SUCCESS AND TRANSFORMATION, COLLECTIVE MARKETING AND COMMON-POOL CREDIT IN A BELIZEAN FISHING COOPERATIVE: AN EMPIRICAL EXAMPLE OF A MULTI-TIERED COLLECTIVE ACTION PROBLEM

A Thesis in
Anthropology

by
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Submitted in Partial Fulfillment of the Requirements for the Degree of
Doctor of Philosophy

August 2004
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Abstract

This dissertation is the combined product of ethnographic field research carried out in a rural fishing community in Belize and the intersection of three literatures interested in society, economy, and community life in similar places around the world. Theoretical and empirical problems important in fisheries anthropology, rural economic development, and self-governing collective action institutions have shaped the research problem discussed in this thesis. I draw from these literatures as they pertain to problems associated with growth in a fishermen’s cooperative.

The cooperative has a long and proud history of success in collective marketing that has provided fishermen a high degree of economic self-determination in their village’s development. The fishermen from this small rural fishing community on the Central American shores of the Caribbean Sea provide us with an example of collective action that illustrates the merits of small-scale, community-directed development. Their cooperative is a success story of the popular grassroots approach to rural economic development. These fishermen’s economic success has transformed their cooperative into a multi-million dollar seafood processing and marketing business. However, the accompanying growth in the cooperative’s membership challenges the cooperative’s resilience. As it has grown, the cooperative’s membership has become more diverse, in the fishing methods members use, their residences in relation to the fishing grounds, and in their economic interests in the lobster fishery. These changes in the membership’s composition affect the members’ commitment to collective marketing and their use of a common-pool of credit—nested components of a multi-tiered collective action problem.

I adopt a theoretical framework based on Ostrum’s principles for self-governing collective action institutions to test the relationships among several variables internal to the cooperative’s structure and operation: membership composition, monitoring opportunities, member commitment, the costs of providing and maintaining the common-pool of credit, and the benefits collective action confers to members. Selected external factors that affect member commitment and the state of the common credit pool are considered as well, namely the effects of tourism development and the average market price for
lobsters in a given season. Data collected through interviews with fishermen and other primary and secondary sources are analyzed using measures of association, correlations, and linear regression to test hypotheses generated from the theory.

The complexity of the theoretical relationships in the model relative to the number of cases and type of data makes more sophisticated and formal quantitative analysis impractical and inappropriate in the present study. Qualitative analysis of these data provides evidence to support the theory. While the regression carried out to evaluate the interaction of these variables is too imprecise to draw reliable conclusions, it does not contradict the results of qualitative analysis. The qualitative analysis identifies membership composition as a significant factor explaining much of the variation in cooperative members’ monitoring options, commitment to marketing with the society, and level of debt and the costs associated with maintaining it over the cooperative’s 40-year history. However, these variables do not influence the economic returns collective marketing confers to members, but rather their effect is shadowed by the influence of foreign market prices for lobster. Therefore, while fishermen’s collective marketing does not determine the level of economic returns conferred through the cooperative, the persistence of collective marketing does provide the institutional setting by which the members access a higher market price, the determining factor in their deferred second payment. The concluding chapter presents the theoretical contributions and practical significance of these findings.
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List of Abbreviations

NFCS – Northern Fishermen Cooperative Society (also presented in the text as Northern)
BFCA – Belize Fishermen’s Cooperative Association
FD – (Belizean) Fisheries Department
CCTGA – Caye Caulker Tour Guide Association
National – National Fishermen Cooperative Association
CZI – Coastal Zone Institute
Caricom – Caribbean Community
CFRAMP – Caricom Fisheries Resource Assessment and Management Project
FAB – Fisheries Advisory Board
MC – Managing Committee (of a Fishing Cooperative, usually references Northern Cooperative’s)
Acknowledgements

Too many individuals contributed their time and knowledge to this work to thank them all. I must thank the people of Caye Caulker, the staff and members of the Northern Fishermen’s Cooperative Society, and several people in the offices and agencies with responsibilities for Belize’s fisheries, cooperatives, and other marine resources. So many of them put up with my constant intrusions into their daily work and lives, participating in interviews, survey questionnaires, and my observations of and attempts to work alongside them as they fished, prepared for fishing, celebrated, and attended village and cooperative meetings. Some among this large number provided extra-ordinary support and insight, without whose assistance my work would have been impossible (in alphabetic order): Gerald Badillo, Jr., Melvin Badillo, Jr., Tomas Badillo, Jaoquim Blanco, Robert Blease, Joseph Bradley (Registrar of Cooperatives), Joseph Bradley (NFCS Plant Manager), Georgina "Maude" Carrasco, Nils Carrasco, Orlando Carrasco, Carlos Chan, Cornelio Chan, Rene and Jesse Funes, Valdemar and Emelda Herredia, Mike and Shirley Kayel, Gregorio Lopez-Vega, John Marin, Jr., Salvador Marin, Ellen McRae, Mike Neal, Abel and Dawn Novelo, Jamie Novelo, Javier Novelo, Ericho Novelo, Jr., Erico Novelo, Sr., Carlos and Sarah Requena, Rolli Rosado, Toby Rubio, Oscar Sanches, Earl Smith, Sr., Robert Usher, Antonio Vega, Salvador Viamil, Robert Wiles, and Peter Young. I have certainly left someone out of this list, my apologies for this oversight.

The cooperation and openness extended from the NFCS and other sister cooperatives helped me see into the rewards and challenges of running a cooperative business. The Northern, National, Caribeña, and Placencia Cooperatives; the Belize Fisheries Department, the Belize Cooperatives Department, and the National Archives all contributed original or photocopied reproductions of cooperative annual reports. Other NFCS data was provided by Robert Usher, the cooperative’s Executive Secretary, and by individual members who graciously and generously opened their personal files for my use. The cooperative’s office staff also contributed their time to help in my collection of member files and other cooperative data.
R. Reid Chapman provided editorial assistance in earlier drafts of the thesis, his open eyes and ears were an invaluable resource to help me clarify my thoughts and the organization of the document. Daphne Karypis also suffered through earlier drafts and helped me prepare the maps presented in Figures 3.1 and 3.2. Thank you to both Reid and Daphne for their support and assistance.

To my dissertation committee I extend thanks for too many years of patience as I struggled to reconcile personal and professional hurdles in the completion of this document. My appreciation to Paul Durrenberger for showing me that the questions I ask matter and to Al Luloff and Jeff Cohen for helping me find clarity in how I present and answer them. Without their assistance, this dissertation would not have been possible.

A final word of appreciation is necessary to acknowledge the granting institutions that provided financial support to carry-out research: the National Science Foundation, grant SBR-9806978; the Wenner-Gren Foundation for Anthropological Research, Small Grant number: 6448; Penn State’s Anthropology Department’s Hill Fellowship; and Penn State’s RGSO Dissertation Improvement Grant.
I dedicate this work to Kristina for the patience and support she generously offered throughout the preparation, research, and writing of this project.
Community-based institutions have been shown to play a key role in economic development. Research spanning fisheries anthropology, rural economic development, and collective action documents how these community organizations structure and guide development that provides social and economic benefits to rural constituents; benefits that large-scale and heavily capitalized development projects have struggled to deliver. Despite their favorable characteristics for rural areas and people, community-based institutions are not a panacea for economic development. These grassroots organizations have their own unique set of challenges they must overcome in order to realize the successes applauded in the literature (Annis & Hakkim 1988; Cernea 1991; McAfee 1991).

One problem common in this diverse literature involves understanding the conditions that promote and frustrate resilience in community-based institutions. Research in fishing communities considers how these institutions, their members’ communities, and local economies contend with growing global dependencies and other extra-local relationships (Marchak et al. 1987; Cordell 1989; Pinkerton 1989a; Dyer and McGoodwin 1994). Studies of rural economy and society document how community-based institutions manage social and natural resources and guide development that accumulates benefits in rural communities (Gudeman 1978; Lamson and Hansen 1984; Black 1991; Cernea 1991; Apostle and Barrett 1992; Moberg 1992). Work focusing on collective action institutions that govern common pool resources (CPRs) contributes theories about the relationships among group composition, participants’ monitoring and commitment, institutional maintenance and resource allocation, and the individual benefits collective action confers (Ostrom 1990; Heckathorn 1993; Balland and Platteau 1996; McCay and Jentoft 1998; Acheson 2003). By identifying the conditions that foster and frustrate success in community-based institutions our research can advance theoretical understanding of these localized attempts to assert control over their economic conditions and provide practical guidance to communities facing increasing pressure from external forces affecting their lives and livelihoods (Pinkerton 1994).
A substantial portion of research in fisheries focuses on institutions and behaviors associated with property rights and fishing activity, where the fishery is the central CPR subject to the property rights regimes. However, all fisheries problems are not solely about property or access rights to natural resources (McCay and Jentoft 1998). Other kinds of institutions and resources are vital for a fishery to continue providing locally accumulating benefits to rural residents (Russell and Alexander 2000). Cooperatives are one of the most prevalent community-based institutions advanced as a means to organize fishermen on the road to achieving self-determined, locally beneficial economic development in coastal communities relying on small-scale fisheries (Poggie 1980; Acheson 1981; Polnac 1991).

However, fishing cooperatives have a history of mixed success (Jentoft 1989); and while those in Belize follow this uncertain pattern, one cooperative has stood out in this context as an example of success: the Northern Fishermen Cooperative Society (NFCS/Northern; Vega 1979; Sutherland 1986; Palacio 1996).

The Northern cooperative is the oldest fishing cooperative in Belize. The fisher-members of Northern specialize in spiny lobster (*Panulirus argus*) production, the nation’s most lucrative marine export. The traditional method of lobster fishing is with wooden traps. The community of fishermen who founded the NFCS and their descendents who continue fishing today live at Caye Caulker, a small island village surrounded by the lobster fishing grounds. The cooperative has grown from a small community-based organization into a large marine food processing, storage, and marketing business with members from across Belize.

In addition to the benefits members realize from collective marketing, the cooperative provides several resources necessary for fishermen to carry-out their livelihoods. Among these, access to credit is one of the most important. The credit cooperatives provide its members is structured as a CPR. Cooperatives secure capital from lending institutions to supply this credit pool for its membership. All cooperative members are entitled to a share of this common-pool, but must apply to the cooperative’s managing committee to receive a portion of it. The managing committee allocates credit to members based on their past performance in marketing with the cooperative. Marketing is a key component of the credit pool because national legislation governing cooperatives structure repayment through it.
In this respect, marketing and common pool credit in the cooperative is a type of multi-tiered collective action problem. By committing to marketing, members can use their combined catch to access capital that provides the credit pool. Members’ continued commitment to marketing replenishes and supplies the credit pool for use in future years. While this source of credit gives cooperative fishermen advantages, Belizean fishing cooperatives are challenged by credit management problems that have caused some to fail (Arnaiz-Burne 1996, Palacio 1996). Some authors point to logistical difficulties in delivering fisheries products to storage and processing facilities, poor organization, and corrupt management as causes for failure (Moberg 1992:123-25; Palacio 1996:31-38; Arnaiz-Burne 1996). This dissertation examines a more fundamental concern within Belize’s cooperatives that underlies these explanations for failure by looking at the cooperative’s marketing and common-pool credit as a unique setting in which to evaluate a theoretical model of nested, multi-tiered collective action problems associated with governing a CPR. Theoretical and empirical work concerning collective action in CPR management institutions are used to explain how the cooperative’s growth is undermining the foundations of its success. Membership composition, monitoring options, commitment to collective marketing, and the financial costs of providing and maintaining the credit pool are examined as predicting variables that determine the economic benefits collective action confers to fishermen and their communities.

Although this cooperative’s financial commons may not seem to be an obvious “fishery” problem, it is a very important issue in this fishery because of the central role cooperatives play in providing for the well-being of fishermen and their communities (Gordon 1981; Sutherland 1986; Palacio 1996; King 1997a). Collective marketing has provided fishermen and their communities the means to economic self-determination, first in their control over the benefits of lobster fishing and more recently in the development of tourism in the village. This focus on the mechanisms of marketing commitment and common pool credit management in the oldest and most successful of Belizean cooperatives is one approach to understand the consequences of institutional growth and the accompanying transformations experienced by the fishermen who constitute it, the lobster fishery upon which they depend, and the rural community to which they belong.
Chapter Two

Community-Based Institutions in Small-Scale Fisheries: Rural Economic Development, Fisheries Resource Management, and Common-Pool Resources

The literature devoted to community-based institutions crosses disciplinary boundaries. A common thread tying this literature together is the observation that benefits of economic development accumulate in rural communities when local institutions play a role in determining the form and direction of the productive, marketing, and other activities entailed by such development (Annis & Hakkim 1988; Black 1991; Cernea 1991; Glade and Reilly 1994). Benefits generated from community-based development will not be evenly, or equitably, distributed among rural constituents; however, that benefits accumulate locally at all is more favorable than having extra-local entities appropriate most of the benefits development generates (Moberg 1992; 1994). While distribution is not even or equitable, rural residents realize residual, secondary, or re-circulated benefits when direct and primary benefits accumulate among other local constituents. These benefits may be economic or social and occur in the form of income opportunities, the development of community services and other public goods, or enhanced environmental well-being through improved stewardship (Pinkerton 1989a). In short, community-based institutions are unique and invaluable conduits for rural communities to improve their well-being on many levels and in diverse ways.

The types of institutions described in the literature include churches, credit unions, cooperatives, small businesses, women’s organizations, common-property, and a host of non-governmental organizations (Annis & Hakim 1988; Cernea 1991; McAfee 1991; Bhuyan and Leistritz 2000). All focus on improving the conditions in which participants live—from fostering environmental stewardship to providing the means to earn substantial income through meaningful and rewarding livelihoods. The people forming these institutions come from a variety of communities and backgrounds. They include, for example, rural and urban artisans, subsistence and commercial agriculturists and fishers, and financial and other services for small-scale producers and entrepreneurs. This chapter reviews work concerning
community-based institutions in resource management and fisheries development, the role of cooperatives in rural development in agrarian and fishery settings, and the place of credit in these settings.

**Community-Based Institutions in Fisheries**

Social science research in fishing societies over the past three decades documents the collective action taken by fishermen to solve problems associated with making a living from unpredictable marine environments. These findings demonstrate the shortcomings of earlier ideas about fisheries resource management and development dominated by economic theory (Ciriacy-Wantrup and Bishop 1975; and see Gordon 1954; Scott 1955). Early theories share assumptions popularized by Hardin’s (1968) well-known “tragedy of the commons” model. Hardin constructs a hypothetical pasture commons to build an argument about the resource consequences of unchecked global population growth. While Hardin’s common scenario was metaphorical, with no ethnographic or historic context, the assumptions supporting the tragedy grew into widely held beliefs about the dangers and potential ruin of commonly held resources. Hypothetically speaking, Hardin’s tragedy is correct, when applied to the appropriate case. Unfortunately, the tragedy model was misused to explain and predict behavior in cases to which it did not apply. When ethnographic and historical conditions meet Hardin’s assumptions we will frequently find resource depletion, destruction, overexploitation, and ruin—and not only resource ruin, but also the ruin of community and society. However, ethnography reveals that several communities relying on common resources do not exhibit the necessary characteristics for a tragedy to unfold.

Ciriacy-Wantrup and Bishop (1975) demonstrate this point by explaining the difference between resources to which access is open and those for which access is communally shared. Hardin errs by conflating resource situations of open access with settings where communities of commoners have shared common-property rights to resources. Hardin’s popularized version of the commons is comprised simply of resources and individuals. This narrow view overlooks the variable characteristics of societies, communities, and institutions. Resource depletion as characterized by Hardin’s tragedy metaphor tends
to occur when access to the resource-base is open; that is, when no institutions exist to maintain the resource or regulate its use (McCay and Acheson 1987; Acheson 1989).

Centralized approaches to resource management tend to base policy and regulations on assumptions that disregard social and cultural factors that define communities and provide for institutions (King and Durrenberger 2000). These centralized regimes can create open access where community institutions once existed, such as in coastal fisheries where state intervention and large capital interests have contributed to the disintegration of localized, community-based fisheries management regimes (Brown 1996). Hardin’s tragedy, then, is played out when people cannot organize institutions that regulate behavior in the commons, not because of the commons. Therefore, any resource depletion or over fishing problem may not be a result or characteristic of the commons so much as a failure of other related community-based or extra-local institutions (McCay and Jentoft 1998).

Research on community-based collective action institutions in fishing communities document the depth and breadth of ways in which fishermen act collectively in order to solve problems (see Smith 1977; Lamson and Hansen, 1984; National Research Council 1986; McCay and Acheson 1987; Cordell 1989; Pinkerton 1989b; Apostle and Barrett 1992; Dyer and McGoodwin 1994; Durrenberger and King 2000). Community, occupational, and family relationships at sea, and beyond the boat, provide evidence of fishermen’s shared interest in fishery resources.

