of fishers' rights to their ranchos and to the benefits they derive from their investments in tending them are neither clear nor stable. SARH's refusal to modify the contract to recognize the legitimacy of the rancho system, and federal PESCA authorities' lack of acknowledgement are examples of obstructive policy undercutting a local institution (Lawry 1990).

The only assurance fishers have is a written agreement between Chapala union fishers and state and local PESCA authorities that recognizes fishers' rights to fish their ranchos according to custom as long as they continue to tend the ranchos. The accord cites the value of ranchos as an aquaculture experiment as the principal justification for the exemption (Ortiz 1985). As official recognition of the rancho system, the accord serves as a deterrent, albeit a weak one, to SARH or SEDUE taking action against fishers for contract violations. The accord between the union and

PESCA extends tacitly to other organizations whose members operate ranchos elsewhere in the Chapala region.¹⁵

Although the accord recognizes fishers' rights to continue fishing under the rancho system, they are reminded often of the incompleteness of that recognition, and the uncertainty of the exclusive right. Whenever conflict arises among fishers or between fishers and the four restaurant owners who also hold island concessions, PESCA officers remind them of the limited scope and fragility of that recognition. They warn fishers that if they call attention to themselves through disputes, authorities (i.e., PESCA in Mexico City, SARH, or SEDUE) will say, "These people are only causing problems. To hell with them. Let's cancel their concessions, and fine them for violating the law."

A second example of inconsistent recognition of fishers' rights to organize is the more general question of allotting the area adjacent to a community to its organized fishers. Before the widespread adoption of outboard motors, most fishers set their gear within a couple of hours' rowing time from their community. This technological constraint created *de facto* boundaries; the introduction of motors removed this constraint on fishers' range. This, together with the increased number of fishers and gear, has brought into question what rights and preferences, if any, local fishers have over "outsiders."

Ortiz and his staff frequently receive complaints from fishers (both those with and those without motors) of intrusion of outsiders into areas they customarily fish. Whereas federal and state authorities maintain that the "lake is free," a phrase echoed by many fishers, the Chapala office has dealt with the complaints by suggesting that fishers ask permission to fish in communities other than their own, thereby giving limited recognition to community preference over adjacent waters. If fishers deny access to outsiders, however, Ortiz reminds them that the request for permission was a courtesy, and that the lake is, in fact, free to all who have permits to fish. Although this procedure has proved a viable mechanism for resolving conflict among fishers in some communities, it has not worked in San Pedro Tesistán. Outsiders come from Michoacan, where recent loss of fishing area related to the drop in the lake level has forced them to seek alternative fishing grounds. Despite

¹⁵ Despite the generally positive effect this accord has had on rancho holders by providing them some assurance of their exclusive right, it has also had a negative effect on cooperative rancheros. The union-PESCA accord was made when a farmer bid for a long-term concession of Isla de los Alecranes. At the time, there were only a few ranchos on the island, held by fishers both from south and north shore communities. To strengthen rancheros' claim to the island, PESCA secured the concession from SARH in the name of the Chapala union, rather than in the name of individuals. Union fishers then gained preference to future island concessions over fishers from other groups because they were named explicitly in the accord. Rancheros from other communities were pressured to join the Chapala union or give up their ranchos. Fishers from the cooperative refused to do either, and finally an accord was established between the two groups that allotted the *islote*, a small sand bar adjacent to Alecranes, to the cooperative. Cooperative members feel cheated by the arrangement because *islote* ranchos are worth considerably less; in dry years there is enough land to make camp to fish the charal season, but the recent lake level rise has precluded fishing the inundated ranchos.

Ortiz' suggestion that they set their gear 500 meters from shore, these fishers continue to fish nearby, often running over local fishers' gear as they motor about. The limit of Ortiz' power to within Jalisco is most apparent here; he cannot force Michoacan fishers to comply with his suggestions. Still, San Pedro fishers expect his assistance, especially when their gear is damaged by outsiders' motors.