A segment of this literature describes how indigenous institutions play roles in resource management independently or jointly with governments. Research in these areas gives voice to fishermen by emphasizing the value of working with them to guide how fisheries are managed and developed (Ruddle and Akimichi 1984; Berkes 1989; Pinkerton 1989b; Dyer and McGoodwin 1994; Finlayson 1994; Crean and Symes 1996; Durrenberger and King 2000). Fishermen organize indigenous and community-based institutions that allocate fishing space (Berkes 1986; Acheson 1975; Miller 1989; Sutherland 1986), operational inputs and supplies (McCay 1980), and information (Acheson 1988; Palmer 1990, 1991). Some of this work aims to understand and improve upon fishermen’s institutions, and therefore parallels governmental agencies’ goals centered on natural resource management, conservation, and sustainable
fishing practices (Berkes 1989; Pinkerton 1989b; Dyer and McGoodwin 1994; Crean and Symes 1996). Other studies bring together cases from fisheries with other types of CPRs to consider the general “question of the commons” (National Research Council 1986; McCay and Acheson 1987) and identify linkages between social and ecological systems that promote sustainability or lead to ruin (Berkes and Folke 1998).

Another strand of research is less concerned with institutions and social relationships and more focused on the knowledge and skills of fishing and the marine environments in which it occurs. This research focuses on indigenous knowledge and behaviors of fishing people, captured and passed on through generations of using local marine environments. Several scholars describe this local knowledge as Traditional Ecological Knowledge (TEK; Johannes 1993; Ruddle 1994; Berkes 1993). This work centers on how this localized, experienced-based knowledge might advance conservation goals and scientific knowledge of marine ecosystems and their relationships to human society (Berkes 1993).

Dyer and McGoodwin (1994:1) argue that when fishermen are left to their own devises community-based institutions naturally arise, facilitating “the sustainable utilization of renewable natural resources.” This view assumes that conservation-like behavior equates to an ethic of environmental protection or ecological stewardship. While conservative resource use is a common characteristic of several community-based and indigenous institutions, sustainability is not a natural extension of conservation. That resources are conserved does not necessarily entail that the use patterns are sustainable or that the ecosystem from which they are drawn will be treated in ways that contribute to their resilience.

Community-based institutions may not facilitate sustainable natural resource use at all. Cultural adaptations and social structures that regulate the use and access of resources may, however, arise. These adaptations to social and natural environments are, in part, comprised of institutions that function to conserve resources for a community; functioning to control access rights and allocation processes which structure the distribution of wealth within and among communities. In this way, institutions conserve resources for local elites (Meltzoff 2000) or function to distribute resources throughout a community (Russell and Alexander 2000).
Berkes (1986) documents an indigenous management institution which emerged over many years of trial and error among inshore fishermen in Turkey. This system reduces conflict among fishermen over prime fishing areas by distributing access to them through a rotational system, illustrating how conservation is not the fishermen’s intent. Acheson (1988) shows that the territorial sea tenure system practiced among lobstermen in Maine regulates access to fishing areas, while only more recently has a conservationist ethic emerged among them (Acheson 1997). McCay (1980) describes a cooperative organized by New Jersey fishermen that limits entry to the fishery, controls the allocation of fishery resources among the fishermen within it, and provides access to other resources necessary to earn a living in the fishery. Although the cooperative may also conserve fisheries resources, the fishermen’s principle goal is to insure better prices for cooperative members by not flooding the market and driving prices down (McCay 1980). This example shows how cooperatives are organized to control production and marketing in order that economic benefits are retained among a community of fishermen—the achievement of self-determined economic development through a community-based institution. The fact that these efforts limit fishermen’s catches and effort may result in ecological conservation is an unintended and latent function.

Community and Property in Marine Environments

Community cohesion among an occupational group of fishermen and the proximity of their geographic community to the fishing grounds are important aspects of defining rights to the marine resources found in them (Acheson 1981). These characteristics are particularly important for fishing communities that rely on inshore and coastal fisheries. Territorial systems of sea-tenure are common in lobster and other fisheries that occur in close proximity to coastal areas and are almost always structured by community membership based on residence and livelihood. Examples of such coastal territorial fisheries are documented in the United States (Acheson 1988); the Caribbean (Gordon 1981:162-92; Miller 1982; Wylie 1989; Leslie 1995); Japan (Kada 1984; Kalland 1984; Akimichi and Ruddle 1984; Akimichi 1984); the island Pacific (Sudo 1984); Southeast Asia (Polioudakis and Polioudakis 2000); and
Australia (Davis 1984; Johannes and MacFarlane 1984). Among these examples, lobster fisheries have been studied extensively (Acheson 1975, 1988; Miller 1982; Palmer 1991, 1994; Price-Daly 1986; Burge 1995; Leslie 1995; King 1997a). The inshore nature of lobster fisheries give fishermen greater incentive to define access rights and property rights to the most productive fishing grounds in which they are found. The formation of a community group based on livelihood and residence is one reason why the literature emphasizes resource management institutions centered on common property rights.

Palmer (1994) argues that indigenous institutions persist to the degree that they are consistent with the morals, values, and interests of the fishermen who participate in them. Pereira (2001) observed this pattern in his research among Amazonian fishing communities, in which he concludes that fishing communities comprised of individuals who share similar backgrounds, livelihood strategies, and interests are more successful in establishing and maintaining CPR management institutions (Pereria 2002). His work demonstrates that fishers construct their communities around their geographic proximity to the resource base, relationships to other fishermen, and other social connections that provide opportunities for alternate income strategies. Fishing households use their relationships both within and outside the fishing economy as a means to forge security from an otherwise unpredictable livelihood in a seasonally predictable, yet always precarious, environment. They recognize Hardin’s tragedy, and they have internalized the lesson that open access is the root of it. When the natural and social environment is appropriately configured, they draw on the relationships and resources that constitute their communities in order to develop institutions to change and avoid the tragedy.

Another reason fisheries social science research focuses on property rights institutions is because the behaviors associated with access to fish and fishing space, allocation of catch, and the distribution of these among fishermen are easily observable, conceived of as “fishing activity”, and viewed as naturally central issues in a fishery. Furthermore, the seemingly most apparent and popularized problems in fisheries have to do with resource depletion and over fishing. Therefore, research surrounding the resilience of community-based collective action institutions tends to emphasize natural resource
management institutions, such as property rights systems and other CPR management arrangements—
institutions and fishing behavior that are most closely associated with the act of taking fish from the sea.

However, resource depletion in a fishery may not necessarily be primarily attributable to fishermen
simply taking too many fish and any common property rights systems present in a fishery is only one
example of a larger set of institutions necessary for a fishery to function. McCay and Jentoft (1998) argue
that too frequently our research questions are singly focused on property regimes—whether they are
present, what type they are, and how well or poorly they conserve the fishery resource. An over-emphasis
on common-property institutions results in a “misplaced analytical focus” that clouds one’s ability to
construct appropriately conceived theories because we overlook other important relationships and
processes that define the most relevant issues facing specific fisheries (McCay and Jentoft 1998:24).
Along the same lines, Bell (1998) points out there are several ways a society can structure rights for
people to gain legitimate access to resources. Property relationships, however, are only one example of
how these rights are determined (Bell 1998:42).

Russell and Alexander (2000) make a parallel point in their analysis of the distribution of fish among
fishermen and local communities in the Philippines. There are few property rights institutions in
Philippine fisheries and the important institutions organize the distribution of fish after they are caught.
They describe “rights of appropriation” that are claimed by a boat’s crew, the boat’s home community,
fishermen on nearby boats, and coastal villages near the fishing site. All have rights to some of the catch.
Therefore, to understand Philippine fisheries one must consider the allocation and distribution of fish after
they are caught as much as the allocation of and access to fish or fishing space at sea.

Durrenberger makes a similar point in his work with Gulf Coast shrimpers in Mississippi and
Alabama. He argues that because shrimpers are frequently in dependent relationships with processors and
creditors, they are not making the decisions to expand production or to invest in larger boats
(Durrenberger 1996:47-60). Theoretical approaches that focus solely on shrimpers and fishing behavior
miss relevant variables that have explanatory power in resource use patterns (Durrenberger 1994, 1997).
Fishermen tied to firms in dependency relationships are producing shrimp for the firm. The firm, in this
case, is the primary decision maker about production. Analyzing fishermen’s behavior at sea as a production unit outside their relationship to the firms who process the shrimp and provide credit for boats is incomplete. Interviews with shrimpers reveal that in those in dependency relationships conceive of themselves as working for firms, despite the “independence” of their occupation.

Inshore fisheries face continually increasing pressure from new technology, growing effort, and expanding relationships with global capitalism (McGoodwin 1990; Ruddle 1994). These forces change fishermen’s behaviors, options, and institutions; and while community-based institutions offer advantages that benefit rural communities and ecosystems, it is clear that they cannot resolve all fisheries management and rural economic development problems (Kearney 1984; Jentoft 1989; Pinkerton 1994; Ruddle 1994; Acheson and Wilson 1996). Research questions need to be tailored to particular circumstances in specific fisheries in order to understand how these institutions might best survive in the face of new social, political, and economic environments. Knowing when to look at property institutions or other types of community-based institutions is a key to understanding and resolving problems in particular fishery settings (McCay and Jentoft 1998; Russell and Alexander 2000). Cooperatives are one of several community-based institutions that play a significant role in economic development in fisheries and agrarian settings, but which frequently are not organized primarily around property rights.

**Cooperatives in Rural Development**

Cooperatives have received favorable consideration by governments and international aid agencies in planning and implementing rural development projects and programs, but they have a mixed history of success in realizing lasting benefits for rural constituents (Jentoft 1986; Hannesson 1988; Kurien 1988). Cooperative organizations are found throughout the world and bring people together for individual benefits from collective action in producing and marketing food and non-food agricultural commodities, gaining access to credit, and buying consumer goods and energy. While diverse in form and function, most cooperatives are organized by similar principles—participants pooling their resources and acting toward a common goal as a means to enhance their individual benefits from economic activity. While
this ideal type structures most cooperative efforts, the manifest collective actions, individual benefits, and institutional resilience vary considerably from case to case.

Some cooperative societies last for years and others fail before participants see any returns on their investments in time and capital (Tendler 1988). Some cooperatives are organized and operate under supportive government regimes, while others are frustrated by indifferent or unfavorable legislation (Peterson 1980). In addition to the social, economic, and political environments in which cooperatives operate, their internal characteristics also determine their resilience. For instance, a cooperative’s success or failure can lie in the composition of its membership—the cooperative’s size (Jentoft 1986), how closely aligned the members’ interests and needs are (Ziegenhorn 1998), and the membership’s knowledge of and relation to resources or markets over time and space (Cohen 1998). External conditions, internal characteristics, and an institution’s capacity to handle growth entail both the problems cooperatives face and the prospects for their success (Tendler 1988).

Moberg (1992) describes how local institutions, state-level government agencies, and international development organizations function at cross-purposes to frustrate and promote the success of fishing and agricultural cooperatives in Belize. The citrus farmers belonging to cooperatives in southern Belize access money and technical support from national and international agencies to promote development projects in their villages. However, the benefits of these efforts are unevenly distributed through the rural communities to which the funds are directed. Moberg (1992) shows that allocation falls along affiliations with political and kin groups, concentrates in the hands of the relatively wealthy community members, and is not distributed based on need. Observing similar situations elsewhere, others have shown that this nearly always leaves the poorest of the poor in the margins without any opportunities to improve their standing (Black 1991, Haraldsdottir 1994). In other cases, some groups may mobilize resources and information more effectively and realize collective benefits (Cohen 1998). Despite these differences in individual and institutional gain, the broader communities in which cooperatives operate may benefit more as a whole relative to the alternative centralized model of development, where the value of resources accumulate in the urban centers and national capitals (Moberg 1992).
When cooperatives are successful and provide these services to communities over time they may attract new participants. Growth in membership, capital assets, and productive output are all signs of successful development, particularly when the economic benefits are reserved for cooperative members and their local communities (Sutherland 1986; Palacio 1996). However, this growth may also confer problems that impede continued resilience as the membership becomes too large and heterogeneous (Hauge 2002). As cooperatives become more complex and vertically structured with high administrative overhead, they become fragile and slower in the ability to respond to changes in the systems they manage (Jentoft 1986). In this regard, they are less adaptive than when they are more horizontally organized with homogenous and community-centered memberships.

Tendler (1988) describes the cooperative movement in Bolivia as fraught with several of the problems related above; however she concludes that despite these seemingly endemic problems several of the Bolivian cooperatives have persisted with aid from external institutions. That these cooperatives are functioning over ten years passed their inception is, according to Tendler, evidence of success in this region. It is interesting to note that with the success these cooperatives realized they did not experience membership growth. The cooperatives of this area remain small, with memberships ranging from 15 to seldom more than 30 members. Several cooperatives are organized under regional associations with total memberships of between 300 and 400. Tendler (1988) explains how residual benefits spilled over into the communities where the cooperatives operate. After cooperative members realized increased prosperity, the infrastructural advances benefited other community members. Non-cooperative farmers began realizing higher returns from the products they marketed through the cooperative and villagers were able to purchase reasonably priced goods from the cooperative stores.

Among the problems associated with the relative successes these cooperatives achieved, Tendler (1988) documents poor management, corrupt leadership, and low member commitment. While these areas were the source of problems, they were also opportunities for leaders and members to learn from their mistakes and experiences (Tendler 1988:111-114). Tendler suggests that while management was poor and leadership corrupt, in several cooperatives these aspects were improving. The issue of low
membership commitment was discussed in relation to credit facilities the cooperatives provided to members. In all but one cooperative the capital used for member credit was granted to the cooperatives through international aid agencies, such as the Inter-America Foundation. Low repayment rates were explained by the lack of stringent provisions for and accountability of member repayment. Because there were no consequences for not repaying, members were not motivated to do so, nor was there motivation for other members or leaders to monitor repayment behavior (Tendler 1988:88-93). Without commitment to repayment, cooperatives’ access to future credit is threatened because they are seen as poor credit risks to lending institutions. Therefore, even when the development programs grant capital to provide a credit pool for cooperatives to supply members, this seed money will not jump-start a long-term credit program without members treating it as a “real” loan by repaying the cooperative what they borrow from it.

Despite these and other problems, cooperatives remain an advantageous option to small producers, particularly in rural and underdeveloped regions. Cooperatives lay a foundation for development by providing capital and other resources necessary for small producers to gain the advantages conferred by economies of scale. By pooling resources small producers gain advantages that would not be realized without some kind of larger organizing structure.

Cooperatives in Fisheries and Fishing Communities

Cooperatives have been used as a means to develop inshore fisheries throughout the world (Polnac 1991). However, fishermen’s success in organizing cooperatives and other institutions to provide improved standards of livings and economic self-determination is as varied as the fisheries in which they are found. Polnac (1991) argues that despite their mixed success fishing cooperatives are viable institutions to structure and set goals for nationally and internationally sponsored fisheries development projects. Three explanations for success and failure in cooperatives are found in the literature: individual or psycho-social characteristics of fishermen (Poggie 1980; Pollnac and Carmo 1980; Sakiyama 1984; Palacio 1996), flaws in the structure and organization of the cooperative model (Jentoft 1986), and
variations in socio-political and geographic contexts in which cooperatives are set and operate (Sakiyama 1984; Price-Daly 1986; Moberg 1992; Leslie 1995).

Fishermen are often characterized as rugged individualists and fiercely independent. This caricature has shaped research into fishing livelihoods and economy (Acheson 1981). Poggie (1980) argues that fishermen adopt an ideology of independence in order to cope with the demanding and sometimes isolating vagaries of a fishing livelihood. This “need for independence” explanation for fishermen’s inability to cooperate is insufficient (Poggie 1980:20). Fishermen may indeed maintain an ideology that emphasizes independence, but this does not explain or accurately describe the nature of fishing, a fishing livelihood, or the success and failure of cooperative behavior. Fishermen engage in several social relationships and institutions that are necessary for them to carry out a fishing livelihood: kin groups, property-rights institutions, buyers and sellers associations, work groups and crews, and cooperatives.

Durrenberger (1996) compares fishermen in Iceland and Mississippi to show that those fishermen’s psyches or views about themselves as independent do not determine their ability or capacity to act collectively. Fishermen in both locations maintain an ideology of independence, but Icelandic fishermen organize themselves into unions while in Mississippi fishermen do not participate in them. In Iceland unions are promoted as a positive means for fishermen to participate in the fishing economy, whereas in Mississippi shrimp fishermen’s unions are illegal (Durrenburger 1996:70-3). While fishing can often be a solitary occupation and ideologies of individualism define the fisherman’s persona, there is nothing inherent about fishermen’s psyches that preclude them from collective action and cooperative undertakings. The difference in whether one group acts collectively is shaped by the structural constraints of the political, economic, and social systems in which they operate.

Jentoft (1986) argues that fishing cooperatives are destined for failure because of inherent flaws in the structure of their organization. He lists three primary problems with the cooperative model as applied to organizing fisheries development: their multipurpose functions, complexity, and participatory decision making. Multipurpose functions involve situations in which cooperatives take on non-fishing related endeavors, such as aiding in co-lateral community development projects “which in a more developed
society, can be divided among several organizations, including government institutions” (Jentoft 1986:353). Complexity entails the difficulty of “membership relations characterized by interdependent but also conflicting interests concerning policy matters, income distribution, and the like” (Jentoft 1986:353). Participatory decision making, Jentoft argues, is difficult to the degree that it relies on members becoming involved in the institution.

These factors are all potential sources of problems for cooperatives, but it is also instructive to look at external social, political, and economic conditions that shape the institution. Studies of cooperatively organized fishing show how these institutions may be frustrated and disintegrate without external support from government and other parallel community-based institutions (Moberg 1992; Petterson 1980). For example, cooperatives in Mexico’s coastal fisheries have been directed and transformed by government policy since they were first promoted in the early 20th century under President Cardenas (Petterson 1980:65; Wood 1995:1). Industrialization and privatization initiatives shaped policy changes through the 1970s and played an important role in dismantling the majority of Mexico’s fishing cooperatives, particularly the shrimp fisheries operating in the Pacific and around the Sea of Cortez (McGoodwin 1980; Wood 1995). While Wood (1995) and McGoodwin (1980) also cite internal corruption, the political and economic environments in which these cooperatives operated favored larger offshore and industrialized operations, leaving little room for small-scale cooperatives to compete.

Some fishermen adapted to this changing governmental and economic situation. Petterson (1980) documents how fishermen in Baja California organized to purchase larger boats to compete with heavily capitalized firms operating on the high seas. This new kind of cooperative in Mexico also depended upon formal recognition from the central government before the fishermen could realize any benefit from their collective action. Again, their fate was shaped to a large degree by support from government.

While the privatization initiatives dismantled cooperatives in the Pacific shrimp fisheries, on Mexico’s Caribbean shores of the Yucatan Peninsula, lobster fishermen embraced the ideals of privatization and strengthened their cooperatives and their claims to local fishing grounds (Leslie 1995). The Mexican government regulates several of its inshore fisheries by forcing production through the
cooperatives. Fishermen in Ascension Bay adapted this structure to their advantage by using the cooperative as a mechanism to legitimate ownership and coordinate transactions of access rights to the valuable lobster fishing grounds in the bay—parcels of sea fishermen call campos. While the fishermen may have established these informal property rights independent of government cooperative policies, the cooperatives have provided a formal institutional means for fishermen to limit entry and reserve the economic benefits of fishing for themselves and their communities.

Fishing cooperatives in Japan have been extensively researched and are arguably the most successful example of decentralized, fishermen-controlled resource management and economic development in coastal fisheries (Ruddle and Akimichi 1984; Short 1989). Japanese fishing cooperatives are the local tier of a nation-wide community centered fisheries management system that emerged near the end of the 18th century, but this system has roots extending hundreds of years into the nation’s feudal past (Kalland 1984; Akimichi and Ruddle 1984; Sakiyama 1984). This highly devolved, and evolved, system of management is coordinated through local prefecture government and the regional Fishermen Cooperative Associations, but each cooperative holds exclusive rights, shared jointly by members, to inshore fishery resources near their communities. Cooperatives are organized and structured according to a community’s proximity to coastal fisheries resources. Membership in a cooperative defines fishermen’s access rights to the fishing grounds adjacent to their coastal fishing villages.

The Japanese approach emphasizes localized control over fisheries resources leaving most of the important decisions and mechanisms for conflict resolution in the hands of cooperatives, villages, and, at the highest level, the regional prefecture administration. Through this institutional infrastructure, the goals of Japanese inshore fisheries management center on social and economic well-being for fishing communities. While the general model is sound, it would not be easy to apply it to other fishery settings. The stability and success of this system lies in a long history of communities and institutions working through trial and error (Sakiyama 1984). Despite cooperatives being relatively new, introduced only in the early part of the 20th century, their structure was drawn from centuries old fishing guilds that were tied into the socio-political fabric of Japanese feudalism. The Japanese system attests to the value of
community-based institutions in resource management. However, a further artifact evidencing this system’s success is found in committing to and staying with a structure in which power is devolved to communities. Time and history may frustrate the implementation of a community-centered approach to fisheries development. As governments, policy, and economic forces change, myriad powerful social entities and institutions wield their influence to inhibit the devolution of community-level power. These economically and politically powerful entities ensure their interests are met before the interests of fishermen and fishing communities, often to the demise of local economies and the marine environments on which they depend (Sakiyama 1984:193-6; Sunderlin and Gorospee 1996).

The literature attempting to explain success or failure in fishing cooperatives emphasizes internal characteristics of cooperatives and their memberships and the external conditions in which the former operate. However, in light of several successes, these explanations are not entirely sufficient. One lesson to take from this literature is that the problems fishermen face in realizing success or failure in cooperative efforts are not problems with cooperatives as an organizational type, but rather problems with providing and maintaining institutions of collective action. Theoretical and empirical studies focusing on collective action in CPR settings provide a framework that can help explain the conditions that foster and frustrate resilience in fishermen’s institutions, a research agenda advanced by Pinkerton (1994). Cooperatives are an appropriate setting to carry out this research. Furthermore, by focusing on cooperatives it is also possible to consider McCay’s and Jentoft’s (1998) suggestion to examine extra-property institutions that are important in fisheries.

**Common-Pool Resources and Collective Action**

Common-pool resources consist of naturally occurring or human-made resource systems to which access and use is limited to a specified community who must bear the cost to reserve these rights and to provide and maintain the resource base (Gardner, Ostrum, and Walker 1990). Individuals and groups who procure resources from this common pool organize into institutions to determine rules about how the costs and benefits to sustain the resource base will be allocated and distributed. Sometimes the institution
is a formal organization, such as the case with unions, cooperatives, or other associations, and in some cases the institution is informal with no codified rules or charter, as is evidenced by the several indigenous sea tenure systems where custom and tradition define allocation and distribution.

In order to specify problems associated with organizing and maintaining a collective action institution to govern a CPR, it is important to distinguish the resource system from the resource flow and resource units that constitute it (Ostrum 1990:30-31). The resource system includes what is normally understood as the resource-base or the aggregate resource entity, such as a fishery, forest, or aquifer. Resource units are not held jointly, but are divisible parts of the resource system that an individual or group entity may withdraw. Once someone takes a resource unit, that unit cannot be appropriated by another. The flow of resource units through a resource system is particularly important for renewable resources. The rate of resource flow can determine the continued availability of units in the resource system for future use.

Three obstacles challenge communities in their attempts to create CPR collective action institutions (Ostrum 1990:43-45):

- Supplying the institution with rules that define behavior in relation to the CPR
- Establishing credible commitments to follow rules
- Fostering a monitoring environment in which participants are able and willing to enforce compliant behavior

It is important that rules are consistent with values and expectations held by the constituents, and as such members must view them as reasonable. The institution’s membership must practice a credible commitment to the rules that define appropriate behavior in relation to withdrawing from and, when applicable, replenishing the resource system, such that the flow of resource units through the system is maintained. Among the rules and/or the institution’s structure there must exist a provision for self-regulation or mutual monitoring. The community of CPR participants must agree to enforce the rules and when they break the rules they must abide by the agreed sanctions.

There are two problems that must be accounted for in the institution’s rules to assure the continued availability of the resource: appropriation and provisioning (Ostrum 1990:46-50). Appropriation problems arise when determining the allocation and distribution of resource units available from the
common resource base. Problems of provisioning revolve around maintaining the flow of units through the system. Membership commitment to rules and acceptance of mutual monitoring are important in regard to both problems, but the degree to which these problems are interdependent varies from setting to setting. Depending on the resource in question, the rules that define rights of access and appropriation, and other institutional characteristics, one or both of these problems may confound participants’ collective action in any particular CPR situation.

Ostrum distinguishes different levels of analysis based on three levels of rules and choices that structure CPR situations: operational, collective, and constitutional (Ostrum 1990:50-55). Operational rules are those most directly associated with the interactions among participants and between participants and the resource system. The operational level involves issues with appropriation, provisioning, and monitoring. The collective level concerns issues of institutional management, rule making, and sanctioning. The operational and collective levels are among an institution’s internal characteristics. The membership of a collective action institution plays a central role in defining these sets of rules. The constitutional level is a higher-order level of rules, regulations, and governance that specifies the possible set of rules an institution may develop. Constitutional level rules lie outside the direct control of the institution and its membership. This extra-institutional order of rules are typically handed down from a central governing body, such as a national government, and are one among several external conditions that shape the organizational and institutional possibilities of collective action participants. Each lower level is nested in the level above it, so that individual and group choices are determined by the rules and structure set from the level(s) above it. Other external factors include market forces; climate, weather, and natural disaster events; alternative income or livelihood opportunities; industrial or development impacts to the resource base or ecology from which participants derive their livelihoods; and the effects of other institutions and human behaviors that compete with or complement the institution in question.
Group Composition in Collective Action

While it is widely accepted that smaller groups may more effectively create and maintain institutions, the causal connection between the composition of an institution’s membership and its ability to maintain collective action is not as clear (Pereira 1999; Hauge 2002:30; and see Balland and Platteau 1997). Some work points to the advantage of membership heterogeneity (Olson 1965; White and Runge 1995), whereas other findings suggest that more homogenous groups tend to succeed in collective action (Tang 1991; Balland and Platteau 1996; Zeigenhorn 1998; Pereira 2001). Heckathorn (1993) concludes that group composition may bolster or falter success in collective action institutions. He argues that homogeneity’s explanatory power for an institution’s collective success depends on several factors unique to particular empirical settings, including the nature of the resource-base, the institution’s purpose, and the membership’s goals and motivations.

Some have criticized work that emphasizes homogeneity as an important characteristic for community-based institutions to achieve success (Natcher and Hickey 2002). These criticisms miss Heckathorn’s point and assume that any attention to homogeneity disregards variability and diversity in communities. Natcher and Hickey’s observation that indigenous communities can be comprised of individuals and sub-groups holding a variety of different and even conflicting views is valid—communities’ and institutions’ memberships are not invariably homogenous. Some authors merit this criticism because they assume homogeneity throughout an entire community rather than applying this characteristic only to the economic activities around which the members of a single community institution cohere for mutual benefit or interest (see Taimni 1998). Using homogeneity as a significant variable to understand behavior among a collective action institution’s membership does not necessarily imply that the broader community from which the membership hails is without variation or that the members do not hold diverse views on topics and issues outside the economic affairs around which the collective action institution is organized. Some of the differences one may observe, or overlook, include those between women and men, owners and workers, large and small producers, or producers and marketers (Moberg 1992; Fergeson 1994; Haraldsdottir 1996; Leslie 1995).
Several of the criticisms directed toward emphasizing the significance of homogeneity in CPR institutions use a generic definition of homogeneity where all community members are alike (Li 1996; Tiani 2001; Natcher and Hickey 2002). For this reason these criticisms are misplaced. Obviously members of human communities are not entirely alike; indeed, the variation we observe in communities is what compels scientists to study and understand them. When an institution or community exhibits some level of relative homogeneity by sharing similar interests and behaviors that pertain to their livelihood or other economic activity, this does not mean that all participating members are exactly alike. The significance of homogeneity among the membership of a community-based collective action institution is relative to an empirically specified range of characteristics pertaining to the livelihood or economic activity surrounding the nature of the CPR.

Pereira concludes in his study of community-based management fisheries institutions that:

More homogenous communities were able to enforce rules about proportional contributions by its members and to bear the cost of creating and maintaining a fully developed local management institution. These communities were very successful in creating and maintaining their management institutions (2000:20).

Ziegenhorn (1998:179-81) documents the importance of intra-group homogeneity in his research with two hog producer cooperatives in Iowa. One group was comprised of farmers with shared histories, friendships, and other factors that on the surface appeared to indicate a like-minded bunch. The other group was organized around a very specific set of shared interests relating to their hog operations. The latter group’s cooperative realized success and longevity, whereas the cooperative comprised of farmers from a single community, who mainly shared geographic proximity to one another, failed after only a short time. Farmers with shared interests, needs, and goals are better able to agree on, accept, and follow the rules governing their cooperative endeavor.

The significance of group composition is relative to each situation. The universal lesson is in finding the relevant set of interests among a group that increases their commitment to participate collectively over time, such that the behaviors gathered within their organization become institutionalized. As Hauge (2002:9) notes, “The type, as well as the degree, of heterogeneity, matters.” After identifying locally
appropriate characteristics among a group of collective action participants, it is possible to evaluate whether intra-group variation is a significant factor determining institutional success. In fisheries settings, homogeneity in gear and residence are appropriate observations of group composition to measure homogeneity (Acheson 1981, 2003; Pereira 2001). Homogeneity in gear entails relative equity in social status, occupational identity, economic interests, and oftentimes fishing opportunities (Kafka 1984; Pinkerton 1987). For inshore territorial fisheries, homogenous residence permits ease of monitoring and oftentimes is the basis for access to fishing space (Polnac 1984; Sutherland 1986; Acheson 1988, 1998; Leslie 1995).

Institutional Complexity, Multipurpose Functions, and Second Order Collective Action Problems

In several empirically observed CPR situations there are a set of collective action problems that occur in relation to other problems, such that the structure and solution of the former is nested (Ostrum 1990) or embedded (McCay and Jentoft 1998) within that of the latter. Ostrum (1990:103) describes these types of collective action problems as second order collective action problems; Acheson (2003:70-1) calls them multi-tiered collective action problems, acknowledging that there may be more than two nested levels.¹ Second order problems create different types of CPR scenarios, which by their nature increase the complexity of CPR institutional settings and may also involve expanding the services an institution provides its members. In other cases second order problems may involve the creation of new institutions that need to have their own rules supplied and require member commitment and monitoring in this new institutional setting.

The significance of distinguishing these nested levels of problems within a collective action dilemma lies in capturing the institution’s capacity to handle complexity. As mentioned above, Jentoft (1986) argues that cooperatives fail in coastal, small-scale fisheries because their organizations are often made too complex by large memberships, their entailing competing interests, and when they extend the services

¹ Ostrum draws on Bates (1988) for this and Acheson also references a similar point made by Hetcher (1990).
they provide to include social and economic functions outside of their primary purpose of support or marketing in fishing. While these kinds of factors may stress collective action institutions’ resilience, the presence of these characteristics in a collective action CPR setting does not cause failure. In fact, when participants can resolve the problems contained in these more complex and nested settings the benefits conferred through their collective efforts are multiplied (Ostrom 1990:103-36).

Acheson (1998, 2003:68-79) discusses how fishermen in some communities on Maine’s central coast are able to enforce trap limits among themselves while other communities of fishermen are not able to do so. Among these fishermen, establishing trap limits is a third-level in a multi-tiered collective action setting. In order for trap limits to be considered as a reasonable option, two other collective action dilemmas around territorial rules and limiting entry to the fishing grounds must first be resolved. Acheson shows how island communities with small indigenous populations that are highly dependent on lobster fishing have been more successful at instituting trap limits among themselves because island fishermen have more precise property rights to the local fishing grounds and access to these grounds is kept relatively closed to outsiders (Acheson 2003:68-72). In contrast to the island communities, the fishing communities on the coast have not instituted trap limits. Although the fishermen from these coastal communities have well established territorial claims to the fishing grounds and access to them frequently is dependent on relationships to kin who have a history with the lobster fishery and the community, their communities’ larger sizes, and the nature of their territorial behavior reduce the likelihood of trap limits to develop indigenously.

The coastal communities have more fishermen living in them and working in the nearby fishing grounds. As has been discussed above, Acheson (2003:69) also notes how group size plays a factor in making collective action more difficult in the coastal communities. In addition, the fishermen’s territories on the coast are mixed between precisely defined perimeter defended ones worked by individuals, like those on the islands, and larger areas claimed by fishermen living in communities in closest proximity to
these fishing grounds. The latter type have more fluid and changing boundaries that overlap with other neighboring communities who also claim rights to equally adjacent waters. For a trap limit to emerge, fishermen must be confident in the commitment of other nearby fishermen working in the same fishing grounds to limit their number of traps and be able to readily monitor others’ behavior. The larger number of fishermen and their origins from different communities makes limiting entry to and defending individual territories within the fishing grounds in between communities and more distant from shore difficult and costly. Without these primary collective action problems resolved, the higher-order problem of trap limits will not be considered by the fishermen in coastal communities.

When fishermen overcome second order collective action problems like complexity and multi-purpose functions by committing to rules and monitoring one another within its structure they will realize increased economic benefits. For example, Maine lobstermen realize higher returns per unit effort building, maintaining, and hauling their traps when they agree to limit the number of traps any one fisherman can work. This arrangement will not emerge, however, when the sub-order problems of territorial rules and access rights are more difficult to monitor and enforce.