A third example of incomplete recognition noted previously concerns definition of who may and may not use the resource. Although Ortiz defers decisions to admit new members, authorities take little or no action on their reports. To many fishers, the de jure state property fishery, which is supposed to be accessible only to members of fishers' organizations has become de facto open access (Bromley 1990). Fishers are frustrated by inconsistent recognition of their efforts to define user boundaries and assist monitoring of resource use. Both in this study and in Pare's, fishers say to PESCA, "either unite us or leave us free." (1989:107)

A final example of incomplete recognition is evident in PESCA's resistance to fishers' efforts to form coalitions. As mentioned earlier, San Pedro fishers had joined a coalition of fishers' organizations, known as Organizaciones Unidas de la Ribera Sur del Lago de Chapala Marcos Castellanos (OULSCH).¹⁶ OULSCH was sponsored by a private, non-profit organization ("EDOC," or Educación y Desarrollo del Occidente), which has tried to foster institutional development among fishers since PESCA first pushed for group formation in 1984. EDOC encouraged fishers to analyze problems of resource use and work collectively toward their resolution (Pare 1989). Part of that effort entailed pressuring government agencies (e.g., PESCA, SARH, SEDUE) to take action to stop deterioration of the lake's water quality and quantity. The agencies reacted against that pressure, and fought the coalition.¹⁷ PESCA has refused to recognize the coalition, and its member organizations. Three years ago, the union dropped out of OULSCH, because of pressure from Pesca, including threats to cancel future aid and withhold permits. This pressure and the closeness of social contact between Ortiz and the union leadership prompted the San Pedro union to leave OULSCH. As problems with outsiders persist, however, union members perceive a lack of recognition by Pesca authorities of their problems and needs for assistance; they are considering renewing their membership in OULSCH.

¹⁶ OULSCH, sponsored by a non-profit, externally funded organization (EDOC), is a coalition of fishers unions and one cooperative. The organization espouses a three-point platform emphasizing ecology, production and commercialization. Its activities have included latrine-building, lakeshore clean-up, information campaigns, press conferences, and other tactics to raise lakeshore residents' consciousness of their interdependence with the lake, and to pressure government into taking action to correct environmental abuses. This latter objective is a chief source of annoyance to Pesca, SEDUE, and SARH. It is responsible, in part, for the pressure felt by San Pedro fishers to drop out of the group.

¹⁷ Agencies went as far as accusing EDOC (the supporting organization), of being linked with the CIA and French intelligence, as part of a scheme to destabilize the Mexican government (Sandoval Lara 1990).

V. Conclusion

Local institutional development in the Lake Chapala fishery is notably beset by a lack of clearly defined boundaries and incomplete recognition of fishers' rights to organize. The lack of clearly defined boundaries is found in the variation among legal prescription, government policy, and group policy. The inconsistencies among these boundary definitions have emerged in the interpretive process necessary for the application of the law to local conditions. The law is interpreted by authorities at three levels (federal, state and local), whose decisions are constrained at times by other agencies' (e.g., SARH, SEDUE) regulations and policies.

Despite legal definition of the resource as state property, it has been portrayed to users as a common pool, to be accessed exclusively by members of fishers' organizations. Yet, authorities' failure to enforce the law and unify policy has created an open access situation. Fishers are not assured of an exclusive right to the resource, with the result that there is no incentive to maintain institutions to coordinate resource use, let alone devise new ones. One exception has been the rancho system. Although its status as a common pool system with its own set of institutions is uncertain, the lack of enforcement by authorities of land use regulations, to date, has allowed it to continue. Still, further institutional development to accommodate changes in the resource and its use setting is hindered by a lack of official support for rancheros' efforts to form their own organization.

There is a strong sense among fishers, both from the organizations studied and from other groups, that under present conditions, cooperation to resolve problems associated with their common resource use would be fruitless. There is no assurance that current rules will remain in place or be enforced consistently. The uncertainty of the resource use structure has forced fishers to elect what amounts to the dominant strategy in a prisoners dilemma, whereby each seeks to maximize his own short term gain, because he has no assurance that others will cooperate in efforts to coordinate resource use. If boundaries were clearly defined and fishers' efforts to devise their own institutions for coordinating resource use were recognized by authorities, a number of social dilemmas confronting fishers might be resolved. At Chapala, fishers could benefit by establishing group fishing zones to reduce potential for conflict and better monitor each others' activities. Rancheros could coordinate their commercialization activities to overcome price collusion by buyers. Fishers, in general, could improve upon poor marketing conditions throughout the lake through the creation of stable coalitions. Yet, without assurance of their exclusive claim to the benefits of such activities through clear definition of resource and user boundaries and recognition by authorities of their rights to organize, such institutional development is unlikely.

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