Social and Economic Resources as Common Pools:
The Role of Institutions in Accessing Credit in Fishing and Agrarian Communities

Most studies considering the problems of collective action institutions that govern CPRs focus on natural resources, such as fisheries, pasturelands, forests, and water. However, several problems that threaten fishing economies, communities, and resources are not always related to issues of property institutions and fishing behavior (Bell 1998; McCay and Jentoft 1998). For these reasons, McCay and Jentoft suggest theoretical attention should be shifted “from the existence of one or another form of property rights to why some communities succeed in preventing or ameliorating problems in the use and

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2 These territories are described in more detail in Chapter Four in comparison with Belizean fishermen’s sea tenure system. This discussion can be found in the section entitled Traps and Sea Tenure in the Lobster Fishery, starting on page 81.
management of common resources and others do not” (1998:25). This re-orientation away from a narrow focus on property regimes leads to research questions that consider other kinds of community-based institutions. This broader focus improves the comparative understanding of success and resilience in community-based collective action institutions that govern CPRs to include settings where the resource is socio-economic rather than natural.

*Collective Action Institutions and Credit*

Credit is advanced as a vehicle for economic development and is in most cases delivered through large financial institutions. Credit is important to agrarian and fishing livelihoods in market economies; however, oftentimes small producers have difficulty accessing it (Tendler 1988; McAfee 1991; Hauge 2002). Most lending institutions require collateral, or other security in kind or social relationships, agriculturalists and fishers are frequently turned away because they lack sufficient economic or social resources to meet the collateral requirements (Tendler 1988).

In the Eastern Caribbean, McAfee (1991) documents the policies and prejudices of the Caribbean Development Bank and its subordinate lending institutions, the Development Finance Corporations. These institutions finance large scale projects, some funds of which may find their way to small producers and poorer constituents in the form of education programs, extension services, technical assistance, and credit (Hardy 1995). However, the lion’s share of resources comprising these programs is consumed by the bureaucracies of large private and governmental institutions that have grown around supplying these resources. McAfee describes how rural and urban poor have responded to the economic gaps these large projects create by organizing community-based organizations that provide credit or access to it.

An interview with a woman from Dominica illustrates the barriers for poor, particularly poor women, to access credit:

> I can’t walk into a bank with my five healthy children and tell the credit man, “Here! This is where my profits from 20 years from food and banana farming have gone. Now give me a loan” (McAfee 1991:171).
Rural and urban poor who need small amounts of capital but cannot access it through formal channels organize institutions comprised of small groups of family and friends who pool resources to create credit associations and revolving loan funds (McAfee 1991:171-2). These institutions supply a widespread demand for micro-loans that is not met by the larger projects.

Muhammad Yunus recognized a similar gap in large scale development projects and the plight of working women and poor in Bangladesh when he organized the now well-known Grameen Bank (Yunus 1999). Yunus first recognized the need for micro-credit as a means for villagers to access capital to invigorate small-scale, local enterprise. Additionally, he acknowledged the need to create an institutional environment where monitoring is accessible and acceptable to members, a factor helping to keep member commitment to repayment high (Yunus 1999; Rahman 1999). The resulting lending structure rests on the characteristics described above for collective action institutions more generally—small group size, shared economic interests, and linking livelihoods to collective action goals, in this case to lending uses.

Rahman (1999) highlights the institutional nature of the Grameen lending groups and how intra-group pressures function to encourage repayment:

…the group is to function as an institution to ensure mutual accountability. The individual in the system is kept in line by a considerable amount of pressure from other borrowers of the group. The pressure of the group acts as the collateral for the bank (Rahman 1999:8).

These pressures are akin to mutual monitoring (Ostrum 1990). Monitoring behavior promotes commitment to the program and is advanced as a primary factor in the high repayment rates realized by the Grameen Bank. The willingness to engage in mutual coercion provides a form of collateral this bank will accept, but other banks will not (Rahman 1999:8; and see McAfee 1993:170).3

Hauge (2002) uses the characteristics of collective action discussed above, group size and composition, and membership monitoring and commitment, to define joint liability incentives and

3 Rahman (1999) praises the Grameen Bank for the accomplishments it has achieved in providing alternate and appropriate means to access capital for poor people in Bangladesh; however, he also critiques the source of the bank’s high repayment rate. Rahman documents how pressure from members of a lending group to force borrowers to repay (which is a pre-requisite for them to access their share of credit, in turn) has resulted in a situation where members take out additional loans to repay existing ones.
evaluate the performance of group-based credit in micro-credit lending programs in Chile. In reviewing literature on group-based micro-credit programs, Hauge (2002) reports ambiguity in the characteristics that promote success in these joint liability lending structures, similar to the uncertainty described above about the role group composition plays more generally in the success of collective action institutions which manage CPRs (Heckathorn 1996). Some authors emphasize the significance of mutual monitoring and membership-driven screening as effective methods to increase repayment rates and decrease operating expenses to provide the credit.\(^4\) However, other work questions whether factors that joint liability institutions share with individual-based lending programs are more significant in providing sustainable credit facilities for small-scale agriculturalists.\(^5\) The features of individual based lending Hauge references include: frequent payments, progressively increasing loan sizes, and aspects of organizational culture (Hauge 2002:2). While controlling for these individual factors in analysis of a group-based program may reveal predominance of one type over the other, aspects of both types promote institutional sustainability in the varying empirical settings in which micro-credit institutions are found.

**Collective Action and Credit in Cooperatives**

Cooperatives provide social and economic resources their members need to carry out their livelihoods. Credit is among the more important resources, and cooperatives provide an organizational structure through which members may devise institutional arrangements to provide access to it. When access to credit is structured as a CPR, a framework that focuses on the principles of collective action institutions is appropriate to measure the efficiency of providing credit services to members. This type of analysis also provides insight to understand where problems may arise and how they may be resolved when the institution is stressed by growth and other internal and external factors.

The problems Jentoft (1986) relates to cooperatives (multipurpose functions, complexity, and participatory decision making) can be viewed within Ostrum’s (1990) framework as issues related to

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collective and operational level rules. In cooperatives, internal rules shape how cooperative members provide, commit to, and enforce compliance of the rules that structure members’ behavior in and relation to the cooperative. If these characteristics of cooperative organizational structure preclude fishers and other small producers from organizing, how does one explain the many successful cooperatives found throughout the world?

While several organizational characteristics of cooperatives do present problems, which in some cases have led to institutional collapse, they are not inherent, immutable traits. These characteristics can be affected through members’ participation in altering the institutional design and by changing their operational level behavior, to create new rules so that the institution works for the members and its members work for it. However, members’ ability to change rules and choices at the operational and collective levels depends upon what structures and constraints are present at the constitutional level. Studies of cooperatives in Mexico and Bolivia provide examples.

Several studies in the varied settings of Mexican fishing cooperatives focus on constitutional level rules which structure cooperatives’ organizational options at the collective level and, in turn, how this centralized system determines fishermen’s behaviors at the operational level (McGoodwin 1980; Petterson 1980; Leslie 1995; Wood 1995). Wood (1995) shows how one cooperative survived in this unfavorable setting when nearly all the others folded. Wood lists seven reasons why this cooperative was able to persist in an environment that dampened prospects for its success. I summarize them here into three more general statements: 1) cooperative members and fishing crews are organized around shared interests and goals; 2) distribution of income, other cooperative resources, and decision making among members are all based on rules defined by members’ conception of equity; and 3) members learned through experience the necessity of following the rules and enforcing them upon others to prevent corruption and promote accountability (Wood 1995:3-5). This example illustrates how cooperatives are not static, immutable structures, but living organizations whose constituents can design rules and shape their own and others’ behaviors to make an institution work for them.
Tendler (1988) documents several large-scale development programs whose purpose involved promoting cooperative organizations among small-scale farmers in Bolivia. The cooperatives were to be set up as institutional conduits through which credit and other support services could be channeled to the farmers. In most of the cooperatives Tendler studied, credit supplied was drawn from a grant fund and there were no requirements set out to replenish the initial outlay of capital that provided cooperative members with credit, and therefore, no strict guidelines or informal measures for mutual monitoring emerged. No incentives were designed to repay loans and in only one cooperative this emerged indigenously. However, once the “free” capital dried up some cooperatives began realizing the importance of commitment in maintaining the flow of capital back into the cooperative’s accounts (Tendler 1988:88-93). The one cooperative that obtained capital from a bank realized a high level of repayment among the membership. Part of this cooperative’s success is due to implementing controls on the access to credit and establishing terms of repayment. Members paid the interest the cooperative owed the bank and members were closely monitored by the cooperative’s leadership and other members (Tendler 1988:110).

An Empirical Example of a Socio-Economic CPR: Credit in Belizean Fishing Cooperatives

Belizean fishing cooperatives offer a unique case for evaluating theories of collective action institutions in a setting where credit occurs as a common pool resource. The Belize case is distinct from other work in the area of group-based credit carried out in cooperatives (Tendler 1988), formal micro-credit development programs (Rahman 1999; Hauge 2002), indigenously devised rotating credit associations (McAfee 1991), and other informal resource pooling credit groups (Firth 1975 [1946]). The way Belizean fishing cooperatives provide credit to its members is structurally similar to several of these other lending institutions and programs. Capital is secured from a lending institution and the cooperative makes it available to participating members, who must follow specified rules concerning repayment in order for credit to be available in the future. The factors differentiating Belize’s fishing cooperatives
from most other group-based lending organizations are in terms of membership and loan size, institutional purpose, and the structure of repayment.

Most of the groups referenced in the previous paragraphs are organized around small groups of people with close ties. The informal cooperative groups Firth describes in Malaysia are typically organized by 3 to 5 fishermen, but some larger groups of up to ten fishermen are also found (Firth 1975 [1946]). The group-based micro-credit programs discussed by Hauge (2002), the rotating credit associations discussed by McAfee (1991), and the lending groups of the Grameen Bank have small memberships ranging from five to ten members (Rahman 1999; Yunus 1999). The cooperatives in Bolivia have average memberships of between 20-25 farmers (Tendler 1988). According to collective action theories the combination of Belizean fishing cooperatives’ size and endurance are an anomaly. Hauge writes,

> In most cases, the likelihood of collective action is predicted to fall as group size grows and dilutes individual benefits from collective good. In credit… group size is a double edged sword. As it increases, borrowers may pool their risks more broadly and lenders may reduce some transaction costs. However, beyond some point – *perhaps between 5 and 20 members* – loss of capacity for collective action is likely to overwhelm the benefits (Hauge 2002:5-6; emphasis added).

In an entirely different setting, but one more akin to Belize, Acheson (2003) describes how differences in the size of fishing communities on islands and the coast effects fishermen’s willingness to institute trap limits. Here the propensity to organize collective action institutions that limit traps in this lobster fishery varies between the smaller island communities, most having between 9 and 15 fishermen, and the coastal communities, having as many as 120 fishermen (Acheson 2003:76). The one island community with 50 fishermen, the largest, had the most difficulty maintaining their indigenously devised trap limit system.

Belize’s fishing cooperatives have more members than any of the groups described above. The smaller Belizean cooperatives have memberships of over 100 and the two largest cooperatives have over 500 members (Belize Cooperatives Department 1999). Even at its inception, Belize’s first fishing cooperative had 38 members (Sutherland 1986).
In addition to membership size, Belizean fishing cooperatives provide members with larger sized loans, relative to the other lending institutions described in the literature. Hauge (2002:18) documents loans ranging from $250 to $450 among 642 borrowers belonging to the agricultural credit groups in Chile’s Central Valley. Loans provided through the Grameen bank are considerably smaller, ranging from tens of dollars to rarely over a few hundred (Rahman 1999:98-101; Yunus 1999). Trap fishermen in Belize may access between $2,000 and $5,000 to purchase materials to build and repair traps, boats, or engines; and larger producers may take loans in excess of $15,000.

Another factor differentiating the Belize fishing cooperatives from some of the other institutions is the organization’s main purpose. Malaysian fishermen’s informal credit groups, various types of RTAs, Grameen lending groups, and several of the cooperatives and group-based lending organizations referenced above are instituted for the sole purpose of making capital available to participants. The difference in purpose between Belize’s fishing cooperatives and these other institutions also provides a structural difference in how credit is made available, allocated, distributed, and repaid. In Belize, fishing cooperatives are in the business of producing, processing, and marketing seafood; credit is available to members as an ancillary service attracting fishermen to market with them and keeping members fishing once signed up with the society. In these cooperatives, credit is a mean to finance production and attract members to grow production and sales.

The fishing cooperatives distribute credit and collect payments with the coming and going of the lobster season to make the terms favorable for members and because members repay their debt to the cooperative through the value of catch marketed to it. Cooperatives use the value of its membership’s anticipated catch as collateral to secure capital from larger lending institutions. This structure of repayment is set by the legislation governing cooperatives in Belize—the only way cooperatives can recoup money members owe it is through the products members market to it. Cooperative leaders use members’ commitment to marketing as a guide to determine the amount of credit the society will give each member.
Maintaining common credit pools in Belize’s fishing cooperatives is a second order collective action problem, creating additional institutional complexity through the multipurpose nature of supplying credit in a marketing cooperative. In a marketing cooperative the first order collective action problem is to get members to commit to marketing their catch with the cooperative. However, because constitutional level rules that govern cooperatives in Belize require that members’ debts with their cooperatives be paid through their productive relationships to them, commitment to repaying debt with the cooperative is structurally tied to members’ commitment in marketing with the cooperative. In this way, credit is a second order collective action problem nested within members’ marketing with, or without, the cooperative.

In addition to providing credit to finance fishing operations, members have used the institutional and economic power of their cooperatives to provide for community development. While this advantage has provided for economic democracy among the fishermen of Caye Caulker, the success of this type of multi-purposed agenda runs counter to Jentoft’s (1986) review of cooperative failings. While many fishing cooperatives in Belize have failed, those that remain in operation provide significant social and economic benefits for rural communities through the collective marketing and credit services (Palacio 1996). The study presented in this thesis looks at one Belizean fishing cooperative to show how it has promoted economic well-being for members and their community over its 40 year history and to evaluate how changes in its membership composition may be affecting its ability to continue providing the benefits collective marketing have historically conferred to members—high prices for seafood and credit.
Chapter Three

Collective Marketing and Maintaining Common Credit Pools in Belizean Fishing Cooperatives:
A Dynamic Collective Action Landscape

Most studies concerned with institutions that manage CPRs focus on settings where the common-pool is a natural resource such as pasturelands, forests, watersheds and aquifers, and fisheries (National Research Council 1986; McCay and Acheson 1987; Berkes 1989; Pinkerton 1989b; Ostrum 1990; Dyer and McGoodwin 1994; Durrenberger and King 2000). Other research concerning community-based institutions focuses on how they invigorate economic and community development (Cernea 1991), provide social and economic benefits to local residents (Annis & Hakkim 1988; Yunus 1999), and engender environmental stewardship (Few 1998). Ethnographic case studies across this literature show that community-based institutions, when endogenously present or extra-locally developed, are inconsistently supported in different historical and political contexts (Moberg 1992; Pinkerton 1994; Wood 1995; Cohen 1999). Moreover, theoretical and empirical questions remain as to the role a membership’s composition plays in affecting the institution’s sustainability over time (Heckathorn 1993; Balland and Plattaee 1997; Periera 2002). It is clear, however, that when community-based institutions are present, any benefits derived from collective action tend to accumulate within and re-circulate through rural communities (Annis & Hakkim 1988; Moberg 1992). This study bridges these areas of research. Theories of collective action typically used in natural resource settings are applied to CPR setting within a Belizean fishing cooperative whose members are faced with a second order collective action problem in supplying, committing to, and monitoring rules that provide cooperative credit.

Marketing and Credit in Belize’s Fishing Cooperatives

Fishing cooperatives structure marketing and finance production in Belize’s export lobster fishery. Cooperatives provide a consistent market for fishermen and have historically paid the best price for the various species fishermen catch. In addition to reliable marketing, cooperatives provide members with
resources they need to carry-out their livelihoods—ice, gasoline, engines, boats, materials to build traps, and credit. Credit is significant because it is the basis for accessing these other resources and the cooperative offers it on favorable terms scheduled with the lobster season. The credit cooperatives provide to their members is structured as a common-pool. Fishermen may access credit from a cooperative after joining and demonstrating their commitment to marketing with it.

Members’ marketing and access to credit in Belize’s fishing cooperatives are tied because members pay their debts through the value of the products they market to it. The Cooperative Societies Act of 1948 structures lending relationships between cooperatives and their members, providing what Ostrum (1990) describes as constitutional level rules (The Cooperative Societies Act 1948: Sections 17, 37, and 72). Given this constitutional setting, cooperatives’ ability to continue providing credit and other resources and services members need to carry out their livelihoods depends on its members’ commitment to marketing their catch with the cooperative.

This example is structurally equivalent to the multi-tiered collective action problems in the institutions of Maine’s lobster fishery where, in the absence of definite territorial boundaries and limited entry rules, fishermen will not establish trap limits (Acheson 2003:78-9). In Belizean fishing cooperatives, the nature of cooperative credit as collective action problem is multi-tiered, or of a second order, because without member commitment in marketing, there is no commitment to repaying debts owed to the common credit pools. Another component of this relationship is that members had to first establish their ability to produce and sell a consistent amount of lobsters in order to demonstrate that their anticipated catch was valuable as collateral to a bank or other lending institution. With their marketing problem solved, by showing they are committed and producing members, they could use the value of their projected catch to supply themselves with credit. In this respect, members’ commitment to marketing determines the state of the cooperative’s common credit pool.

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6 Cooperatives have alternative avenues to recoup debts owed by delinquent members outside the “normal” means defined in the Cooperatives Act. However, these options require support from the majority of members and the involvement of the Registrar, the Minister, or an arbitrator, making them difficult and expensive. Cooperatives rarely pursue payment in this way.
The theory presented here assumes that when the rate of marketing and debt payment among the membership decreases, the state of the credit pool is affected. The benefits of collective marketing and availability of cooperative services decrease and may even cease, as has happened with several failed fishing cooperatives in Belize, as commitment and the state of the credit pool diminish. Fifteen fishing coops have registered with the Belize Cooperatives Department since 1960, but only four remain active. Today, most fishermen belong to one of these four fishing cooperatives. Table 3.1 shows the names, locations, registration dates, and status (in 1999) of all fishing cooperatives registered in Belize. Table 3.2 shows cooperative membership in the different fishing cooperatives in Belize from 1960 to 1999. A last variable affecting members’ collective returns from marketing is the price the cooperative is able to negotiate for the lobster they export, the average selling price throughout the season.

The resilience of the remaining fishing cooperatives is important to the Belize lobster industry and the several rural communities where fishing is a mainstay of the local economy because cooperatives provide fishermen with higher returns for their labor and capital investments relative to when the industry was dominated by foreign companies that appropriated most of the value fishermen’s labor created. This wealth now remains in the local economy and it, in association with the institutional support from the cooperative, promotes broader social and community well-being in addition to the economic benefits members realize. Corruption, geography, and lack of member commitment are cited in the literature as reasons for cooperative failure worldwide (Poggie 1980; Jentoft 1986; Pollnac 1991), but little work has been carried out to understand what specific organizational and institutional conditions bring about this kind of collapse (Pinkerton 1994). Some authors have used these factors to explain the failure and crises in Belizean fishing cooperatives (Palacio 1996:34-6; Price-Daly 1986). While these factors have contributed to the problems cooperatives face, they have not been explored to understand and explain the mechanisms that led to institutional crisis and failure.

Palacio (1996:35) notes that “lack of proper controls” over cooperative finances is one of the characteristics leading to institutional deterioration in this setting. Looking at one cooperative’s finances, their use and management, and other related variables in the operation of cooperative business and lobster
<table>
<thead>
<tr>
<th>ID</th>
<th>Name</th>
<th>Date of Registration</th>
<th>Date of Dissolution</th>
<th>Status</th>
<th>Location(s)</th>
<th>Members</th>
</tr>
</thead>
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<td>Yellow Creek</td>
<td>n/a</td>
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<tr>
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<td>Toledo North fisheries Cooperative Society</td>
<td>4-SEP-86</td>
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<td>n/a</td>
<td>Toledo Town</td>
<td>n/a</td>
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<tr>
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<td>Independence Fisheries Cooperative Society</td>
<td>20-OCT-85</td>
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<td>n/a</td>
<td>Yellow Creek</td>
<td>n/a</td>
</tr>
<tr>
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<td>n/a</td>
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<tr>
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<td>Toledo Town</td>
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<td>n/a</td>
<td>Toledo Town</td>
<td>n/a</td>
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<tr>
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Table 3.1: Fishing Cooperatives Registered in Belize 1960-1999
Table 3.2: Membership in Belizean Fishing Cooperatives 1960 - 1999

<table>
<thead>
<tr>
<th>Year</th>
<th>Northern</th>
<th>National</th>
<th>Caribena</th>
<th>Sarteneja</th>
<th>Plancencia</th>
<th>Other</th>
<th>Total</th>
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<td>135</td>
<td>0</td>
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<td>50</td>
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fishing is one way to bring more understanding to the conditions that promote and frustrate resilience in cooperatives and similar community-based institutions more generally. This study takes this approach by focusing on one cooperative, the Northern Fishermen’s Cooperative Society (the NFCS or Northern), in order to evaluate the theoretical relationships among operational and collective variables that comprise Belizean fishing cooperatives’ marketing processes and common credit pools.

Changes in the cooperative’s membership composition and their commitment to collective marketing affect the continued availability of credit for all members, the cooperative’s financial standing, and its overall resilience. Northern’s growth has changed the composition of its membership, particularly in regards to the homogeneity of their gear, residence, and economic interests in the fishery. The membership’s level of homogeneity in these areas determines the likelihood of mutual monitoring. Monitoring entails members’ ability and likelihood to observe others’ behaviors in relation to the common-pool and enforce sanctions when non-compliance occurs. In turn, these aspects of membership composition determine members’ commitment to marketing with the cooperative, which, in turn, maintains the flow of resources through the cooperative to supply the common pool of credit to members. Opportunities to work and market lobster in tourism and returns from collective marketing (past and anticipated second payments) predict members’ level of commitment.

Members’ commitment in marketing has implications for the common credit pool because of the constitutional level rules that limit how cooperatives can collect debts members owe to them. Member commitment in marketing and their lending behavior together shape the NFCS’s financial standing. When members shirk their commitments by not marketing to the cooperative, the remaining membership bears the burden of the disloyal members’ unpaid debts, realized as an increase in costs to provide the credit pool and maintain the cooperative’s resilience over time. In this regard, commitment determines the costs of maintaining the resource system. As the costs of providing credit to members increase, the benefits conferred to fishermen-members decrease.
Figure 3.1 shows the relationships among variables in the case of this Belizean fishing cooperative’s multi-tiered collective action problems of collective marketing and common pool credit. The last part of this chapter provides the central hypotheses based on the observations made from the sources and data described above. These hypotheses are used to evaluate the theoretical relationships among the cooperative’s changing membership composition, commitment in marketing, and their effects on the state of the common credit pool and members’ returns from collective marketing. Qualitative and quantitative data are used to evaluate the relationships among these variables. However, because of problems with inter-correlation among the independent variables and the number of cases relative to the complexity of the relationships described, I rely mostly on qualitative analysis of ethnographic data and cooperative annual reports. Quantitative analysis is limited to a multiple regression equation using the variables represented in Figure 3.1. This latter analysis is used only to supplement the qualitative findings.
Capturing Institutional and Behavioral Aspects of Common-Pool Credit

The data on which this dissertation is based was collected during 18 months of ethnographic field research carried out in Belize between 1995 and 1999. I adopted an iterative, multi-method approach to evaluate how changing membership composition and institutional growth affect the cooperative's resilience as a marketing institution and credit source for fishermen. The following sections provide some background to Belize and the Northern Lagoon, the setting of this research, and the research plan.

Research Setting: Belize, the Northern Lagoon, the Lobster Fishery

Belize is a small and new nation on the Caribbean shore of Central America, bordered by Mexico and Guatemala (Map 3.1). It holds a unique place in the region, possessing a mix of Latin American and Caribbean characteristics in its geography and population. Belize’s porous borders have been a main ingredient the nation’s ethnic and cultural diversity. The 250,000 people documented in national census figures include Afro-European descended Creoles (29.8%), Mestizos (43.7%), Garifuna (or Garinagu, 6.6%), Mayan Indians (Mopan 3.7%, Ketchi 4.3%, Other Maya 3.1%), Mennonites (3.1%), East Indians (3.5%), and North American, European, and Chinese (from the Mainland and Taiwan) immigrants and entrepreneurs (2.2%; CSO 1999). While English is the language of commerce, government, and taught in schools, several other languages are common to Belize—Creole, Spanish, Garifuna, Mayan languages, Chinese, Low-German (Plätte-deutsch), in addition to the languages of an array of international tourists and ex-patriots visiting and settling in Belize.

Variation in its physical geography and climate shapes the predominant resources, industries, and livelihoods on which its population and export oriented economy depend. The climate varies from sub-tropical highlands in the south to a drier, but still wet, savanna plain in the north. Acres of deciduous and pine forests cover mountains, rolling hills, and river valleys throughout the western and southern districts (Toledo, Stann Creek, and Cayo). These forested highlands descend into a low coastal plain as you move across the country into the east-central and northern districts of Orange Walk and Corozal. Notable
differences in rainfall also contribute to the climatic variation. Average annual rainfall totals range from 500 cm in the south to less that 200 cm in the central and northern regions.

Belize is a rural country having only one city with a population greater than 50,000—Belize City. The national capital, Belmopan, is surrounded by jungle and farmland with a modest population of fewer than 5,000. Belize’s rural population has increased slightly in the last part of the 20th century, growing from 46 to 52 percent between 1970 and 1991 (Shoman 1994: 250), and is estimated to be have leveled off near 50% (Abstract of Statistics 1999). As the sole urban area, Belize City remains the fulcrum of commerce as most of the nation’s agricultural and marine products are shipped there for export. It is also
the transportation hub for tourists traveling to, from, and around Belize. While people and resources are
drawn to Belize City, the rural areas possess the resources on which the nation’s economy depends.

Historically, forest, agricultural, and marine sectors dominated Belize’s export oriented economy.
These sectors remain vital, but tourism is the fastest growing industry and is one of the primary factors
drawing Belizeans to its geographically and culturally diverse rural areas. Timber products remain an
important source of export earnings, but agricultural commodities have surpassed timber in quantity and
value. Food products comprised between 76% and 86% of the total value of exports between 1986 and

Sugar predominates in the northern lowlands, while citrus and banana operations stretch from the
western Cayo District to the Toledo District in the south, but most production is concentrated in the east
central Stann Creek District. Marine resources are procured by residents from villages and towns on the
cayes and along the coast. Fishing is the predominant sea-food export activity and shrimp farms are being
developed on Ambergris Caye and in coastal areas north of Belize City. Tourism is Belize’s leading non-
agricultural industry and, like agriculture and fishing, it flourishes in rural areas, especially on the cayes
of the Northern Lagoon because of their proximity to the sea and the Barrier Reef (see Map 3.2).

Belize’s large rural population is due in part to the historical predominance of its agricultural sector, but
more recently people are drawn to the employment opportunities found in rural tourism destinations.
While fishing is still a viable livelihood strategy on the cayes, tourism has grown to be the primary
industry in these communities as it has across the rest of the country. San Pedro has grown into a small
town and now faces challenges associated with a rapidly developing tourism industry, a pattern common
throughout the Caribbean and parts of Central America (see Gordon 1981 and Arnaiz-Burnes 1996).
While San Pedro has sandy beaches and sits only a quarter mile from the reef, it is further from the more
productive fishing grounds around Caye Caulker. It is in this setting where the fishermen of Caye
Caulker established their sea tenure system, organized the Northern Fishermen’s Cooperative Society, and
continue to live and work today.
The Physical Environment of the Northern Lagoon

The Northern Lagoon is an area of shallow water between Belize’s Coast north of Belize City and the Barrier Reef. Its underwater geomorphology consists mainly of limestone and is known for its elaborate system of underwater caves. These were carved out of Belize’s relatively malleable continental shelf over eons as the waters of the lagoon rose and receded. Most caves are unexplored, but local fishermen and guides know their locations, in addition to patch reefs and other underwater features where marine life congregates. The depth of the water varies from two to eight meters and the bottom topography consists of one or a combination of sand, seagrass, mud, or lahe.\(^7\) Patch reefs throughout the lagoon attract several species of marine life and, consequently, fishermen near them. This limestone foundation extends under the Northern Lagoon to the edge of the continental shelf, where the sea floor meets the Caribbean surf and then drops hundreds of feet to form the Western Hemisphere’s longest continuous reef.

Running nearly 250 km along its coast, Belize’s Barrier Reef is the world’s second largest, behind Australia’s Great Barrier Reef. The protected lagoons, cayes, and littoral mangrove forests within the reef constitute the physical environment of the nation’s Caribbean coast. This environment is comprised of several interdependent ecosystems called the reef/caye/seagrass-bed complex (McRae 1999). The reef is the most dramatic and apparent feature of this marine environment, protecting the coast and cayes from hurricanes, but it is also an integral part this fluid ecological complex, continually transformed by storms, tides, and human activities. Despite its massive size, the Reef is helpless against the constant current that ferries silt onto the coral that crowns its limestone foundation. Dredging, agricultural run-off, pollutants from Belize City, growing maritime traffic, and tourism activities like snorkeling and SCUBA diving are accelerating the flow of sediments to the reef (McField, Wells, and Gibson 1996:37-9, 43, 53-4). Without the ecological services provided by the other natural features of the reef/caye/seagrass-bed complex, the reef’s health would deteriorate more rapidly under these changing conditions.

\(^{7}\) *Lahe* is a term used to describe limestone found on the seafloor or under the sandy topography of the cayes. *Lahe* is encountered when digging wells on the caye. People try to avoid digging to this depth because the water tends to acquire a foul odor, possibly from the presence of organic material deposited before the sand accumulated to form the caye.
Seagrass beds are important components of this ecosystem because they are habitat for several commercial fisheries and provide essential ecosystem services. Several species of seagrasses grow on the sea floor of the shallow waters within the barrier reef in small patches and larger underwater meadows, separated by and interspersed with patch reefs and an array of bottom cover that includes sand, mud, and rock. The predominant seagrass species include turtle grass (*Thalassia testudinum*), manatee grass (*Syringodium filiforme*), shoal grass (*Halodule wrightii*), and midrib seagrass (*Halophila baillonis*); and less widely spread species include *Halophila beaudettei*, *Halophila engelmanni*, and *Halophila decipiens* (McField, Wells, and Gibson 1996:42).

Spiny lobster (*Panulirus argus*) and queen conch (*Strombus gigas*) feed in and migrate through these underwater pastures. Figure 3.2a shows a photo of a lobster trap placed in a patch of seagrass near Caye Caulker. Beyond sustaining these tasty and valuable marine creatures the seagrasses act as natural filters, collecting sediments and other effluent from coastal areas and open-water human activity that stirs the sandy seafloor. This ecological service has not been measured, but is known to protect the reef from harmful sediments. Coral reefs require clear, clean water in order to remain healthy. Without the aid of seagrass to accumulate the majority of silt and sediments carried through currents from the coast, the reef would suffocate and die (McField, Wells, and Gibson 1996: 42).

Littoral mangrove forests anchor the cayes within the fluid marine environment of the Northern Lagoon. Like the sea grasses, mangroves collect sediment carried in tidal and other currents between the coast and cayes to the reef (Figure 3.2b). Currents also carry mangrove seeds. When seeds settle and take root on shoals, a small clump of a few mangrove trees can expand into small islands, called cayes (keys). The mangrove’s tentacle-like root structure provides a foundation around which fallen leaves and water-borne sediments accumulate, holding the trees together. The vast majority of cayes in the Northern Lagoon are barely more than collections of mangrove trees with little or no inhabitable land. Once established, mangroves prevent erosion and storm damage by anchoring the land in coastal and caye areas.
Figure 3.2a
Lobster Trap submerged in a sandy patch of seagrass on the floor of the Northern Lagoon

Figure 3.2b
Mangrove Trees near the shore at Caye Caulker, 1995
The mangrove does not confer any direct economic value, but their ecological services in preventing erosion and protecting the littoral and cayes from storms are an irreplaceable form of natural capital. Despite this important role, the trees are frequently cleared because they are perceived as a barrier to sea view tourist development rather than an essential part of preserving the land on which that view depends. When these mangroves are removed from coastal and caye environments storms and currents rapidly erode the land that has grown around their presence. In addition to protecting the caye from erosion and damaging storm surges, mangroves also provide important habitat for several animals. Numerous marine birds nest and rest in the upper branches, while several marine species find shelter and food in the dense web of roots under the water. Among the marine species, juvenile fish and larval lobsters find protection from larger predators (McField, Wells, and Gibson 1996:52-3). The spiny lobster is the most important and valuable commercial fishery in the waters of the Northern Lagoon. Fishermen who developed this fishery and participate in it today have played a key role in shaping the growth and well-being of island residents, particularly at Caye Caulker.

**The Spiny Lobster and State-Level Management**

Spiny lobsters are migratory creatures. They following a counter-clockwise route throughout the Caribbean, traveling south along the coastal areas of the Yucatan, Belize, and Central America; east along the northern coast of South America; north between the smaller islands of the eastern Caribbean; and westward along the continental shelves off the coasts of the islands of the Greater Antilles and Florida. The marine environment of Belize’s Barrier Reef and Northern Lagoon is one habitat in which they live. While journeying past Belize’s Barrier Reef lobsters roam away from the more abundant and conspicuous hiding places at the reef for feeding opportunities throughout the seagrass beds in the lagoon. Lobsters are sensitive to the sunlight that easily penetrates the shallow, clear waters in the Northern

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8 National laws prohibit clearing mangrove without a permit. Permits are not too difficult to obtain; however, people commonly go about cutting mangrove without one.

Lagoon area and, therefore, travel and feed mostly at night. When the daytime sun interrupts their nocturnal activities, they find shelter under and between crags and crevices of coral and other reef morphology and inside or under fishermen’s gear.

The abundance of shelter, diversity of habitats, and opportunities for feeding make the lagoon areas within the Barrier Reef conducive to the spiny lobster’s reproductive lifecycle. Female lobsters carry their fertilized eggs with them under their tails as a mass of tiny reddish colored “berries.” During the first six to twelve months after hatching, spiny lobsters exist as plankton-like creatures, called *puerulus* (Figure 3.3). Floating and drifting with ocean currents, they find shelter in floating matter such as seaweed or trash near the surface and in corals and mangrove roots under the surface. As the *puerulus* grows, it begins molting (shedding its hard outer shell).

After their first or second molt, spiny lobsters transform into juveniles and take on the appearance of tiny “baby” lobsters (Figure 3.4). At this time lobsters begin to behave and move like adults, finding refuge in mangrove roots and under natural and artificial reefs. Lobsters continue to molt throughout their life (Figure 3.5) and it takes about three years for lobsters to reach reproductive maturity (Figure 3.6). After juvenile and adult lobsters molt they seek out a safe place to hide as their soft skin hardens to form a new protective exoskeleton.

Belizean lobster management laws, the state-level institutions mandated to enforce them, and fishermen’s conservation behavior are relatively advanced in the Caribbean region. Most Caribbean nations with commercial lobster fisheries have a national level governing authority that supplies and enforces one or more of the following conservation laws: minimum size restrictions; a closed season; and prohibitions on lobsters in various stages of their life- or reproductive-cycles. Belize’s current lobster management policies are founded on regulations first enacted in 1948, when the colonial government responded to the expansion of the export trade in spiny lobsters and passed the colony’s first fisheries legislation that regulated lobster fishing. This ordinance prohibited the capture, sale, and possession of lobsters less than 3½ inches on their back, called the cape or carapace; lobsters that are carrying eggs, called “berried” lobsters; and all lobsters during the closed season, set between March 15th and July 15th.
Figure 3.3, *Puerulus*

Figure 3.4, Early juvenile lobsters begin to take their adult shape at an early age.

Figure 3.5, Small lobster captured by Fisheries Department staff during recruitment data collection
The Fisheries Regulations of 1977 expanded the protection of lobsters to include prohibitions from taking “soft” (molting) lobsters and changed existing regulations by reducing the minimum cape length to 3¼ inches and including a tail weight equivalent set at four ounces.

The Belizean Fisheries Department (FD) is the government agency responsible for monitoring fishermen’s behavior and enforcing Belize’s fisheries laws.¹⁰ Minimum size laws are designed to prohibit fishermen from taking lobsters smaller than the estimated size of a reproductive aged lobster. Most fishermen do not measure the carapace; they estimate the lobster’s tail weight based on their experience. Molting lobsters have a soft shell and are not valuable for export as this characteristic is not palatable to foreign consumers. The law prohibiting the harvest of berried lobsters is aimed at increasing recruitment, as the egg-bearing female is proven reproductive stock. Additional provisions in the 1977 laws included data collection rights for the Belizean FD. In 1995, the most recent update to fisheries regulation changed the closed season to begin on February 15th and run until June 15th, the new opening day.

¹⁰ Several other formal institutions play a role in fisheries management in Belize. See Appendix A for more details about these other institutions.
The Belizean FD has problems enforcing the laws governing the fisheries under its jurisdiction. The main problems include lack of funding and inexperienced staff. The FD staff includes researchers, extension officers, and fisheries enforcement officers. The researchers and extension staff have contributed to significant improvements in the quality of information the FD has gathered in recent years, but they are continually faced with tight budgets and limited resources to maintain positive momentum going forward. Conversely, several of the fisheries enforcement officers have law enforcement backgrounds and do not possess the knowledge, interest, or skills to convey the principles of resource conservation and ecological stewardship. Fishermen describe their encounters with these officers as confrontational, naming the officers’ policing attitude and heavy-handed intimidation as the source of conflict. This tenuous relationship contributes to animosity and fails to encourage resource stewardship, the intent underlying the fisheries laws of the nation (King 1997a).

With their focus on marketing, Belizean fishing cooperatives’ play only a passive role in management of Belize’s natural fisheries resources. When they do participate in resource management issues it is in the role of advocate for its members. In this capacity, the fishing cooperatives provide a voice for fishermen, serving as a conduit through which fishermen can channel their concerns when they think FD officers infringe on their rights. For example, there have been conflicts between enforcement officers and fishermen during the weeks leading up to the opening of the lobster season when fishermen set their traps to prepare for the opening of the season.

Research Plan

The research plan included aspects of cross-sectional and longitudinal designs adapted from a research model introduced at the 1997 National Science Foundation's Summer Institute for Research Design in Cultural Anthropology. This research design emphasizes multiple visits to field research sites to build theory through empirical observation and comparative background research, breaking up research iterations into exploratory and explanatory components. Exploratory projects during the months of June and July in 1995 and 1997 focused on documenting changes in an indigenous sea tenure system and
marketing cooperative organized by fishermen from Caye Caulker, Belize (King 1997a, 1997b). These institutions had been previously researched and described as a case of success in grassroots development (Craig 1966; Price-Daly 1986; Sutherland 1986; Palacio 1996). During these initial field visits I built relationships with fishermen in the village of Caye Caulker and other cooperative leaders in Belize City and oriented myself to the institutions and mechanisms of the fishing industry, fishing cooperatives, and the idiosyncrasies of conducting field research in Belize.

This preliminary work revealed the central position fishing cooperatives occupy in Belize’s marine sea-food industry and the social, cultural, and economic fabric of peoples’ lives at Caye Caulker and in other fishing communities across the country. Among the components of the lobster fishery, the cooperative’s common credit pool surfaced as a locally important empirical problem suitable to apply a theoretical model of collective action in relation to the cooperative as a type of CPR institution.

While the thesis draws on data collected through this entire period, it relies most heavily on this latter research period between 1998 and 1999. Research between October 1998 and December 1999 was done in two phases. The initial phase had three objectives: renewing relationships and building rapport with fishermen and villagers; introducing the project to the cooperative and the village; and re-familiarizing myself with the local fishermen and their views of the problems surrounding collective marketing and cooperative debt. Research during Phase One included three primary methods of data collection. I conducted a village-wide census; carried-out participant observation with fishermen around their yards, at cooperative receiving stations, at meetings, and at sea; and engaged several fishermen with casual conversation and open-ended interviews concerning lobster fishing and their cooperative. Phase Two research focused on fishermen’s fishing and marketing behavior. Interviews, participant observation, and collection of cooperative documents were the primary means of gathering data during this phase.

**Phase One**

Extended ethnographic research would not be complete without some unplanned upheaval to throw research plans into a tailspin. Three things slowed the progress of the first phase of research and
ultimately changed the rest of the project: a late-October hurricane that threatened Belize’s coastal and
caye environments, my underestimating the size of the village, and spending more time than planned
working with fishermen as they prepared for the opening lobster season.

Hurricane Mitch was forecast to make landfall in Belize two weeks after I arrived in October 1998.
The Cayes, coastal villages, and most of Belize City were evacuated as the storm approached. To the
misfortune of Honduras and parts of Guatemala, Mitch took a southerly route before circling completely
around the south and west of Belize. Although the hurricane did not make landfall on Belize’s coast, its
coastal communities experienced high surfs and substantial beach erosion. At Caye Caulker, all the piers
on the windward side of the island were destroyed; debris was washed up onto the front street and into
many yards, homes, and businesses; and thousands of lobster traps were either destroyed or lost. Upon
returning to the caye I set aside my research plan to help in cleanup efforts clearing debris and rebuilding
jetties. This disaster provided an opportunity for me to demonstrate good will and respect. Through this
unfortunate turn of events I earned the respect and trust of several villagers, who afterwards were willing
to hear about and participate in my project.

I revised my initial schedule and began census interviews in mid-December of 1998. I used a
structured survey to collect basic socio-economic data about the village population and identify the
population of fishermen and fishing households on the caye. I visited nearly every household on Caye
Caulker and gathered at least some information about all households.11 From this dataset I was able to
construct a sample frame of fishermen for interviews to be administered during the second phase of the
project. Data from the census was also used to supplement national census statistics from previous years
and reports on village economy and structure from earlier research (Craig 1966; Sutherland 1986). This
historical perspective lent insight into patterns in the village's development over time and helped identify
markers of community and individual well-being that were associated with stages in the cooperative’s
growth and the emergence of tourism on the caye.

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11 I counted 378 households at Caye Caulker in 1999. I collected at least some information about all of them and
conducted full census interviews with 346 (91.5%) of them.
In 1995 and 1997, local residents suggested that around 800 people lived on the caye. In late February I realized that I had underestimated the village’s population, and therefore underestimated the time it would take to complete the census. This delayed transition into Phase Two because I began splitting my days between census interviews and working with fishermen as they prepared for the next lobster season. The months prior to and just after the opening of the lobster season, March-July, are the fishermen’s busiest time of year; and would turn out to be my most active time of informal interviewing and participant observation in the contexts of lobster fishing and cooperative activities.

Throughout Phase One and during the transition to Phase Two I interviewed several fishermen informally. These interviews varied considerable in structure, content, and length, ranging from short conversations to long open-ended interviews. I spoke with fishermen about their concerns with the cooperative’s management, growth, and financial position. These meetings were mostly informal, with the intent to verify the content of and relationships among variables in the theory concerning the relationship of membership composition and cooperative credit. The more focused interviews during this period were aimed at drawing out descriptive accounts of the problems fishermen face in their livelihoods, how they perceived changes in the cooperative during its growth, and ideas they have about causes and remedies to the issues as they see them. In short, I wanted to confirm that my observations from the exploratory work in 1995 and 1997 were appropriately conceived and still relevant and accurate.

Participant observation with fishermen and other villagers provided opportunities to verify information collected in interviews and conversations. This method also provided insight into interview responses that informed follow up questions, shaped interview and survey instruments used during Phase Two, and helped identify the relevant variables used in specifying the theory (Figure 3.1). Most of my efforts at participant observation involved working with fishermen preparing for the lobster season and hauling traps and cleaning the catch once the season opened. I worked building and hauling traps with seven fishermen and observed several others at the cooperative receiving stations where they marketed

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12 By the time I finished the census I counted 1131 full-time residents. Data from the census are discussed in Chapter Five. Details about how I conducted interviews and defined household units are presented in Appendix B.
their catch and in their participation at cooperative membership meetings. Other opportunities for participant observation included fishing trips for conch or snapper, eating out in local restaurants, visiting with fishermen in the evenings, and attending village meetings. I also accompanied the fisherman who ferried the catches from Caye Caulker to the processing plant in Belize City.

The majority of my time was spent with one fisherman, with whom I worked building traps, hauling traps, and cleaning his catch throughout most of the 1999 lobster season. This relationship provided unique opportunities for data collection for which I did not plan. He became interested in a vented lobster trap experiment I described from an article I had read about lobstermen in New Hampshire. After contemplating several trap designs, he suggested we try this during the 1999 season. Opportunities like this arise only after gaining the trust and respect of residents, which grow out of commitment to a community through long term field research and participation in people’s lives on a daily basis. The participant observation that was part of the experiment created further opportunities for informal interviews about fishermen’s behavior in relationship to small lobster production, use, and marketing. While this experiment and the issues surrounding small lobster mortality were not a central focus of the main thesis, the interviews, conversations, and observations relating to them provided a view into the role tourism and small lobster markets play in providing alternate income strategies for fishermen, an important variable influencing member commitment in marketing with the cooperative.

Phase Two

After the lobster season slowed down in late July, I refocused my efforts on data collection for Phase Two of the project. Phase Two work consisted of continued participant observation and informal interviews, more formal structured interviews with fishermen and other caye residents, research into cooperative documents, a household food and work journal project, and archival research. I used the data from the census as a sample frame to draw participants for both informal and formal interviews.

I administered informal, unstructured interviews with fishermen, other members of fishing households, and caye residents who fished in the past. The purpose of these interviews was twofold: 1) to gather as wide a range of views on fishing and the cooperative as possible and 2) to provide background to design the more focused structured interviews to be carried-out with fishermen. I began with the intent of drawing a random sample of fishermen for the structured interviews. Because several fishermen refused to participate I was forced to fall back on an opportunistic sample. However, I selected fishermen from different segments of the population in order to approximate as representative a sample as possible without randomization. The sample is biased in favor of fishermen who are in good standing with the cooperative and who fish lobster with traps (see Appendix C). The structured interviews resulting from this work focused on lobster fishing effort and capital inputs, uses of credit, marketing outside the cooperative, and fishermen’s views about the cooperative’s growth and changing membership composition. The structured interviews provided more quantitative data to complement the descriptions collected from informal interviews and allowed me to verify dates, events, and stories related through them and those presented in secondary sources (Price-Daly 1986; Sutherland 1986). These interviews also helped in gaining access to, understanding, and organizing the data from the cooperative sources.

I viewed and collected a membership roster (1999), second payment schedules (NFCS 1996-1999), annual reports (NFCS 1963-64, 1968-99), and member files (NFCS, various years between 1974 and 1998 for 33 fishermen, depending on the member’s tenure with the cooperative) from the cooperative and national collections. The membership roster lists members by place of residence. The second payment schedules for the NFCS also provide information about members’ residence to help verify data from the roster, but more importantly these payment schedules help identify members’ primary fishing methods and how the total catch is distributed among the membership. Second payment schedules list the receiving station where fishermen marketed their catch and how much of what species were sold. These sources were used in association with the census and membership lists from NFCS and other cooperative annual reports to identify and verify members’ residence and gear.
Cooperative annual reports contain most of the macro-level data used for the analysis of changes in membership composition, member commitment, and the state of the cooperative’s credit pool. Cooperative reports summarize business operations for the fiscal year and fishing seasons. Information on catches and sales, members’ production status, assets and liabilities, investments, major cooperative events and decisions, plans and goals for future seasons, and minutes from the previous year’s Annual General Membership Meeting are the major topics contained in the annual reports. Data on cooperative production was collected from several annual reports, the Belize Cooperatives Department, and a handful of secondary sources. The Northern, National, Caribeña, and Placencia Cooperatives; the Belize Fisheries Department; the Belize Cooperatives Department; and the National Archives all contributed original or photo-copied reproductions of annual reports. I collected these reports during my trips to Belize between 1995 and 1999. No one institution has all reports for any single cooperative. Piecing these data together was a tedious and time consuming process that resulted in a complete dataset for the NFCS for the years with lobster seasons ending in 1968-1999. While this thesis relies heavily on this data, related data on other cooperatives is less complete and contains gaps. For example, data presented on the NFCS may have years 1968-1999, whereas data on all cooperatives may have 1977-1998 or be incremented by five year intervals between 1960 and 1999. Likewise, data from the small sample of member files varies depending on when the member joined the cooperative from between 1974 and 1998 for senior members to only one or two years for new members. These data begin in 1974 because that is as far back as members’ files were kept in the cooperative office.

Members’ files provided details about members’ production and lending with the cooperative and supplemented data gathered during structured interviews. File content varies depending on the number of years the member has with the cooperative, the size of their fishing operation, and their primary gear type. Because members’ files are private and closed, I was only allowed access to a small sample of files from fishermen who were generous enough to release their personal information to me for this study. I asked fishermen for permission to use their files and had them sign a release form upon their approval. I presented these forms to the main cooperative office to access the files.
Cooperative reports and data from members’ files summarize members’ participation in marketing and lending services through the cooperative. Apart from fishermen’s self-reporting from interviews, these are the only data available to ascertain the repayment and delinquency behavior. These data provide detailed accounts of member’s transactions with the cooperative, both in marketing and lending, and therefore are a valuable source for supplementing data from interviews with fishermen in these areas. Because of the sample is small and non-random, I am unable to use this data for substantial quantitative analysis. Despite this, information from members’ files and interviews with fishermen gives context to the aggregate institutional level data found in the annual reports. Therefore, I rely on the aggregate level cooperative data more than the individual level member file/interview data to show evaluate the relationships among the primary study variables over time.

In addition to the cooperative annual reports, the National Archives, the National Library, the Cooperatives Department, and the Fisheries Department provided other archival sources, such as colonial annual reports and other documents relating to the fishing industry and cooperatives. Data from archival sources supplemented what was available in the cooperative annual reports and provided some historical depth to the cross sectional data I collected during the census and other interviews with Caye Residents. Hurricanes and the failure of several other fishing cooperatives have eroded a more complete set of archival records. In most cases, the data used here is the best of what is available.

Other macro-level data includes national statistics on population, economy, and fishing. These data were gathered from several diverse sources and are, therefore, out of necessity of varying date ranges and in some cases have inconsistent time intervals. Data on national fish landings were collected from the Belize Fisheries Department, the offices of the CARICOM Fisheries Resource Assessment and Management Project (CFRAMP), and the individual cooperatives. National and village level population statistics were collected from sources at the Central Statistics Office and the National Archives. The Abstracts of Statistics and Colonial Annual Reports for British Honduras were of most use. Volumes of the Abstract of Statistics were used for more recent years’ data between the 1940s and 1990s and the colonial reports contained data between the 1860s and 1960s. These data were selected because they are
reliable, valid, and they are the best of what was available. While recent copies of cooperative annual reports are relatively easy to come by, other cooperative data is not as accessible. Cooperative reports from the 1960s and 1970s are scarce and reports for now dissolved cooperatives are even more so.

Toward the end of Phase Two I initiated a project to collect data on household members’ daily work and eating habits. Information about work was useful in providing specific examples of how people participate in fishing, tourism, and household work. Data household food consumption was intended to supplement the data collected concerning the use of small lobster in households. I asked 15 households to participate in this project. The households were non-randomly selected. I chose participants who I thought would record data with care and diligence and selected households that were representative of the diverse types of households in this village population.

Research Hypotheses

One advantage of an ethnographic approach to supplement quantitative data is that it provides context to the relationships among theoretically relevant variables. Inter-correlation among several of the independent variables prevents sophisticated statistical analysis. While inter-correlation may be a sign of imprecise or invalid measurement, in this case it is a product of how the independent variables deemed significant to the theoretical relationships are defined, particularly group homogeneity and propensity for mutual monitoring. Therefore, I rely mostly on qualitative analysis of ethnographic and supplemental quantitative data to evaluate the relationships among the study variables presented in Figure 3.1. A multiple regression model is included to show the difficulty of untangling the complexity among the variables required for more formal statistical analysis. Both the regression and qualitative evaluation of the hypotheses are presented in the discussion of results in Chapter Seven.

Membership Composition and Monitoring: Group Size and Homogeneity

The theoretical relationships presented in Figure 3.1 assume that there is a positive correlation between members’ monitoring options and the cooperative’s intra-group homogeneity. I measured the
cooperative’s homogeneity by constructing an index that combines observations of members’ residence and lobster fishing method. Three types of monitoring behavior occur through the cooperative’s development: informal monitoring, annual reporting of non-productivity, and inquiry into the cooperative's and individual members' accounts. Each of these aspects of monitoring is combined into an index as well. The following hypotheses will be tested using the Pearson’s $r$ correlation to see if when the membership is more heterogeneous, monitoring options relating to members’ accounts with the cooperative will be less accessible:

H$_{10}$: There is no correlation between the homogeneity of cooperative membership and the monitoring options available to the membership.

H$_{1A}$: There will be a significant positive correlation between monitoring opportunities and the homogeneity of the cooperative’s membership.

Membership Homogeneity

Membership homogeneity is observed through variation in members’ residence and gear. While these two indicators of membership homogeneity are independent, they are closely associated because of the nature of the traditional sea tenure system and the distribution of different types of fishing grounds and sites. I used the membership roster and second payment schedules from the NFCS, interviews, annual reports from other cooperatives, and secondary sources to provide residence information. The 1999 membership roster and 1996-1999 second payment schedules provided the most comprehensive data on residence. Using the NFCS annual reports as a guide, I asked a small non-random sample of fishermen to identify members’ residence. Census interviews also identified fishermen who had belonged to the cooperative prior to 1996. The National cooperative had some reports that listed members’ residence and was used to verify data from the NFCS, as some fishermen have switched cooperatives. In addition, some secondary sources listed residence information for several NFCS fishermen (Craig 1966; Price-Daly 1986; Sutherland 1986). These multiple sources provided reliable and accurate residence information that could be cross referenced and verified for members during the years 1968-1999.
Observations of members’ gear were made through interviews with fishermen, the census, and the cooperative’s second payment schedules. Census interviews and other structured interviews with fishermen provided the most reliable information on gear. Second payment schedules and participant observation data were used to verify responses concerning fishing gear from the census and fishermen interviews. The cooperative second payment schedules were also used to identify which members produced which types of seafood and in what quantities. The second payment schedules provide landing sites at which members sold their catch to the cooperative and their production totals by species. While the second payment schedules could not provide information reliable enough for determining all members’ primary fishing method, it provided enough information to identify gear for the majority of fishermen. Using multiple sources to verify one another, these measures produced accurate and reliable data about cooperative members’ residence and gear.14

The observations on members’ residence and gear were compiled into a dataset of individual members, which was then used to provide aggregate annual data for the cooperative macro-level dataset. Because membership size and homogeneity are often highly correlated, the observations used to measure each need to control for the other. Therefore, I created an index for homogeneity that controls for membership size. This index combines the observations of residence and gear for each season ending between 1968 and 1999 and sums the differences between 1) the percentage of members from Caye Caulker and the percentage of members from places outside Caye Caulker and 2) the percentage of trappers and members who do not use traps.

Monitoring Options

The theory presented here maintains that members’ access to monitoring credit allocation changes with the cooperative’s growing membership size and diversity. During the cooperative’s early years in

14 These observations provide accurate data on residence for 739 of 897 (82.4%) members between 1960 and 1999 and 530 of 592 members in 1999 (89.5%); and on gear for 740 of 897 (82.4%) members who produce lobsters between 1960 and 1999 (85.5%).
the 1960s up through the early 1970s opportunities to monitor credit allocation and marketing were relatively accessible because the membership was smaller and geographically centered around the Northern Lagoon. Because the membership and leaders were mostly from Caye Caulker it was easy for members to inquire about cooperative business, including delinquency and non-productivity. Furthermore, it was easy to monitor the use of cooperative funds and observe any significant increases in members’ living standard or material wealth in the small community of less than 400 people.

Another change in monitoring took place in the 1970s; however this change provided a new way to monitor the growing membership. Beginning in 1977, the cooperative’s Annual Reports started listing members’ production status. This change made public who was and was not selling their product to the cooperative. Reports before 1977 list all members and document the addition of new members and the expulsion of members for not producing.

During the season ending in 1995 a policy regarding members’ access to others’ accounts was adopted. This new policy prohibited members from accessing information about other members’ accounts, making members’ accounts accessible only to the member himself and the managing committee, who reviews member performance to decide on loans. Supported with an argument for individual privacy, this new policy prevents members from examining the status of other members’ accounts. This was the only direct way for members to monitor other members’ behavior in their cooperative’s credit commons. As co-owners of the cooperative business and its resources, this provision prevents members from learning about and scrutinizing the behavior of other members who fail to repay the debts they have with the society.

The membership’s level of monitoring in a given year is observed in three ways: whether or not the members are allowed access to view one another’s accounts, how the cooperative reports member non-productivity, and the opportunity for community-based informal monitoring. I combined these observations of monitoring options into an index as well. This monitoring index sums a relative, subjective value of each of the monitoring observations described above: community-based informal monitoring opportunity, annual non-productivity reporting, and member account access. The portion of
the index for each component is either based on an empirically observed value or weighted for its relative importance as a means of monitoring cooperative members’ and leaders’ behavior.

The measure of community-based informal monitoring opportunities is observed as the percentage of members from Caye Caulker and the percentage of caye members serving in the Managing Committee. This is the only empirically observed value in the index. It represents the relative concentration of membership and cooperative leadership in the village of Caye Caulker, the cooperative’s place of origin. This measure is the best approximation of the geographic concentration of the membership and the membership to its leaders from the data that is available. Fishermen’s participation and access to monitoring becomes limited as the number of members and leaders living and working at the caye decreases. The value used for this aspect of the monitoring index is the sum of the two percentages.

While the additional public reporting of members’ production status with the cooperative may provide some social pressure for members to comply, member’s marketing behavior is oftentimes common knowledge among fishermen (versus the general public or others reading these reports). Fishermen spend time around the receiving stations, observing their fellow fishermen, and talking about others’ behavior to relate much of this information about who is selling their catch to the cooperative, to other members, or to the restaurants. Therefore, the portion of the index that represents non-productivity reporting in annual reports is given a low value (0.1).

The portion of the index representing members’ ability to access others’ accounts and files is given a higher value (0.5). This is given a higher value because access to the actual record of what a member is or is not doing in regards to the dealings with the cooperative is more empowering for members than informal, possibly unreliable, and inconsistent reports from rumors and happenstance observations. Additionally, I have weighted this aspect higher because this change was made recently, during a time when the business was growing larger and, therefore, in need of more participation among the membership rather than less. This move is counter to the value monitoring can have for institutional resilience and allows for monitoring the leadership, those making the credit allocation decisions, as well as the how the general membership is using this common cooperative resource.
Membership Homogeneity, Monitoring, and Commitment

The measurements of cooperative members’ monitoring options and intra-group homogeneity are used to predict the membership’s level of commitment to the cooperative. The cooperative defines a member’s commitment by the consistency with which they market their catch to the cooperative, what the cooperative and its members describe as loyalty. Members who are committed to the cooperative market their catch to it. Members who deliver only some, very little, or none of their catch to the cooperative are considered as non-producing or delinquent.¹⁵ When members deliver their catch to the cooperative, the cooperative can deduct part or all of the value of the catch from the amount it pays the fisherman and apply this amount to his outstanding accounts. Commitment, then, is observed as the percentage of members who are classified as producing members in the cooperative for a given year.

Member commitment is also influenced by changes in the prices members receive from collective marketing with the cooperative and by alternative marketing and employment opportunities outside the cooperative. The prices cooperatives pay members are found in annual reports and secondary sources and are observed as the total price and second payment amount members receive from the cooperative per pound of lobster tails sold to it. Tourism is the primary source of alternative economic strategies for these fishermen. Because tourism provides alternative livelihoods and marketing options for fishermen, it is a force that pulls fishermen from participation in the cooperative and reduces their likelihood to market with it. I use the number of hotels at Caye Caulker and San Pedro to measure the effect of tourism in relation to decreasing member commitment in these ways. The following hypotheses are tested to evaluate the theoretical relationships between member commitment and membership composition, the prior year’s second payments, and tourism opportunities:

H2.10: There is no relationship between the members’ commitment to the cooperative and its membership’s homogeneity and monitoring options.

¹⁵ Fishermen use the verb deliver to talk about marketing with the cooperative. I use this term interchangeably with selling and marketing to describe fishermen’s exchanges of lobster for cash with the cooperative. Chapter Six provides more detail about these labels and how they are used to classify fishermen in the cooperative.
H2.1A: Membership homogeneity and monitoring are positively correlated with and predict member commitment.

H2.2O: There is not a statistically significant relationship between second payments per pound of lobster controlled for inflation in year $t - 1$ and member commitment in year $t$.

H2.2A: Member returns from collective marketing in year $t - 1$ is positively correlated with and predicts member commitment in year $t$.

H2.3O: There is not a statistically significant relationship between employment and marketing opportunities in tourism and member commitment.

H2.3A: Alternate employment and marketing opportunities in tourism is negatively correlated with and predicts member commitment.

Providing for the Resource System and Maintaining the Resource Flow:
The Relationships between Membership Composition, Commitment, and Maintaining the Credit-Pool

The next part of the analysis looks at the relationship between member commitment and the state of the cooperative’s common credit pool. The state of the credit pool is determined by the ratio of members’ collective earnings to the level of their debt and the costs associated with providing and maintaining it, less the portion of the debt the cooperative deems uncollectible. Figure 3.1 predicts that the level of member commitment will be positively correlated with and predict the state of the cooperative’s common credit pool; the more producing members there are (higher commitment), the better off the cooperative’s common credit pool will be. When member commitment is high, the costs to provide members with credit will be lower than when members stop selling to the cooperative because member non-productivity leads to delinquency, which decreases the state of the credit pool. This gives the following hypotheses:

H3O: There is no relationship between members’ commitment (percent of producing members) and the state of the cooperative’s common credit pool.

H3A: The percent of producing members is positively correlated with and predict the state of the cooperative’s common credit pool.

The level of member debt is simply the money the members owe the cooperative. This is observed by looking at outstanding member’s accounts for each season. Looking at outstanding member accounts is important because these include both producing and non-producing members and, therefore, account for
any delinquency that may be attributed to otherwise loyal, producing members. As described above, producing members are considered loyal to the extent that they sell their catch to the cooperative, but they may not be completely loyal if they have taken out loans that exceed their ability to repay in a single season or they market only some of their catch to the cooperative, thus leaving a share of their debt with the society. The sources of cooperative credit are described in more detail in Chapter Six and are combined here as one aspect of the state of the cooperative’s credit pool. The important ethnographic facts about these sources of credit are that they are obtained by the cooperative and occur for members as a common-pool and that this common credit pool is a second order collective action problem nested within the cooperative’s first order problem of collective marketing.

The costs to maintain and provide this credit pool are observed in the annual reports and include financial expenses reported in the annual reports, such as interest payments, bank overdrafts, and other bank fees. Interest expenses, overdrafts, and other bank fees comprise most of the expenses to provide and maintain credit. Interest rates have been relatively high (12-22% for most loans) for the cooperative and the amount the cooperative pays to cover this expense to maintain their debt is recorded in annual reports. Banks charge the cooperative high fees for overdrafts. Cooperative overdrafts only recently have grown in significance in association with growth in the cooperative’s membership.

The membership’s collective earnings are observed in annual reports as the aggregate second payment price for lobster tails and the undivided earnings that are capitalized into the cooperative’s reserves. When the ratio of these are greater than the level of members’ combined debt and the financial expenses to maintain it in the current year and pay interest and principle to ensure it is provided in future years, then the state of the credit pool is positive, or in good standing. When these measures of collective returns fall below collective debt and the cost to maintain it, then the credit pool is negative, or in poor standing. The percentage of members’ accounts receivable that the society deems uncollectible will be subtracted from this ratio in order to account for additional negative effects of member delinquency on the state of the credit pool.
The cooperative has estimated the percentage of accounts deemed uncollectible only since 1989. However, it has calculated this estimate in previous years for other debtors, such as its foreign customers and other cooperatives with which they do business in Belize. Therefore, I assume a zero percentage for members’ accounts deemed uncollectible for the years prior to 1989. This assumption fits within the logic of the broader model, lags behind the effect of the influx of members from Sarteneja who joined the NFCS in the early 1980s, and coincides with members’ reports of when the problems of filtering\textsuperscript{16} and member delinquency were becoming more serious.

The hypotheses presented thus far aim to test whether member commitment is positively correlated with the state of the cooperative’s credit pool. Ethnographic knowledge of the cooperative’s operations helps to determine the direction of the causal relationships among these variables. When members stop marketing their catch with the cooperative they fail to replenish the cooperative’s financial resource flow. This, in turn, increases the costs of providing credit to the rest of the membership, dampening the state of the credit-pool.

Factors Determining the Members’ Returns from Collective Marketing

Figure 3.1 shows that the membership’s level of commitment to marketing, the state of the cooperative’s common credit pool, and the average selling price for lobster tails determines members’ returns from collective marketing, observed as the per pound second payment price for lobster tails. All three independent variables are assumed to be positively correlated with the per pound second payment. The primary difference between the first two independent variables and the selling price is that the former are internal to the cooperative, whereas the cooperative has no control over the latter. Following this theory, if members market to the cooperative (high commitment) then they will repay their accounts and the credit pool will be in good standing. In this regard, the cooperative and its members have control over the outcome of this variable. Alternatively, the average price the cooperative negotiates for lobster tails

\textsuperscript{16} Filtering is a marketing option where fishermen buy product to sell to the cooperative, as opposed to delivering catch resulting from their own labor. More details about it are presented in Chapter Six.
determines what fishermen will earn from their collective marketing; and market, weather, and other unforeseen forces outside the control of anyone in the cooperative dictate this external variable.

This thesis is most concerned with the first two variables, to the extent that the cooperative leadership and general membership can affect them directly through their behavior and policies relating to marketing and their common credit pool. If their credit pool is being replenished by loyal producing members, then the costs to maintain it should be less (reduced interest expenses and back fees), resulting in more of the profit from sales of lobster to be distributed to the membership. The effects of these variables on members’ second payments are evaluated by testing these hypotheses:

H4.1O: There is no relationship between the second payment prices members receive for marketing lobster to the cooperative and the state of the cooperative’s common credit pool.

H4.1A: There is a positive correlation between the second payment prices members receive for marketing lobster to the cooperative and the state of the cooperative’s common credit pool.

H4.2O: There is no relationship between the second payment prices members receive for marketing lobster to the cooperative and membership commitment measured by the percent of producing members.

H4.2A: There is a positive correlation between the second payment prices members receive for marketing lobster to the cooperative and membership commitment measured by the percent of producing members.

H4.3O: There is no relationship between the second payment prices members receive for marketing lobster to the cooperative and the average selling price received through the season.

H4.3A: There is a positive correlation between the second payment prices members receive for marketing lobster to the cooperative and the average selling price received through the season.

Collective Marketing, Cooperative Credit, and Socio-Economic Well-Being

The socio-economic benefits of collective marketing are observed across three levels—individual member (access to markets and capital in fishing), household (members’ uses of earnings and credit), and community (enhanced social well-being conferred through public goods and residual effects of the former resources provided by the cooperative). Individual benefits are observed as the price per pound members’
receive for lobsters they market to the cooperative. Cooperative annual reports and secondary sources (Craig 1966; Price-Daly 1986) provide average seasonal prices for lobster sold to the NFCS. That this level of payment for lobster is an advantage or benefit of collective action is shown in two ways. Looking at historical data on prices before and immediately after cooperative organization shows that collective marketing substantially increased the proportion of value fishermen appropriated from their labor and capital inputs in fishing. This benefit continues.

The second observation comes from comparing prices members receive for lobster when selling to the cooperative versus selling to local markets. Fishermen benefit from cooperative marketing in three main ways. The cooperative gives members access to a reliable and constant market that pays the highest prices. In this way the cooperative provides direct economic benefit in addition to increased security for fishermen who know this market is always available. Moreover, the cooperative’s higher prices forces local markets to offer higher prices. This provides both direct and indirect economic benefits as well. The competition edges prices in the restaurant market higher and this alternative market to the cooperative gives fishermen options to choose markets depending on their needs on any particular day. They may choose the cooperative for high returns or other domestic markets for quick cash.

These other domestic markets include tourism restaurants and other fishermen who buy lobsters in order to sell them to the cooperative. Local markets give a lower price than the combined first and second payments offered by the cooperative, but restaurants must still compete with the cooperative’s higher prices to attract fishermen’s interest. The restaurant market is straightforward, but does entail some problems because it motivates a market for small, undersized lobsters. The second local outlet is the filtering process introduced above. Filtering has significant ramifications for the cooperative, member loyalty, and the problem of managing member credit; these are described in Chapter Six.

Access to cooperative credit ties all of these benefits together. Fishermen finance their operations through cooperative credit and the level available to all members and to each individually depends on aggregate and individual member production (i.e., consistency and loyalty in marketing). Fishermen’s household well-being is enhanced when this credit is available for use in the fishing operations, as a
supplement to household needs or, in some cases, to finance business ventures. The cooperative’s higher prices and credit provide fishermen with capital to send children to school, build onto their houses, and travel abroad for medical attention. The cooperative credit pool provides capital that directly and indirectly promotes fishing households’ control over economic development at Caye Caulker.

The credit that members secure to improve and expand their fishing operations has provided increasing production. Increased production associated with continual rising prices on the international market for spiny lobsters has provided fishermen with higher incomes, which they have used to invest in tourism and other things to enhance their economic security and social well-being. Access to this credit is also used to supplement their increased incomes from higher production; some fishermen use this credit from the cooperative to finance business opportunities in tourism or to diversify into other fishing opportunities outside of lobster. The local control of tourism helps re-circulate capital through the local economy, providing collateral community benefits. The economic benefits provided through the cooperative have also increased the community’s political wherewithal, that has brought electricity, health care, and other services and resources to their village. In sum, cooperative credit provides economic self-determination and has financed economic and community development at Caye Caulker—benefiting fishermen, their households, and others in the community. These community factors are highlighted in Chapters Four and Five.

Figure 3.7 depicts the hypothesized causal relationships among these variables; however, it does not represent a quantitative model. This diagram shows the study variables presented in Figure 3.1 and the hypotheses introduced above (H1, H2-1.1, etc.). There are two ways to evaluate a model like this, quantitatively and qualitatively. Because of the complexity of the relationships among the study variables in our theory, a heavily quantitative analysis is problematic. When faced with confounding problems, like inter-correlation, ethnography can be a more powerful mode of analysis than sophisticated quantitative statistical methods of analysis. Because of the nature of the variables being observed, there is no empirical basis to appropriately present a formal quantitative model that accurately represents the relationships among the relevant variables.
Detailed Theory of Marketing and Credit in the Northern Peninsular Cooperative

An Empirical Multilevel Collective Action Problem

Figure 3.7
Chapter Four

The Foundations of Economic Success at Caye Caulker:
History and Development of Fishing and Tourism

In the years between 1950 and 1960, the conjunction of Caye Caulker fishermen’s sea tenure system, their adoption of motorized skiffs, and collective marketing through a producers’ cooperative changed the their relationship to their livelihood, the natural resource base, and the direction of their village’s development. Sea tenure reserved access to the most valuable resource at their disposal—the lobster fishing grounds around their island. Motorized skiffs provided the technological advantage that allowed fishermen to expand their holdings and increase the efficiency of their fishing effort. Caye Caulker fishermen used their control over production in the trap fishery as leverage to assert control over marketing through the organization of the nation’s first fishermen’s marketing cooperative—the Northern Fishermen Cooperative Society.

The Northern cooperative’s longevity is heralded as a prime example of grassroots development whereby small-holders have improved their social and economic well-being by agreeing to cooperate through collective marketing (Vega 1979; Sutherland 1986; Usher 1995; Palacio 1996). The cooperative has allowed fishermen from Caye Caulker to appropriate the value their individual and collective efforts create from producing and exporting spiny lobster. Their success in fishing and collective marketing has provided a form of economic democracy in which they have substantial pride and which has provided a foundation for villagers to retain control over the growing tourism economy in their village. The NFCS also generated community level well-being by assisting with infrastructure development in the village and by giving villagers political and economic power that helped influence government to provide social services, such as improved health care and schools (Vega 1979; Gordon 1981; Sutherland 1986).

Research carried-out in the Northern Lagoon communities through the early 1980s documents these achievements and their history (Craig 1966; Gordon 1981; Price-Daly 1986; Sutherland 1986). Most work compares the different paths and results of this development between Caye Caulker and San Pedro.
(Gordon 1981; Price-Daly 1986; Sutherland 1986). Some work provides political economic and geographic descriptions of the Northern Lagoon’s lobster fishery and the history of the fishing communities involved in its development (Gordon 1981; Price-Daly 1986). The years during which this research was carried out coincides with the onset of several significant changes in the Northern Lagoon’s economy and demography. The most significant of these involve tourism development, the failing of other fishing cooperatives in Belize, the reaction of the larger cooperatives to these failings, and a couple of seasons of extraordinary high lobster production in Belizean waters.

This thesis analyzes how the success and growth of the cooperative and the corresponding institutional transformation threatens the benefits cooperative members realize through collective marketing. However, because the cooperative’s common pool credit dilemma is a second order collective action problem nested within the first order problem of collective marketing, it is necessary to include details about several factors related to fishermen’s participation in and decisions about their livelihoods, lobster production, and lobster marketing. These descriptions are provided in this chapter in order to give context to the problems associated with the credit pool and the cooperative’s growth. The chapter is divided into sections that describe some of the important aspects of the caye’s development; the practices of lobster fishing and marketing; and recent changes in Caye Caulker’s economy and population in relation to the growth of tourism.

**Settlement and Cultural Geography of the Northern Lagoon and its Cayes**

Caye Caulker and Ambergris Caye are the two most prominent islands within the Northern Lagoon. Caye Caulker is the smaller of the two islands and lies about 34 km (21 miles) northeast of Belize City (see Map 3.2). It is eight km (five miles) long and less than a half km (¼ mile) across at its widest point, south of the village. Ambergris Caye, the largest of Belize’s cayes, is located another 24 km (15 miles) north beyond Caye Caulker. San Pedro Town is the primary settlement on the caye and is the population center amidst sprawling tourism developments and squatter settlements (Arnaiz-Burne 1996).
The area from Mexico’s Yucatan Peninsula, south into Belize and Honduras, and west into Guatemala has been populated by Native Americans for thousands of years, most recently the Mayans and their descendents. There is evidence of pre-colonial Mayan occupation at Ambergris Caye, but none at Caye Caulker (Craig 1966). Ambergris was a trading point for the Maya along the Caribbean coast. The full time residents occupying the few permanent settlements drew subsistence from the marine environment, small gardens, and harvesting salt and basalt from the small lagoons on the northern part of the caye. Fish, basalt, and salt were consumed locally and exchanged for staple food items and luxury goods (Godfrey 1996). This trade transported maize, honey, cacao, wax, cotton textiles, jade, and obsidian along the coast and up and down the rivers draining the Mayan lowlands of Central America from Honduras in the south to Mexico’s Yucatan Peninsula in the north. The permanent Mayan settlements at Ambergris were abandoned between 1200 A.D. and Spanish contact (Guderjan 1993).

While Spain occupied the majority of Central America, it paid little attention to the Caribbean coast south of the Yucatan Peninsula to Honduras and even Nicaragua. The limited Spanish interests in the Northern Lagoon focused on the sea salt resources found throughout the small lagoons and salt flats on the northern part of Ambergris Caye, but the Spanish never settled along Belize’s coast or on its cayes (Guderjan 1993). British pirates took advantage of this blind spot in Spain’s colonial vision and in the late 1600s began making harbor in the shallow waters of Belize’s Northern Lagoon. The pirates began harvesting logwood and exporting it to Britain.

As their trade grew they settled near present day Belize City and on St. George’s Caye, but the Spanish continually drove the pirates-turned-merchants, who called themselves Baymen, from their coastal settlements. In 1763, the Treaty of Paris gave Britain limited rights to export timber resources from the eastern shores of Central America. Despite this agreement the Spanish continued to raid British settlements and disrupt the logwood trade, reminding the British that their rights were to the timber and not the land. The Baymen’s rights to the forest resources expanded through the latter half of the 18th century to include mahogany and more definite property rights to tracts of land from which to harvest
timber products (Shoman 1994:19-31). In 1798, the Baymen finally turned away the Spanish after a three day naval battle throughout the Northern Lagoon north of St. George’s Caye.

The British settlements and timber tracts would come to be known as British Honduras and timber production dominated the colony’s export economy into the 20th century. The colony was granted self-governance in 1963, but remained under British rule with a slow transition plan for full independence, mainly a result of Guatemala’s territorial claims to Belize. Its strategic location as a crossroads between the Central American Isthmus and the Caribbean Sea led to political maneuvering, drawing out Guatemala’s claim and other nation’s political-economic and -ideological interests (see Barry 1992:22-30; Shoman 1994:217-30). In 1981, Belize gained its full political independence from Britain.

Modern settlement of the Northern Lagoon was slow and sparse until the mid-1800s when refugees fleeing the Guerra de Castas (Caste Wars) settled on Ambergris Caye. By the late 1800s this migration had reached Caye Caulker or Hicaco Cayo—the Spanish name describing the abundant coco plum trees found across the caye at the time. Export oriented commodity production has shaped the lives and livelihoods of people living on these cayes since this time. Although people living at Caye Caulker and San Pedro share a common history that began with their ancestors’ migration from Mexico’s Yucatan Peninsula, each community’s path through this history is unique, shaped by their distinct geography, the individual and collective actions of their resident populations, and other climatic and geo-economic factors outside their control.

Coconut products were the first export commodity of modern capitalism to shape Belize’s caye environments, from Ambergris Caye in the North to the remote and distant outer atolls. Early residents of Ambergris Caye and Caye Caulker worked harvesting and processing coconuts for this export industry. Production in the coconut walks, called cocal, on Ambergris Caye was organized as a plantation and was owned by an elite family. Cocal workers on the plantation were bound with debt obligations to the plantation owners through a contract system. Workers contracted their labor in return for cash advances they needed in order to cover land rent and costs of provisioning their households (Gordon 1981:93-108).
The coconut palm slowly replaced the coco plum across Caye Caulker as the caye’s residents planted their own coconut walks to satisfy the growing export market. The cocalos planted at Caye Caulker were smaller than those planted at Ambergris Caye and production was organized differently. Two families at Caye Caulker owned the cocalos there. They shared the same ethnic background and heritage of the other residents who had settled on the caye. The owners and laborers worked these small holdings together (Sutherland 1986:46-49). The laborers were not tied to oppressive debt obligations of the plantation system like the people at Ambergris Caye.

Residents of both cayes relied on fishing for subsistence to supplement their income from work harvesting and processing coconuts; however, the greater autonomy among Caye Caulker’s residents provided opportunity for men to spend more time fishing. A land-sea division of labor emerged as fishing grew in importance. Men dedicated their time to the sea, whereas women mostly remained on-shore maintaining the households, harvesting and processing coconuts, and producing goods for sale. Subsistence and commercial fishing have been a central part of life on the cayes and after a period of dependency on the export market for coconuts, fishing emerged as the primary economic activity. Fishermen targeted various scale and fin fish for home use and sale in local and regional markets. While these fisheries are still active, lobster fishing has been the mainstay of the fishing economy since an export market emerged in the early 20th century.

**Early Fishing: From Subsistence to Market Production**

As copra production waned by the early 20th century, people relied more on fishing, both for subsistence and, increasingly, for cash. Figure 4.1 shows the number of fishermen in British Honduras from 1861 to 1960. Livelihood activities among Caye Caulker’s population were first recorded in 1891 and among the 255 fishermen in all of British Honduras in that year, only nine lived at Caye Caulker (3.5%; Blue Book 1891). By 1960, 627 people worked as fishermen in British Honduras; at least

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17 Products exported included the nut, coconut oil, and copra (the dried meat inside the nut, the source of the oil).
60 of them lived at Caye Caulker, representing 9.5% of the colony’s 627 fishermen, 18% of the caye’s 328 residents, and 75% of the adult men living on the island (NFCS 1963; Price-Daly 1986; CSO 1999). By the 1930s fishing had become a primary livelihood at Caye Caulker with grouper, mackerel, and snapper among the more important species targeted. Fishermen supplied local and regional markets from Honduras in the south to the Yucatan in the north covering much the same area as the Mayan traders of the past. Caye residents also developed other seaward focused skills that complemented their fishing livelihoods. Several men from the caye became renowned shipwrights, a traditional artisan livelihood that only a few have carried on to the present generation. They crafted single mast sailing boats called smacks. Smacks were between 8 and 10 meters long and equipped with a live well under the deck to store several days catch before fishermen transported it to market.

Figure 4.1

Fishermen in British Honduras, 1861-1960

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Fishermen</th>
</tr>
</thead>
<tbody>
<tr>
<td>1861</td>
<td>261</td>
</tr>
<tr>
<td>1891</td>
<td>255</td>
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<td>1901</td>
<td>331</td>
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<td>1911</td>
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<td>1921</td>
<td>306</td>
</tr>
<tr>
<td>1931</td>
<td>417</td>
</tr>
<tr>
<td>1946</td>
<td>329</td>
</tr>
<tr>
<td>1960</td>
<td>627</td>
</tr>
</tbody>
</table>

Sources: Blue Books 1861, 1881, 1891, 1901, 1911, 1921; Colonial Annual Reports 1931, 1946, 1960

18 Boat building at Caye Caulker has waned, but you still find locally built sail boats and wooden skiffs despite the fact that most fishermen prefer the ease, cost, and durability of fiberglass skiffs imported from Mexico. This rich traditional livelihood is documented at the Maritime Museum in the Marine Terminal in Belize City.
The 1920s saw the emergence of an export oriented commercial market for lobster. One of the first entrepreneurs who attempted to develop a lobster trade was a Canadian, Captain Foote.\footnote{There are some discrepancies to Captain Foote’s name in the few sources that reference his role in developing the lobster export market. Craig (1966) is the earliest source, who names Captain Frank Foote. Gordon (1981) cites Craig, but names Captain R.E. Foote of the Franklin Baker Company. Godfrey (1984 [1996]) also names R.E. Foote of the Franklin Baker company, giving acknowledgement to Gordon for generous use of his 1981 thesis. Then Sutherland (1986) references Godfrey’s use of Captain R.E. Foote.} Foote had been involved in exporting copra and sponges from Belize and recognized the widely available and under-used resource of spiny lobsters. After a few failed attempts at canning in the south of Belize in the mid 1920s, he moved north and set up an operation near Caye Caulker in the early 1930s. He introduced area fishermen to a Canadian lobster trap design. Fishermen from Caye Caulker used Foote’s trap and sold lobsters to him, but Foote abandoned his canning operation in 1935. Caye fishermen continued to produce lobsters for their own use and for sale. They sold whole lobsters to the domestic market in Belize City and later to a parade of entrepreneurs who returned to British Honduras to tap into the still largely untouched lobster fishery.

Before this export lobster market, lobster was considered a food of last resort. Caye residents who were children during this time described how storms, called “Northers”, washed up lobsters on shore by the hundreds. Northers brought southward migrating lobsters into the warmer waters of the Northern Lagoon and other areas within the reef. Older fishermen described times from this era when lobsters colored the bottom of the sea red, giving it the appearance of a single moving mass underneath their boats. During lobster runs associated with Northers, fishermen scooped lobsters from their boats with nets called \textit{hammos} (also called bully nets) and set beach traps along the shore to capture lobster.

\textit{Hammos} are circular nets attached to long poles which the fishermen dip down to the sea floor to capture one or more of the running lobsters. Beach traps are constructed from chicken wire and look like a fence set on the sea floor, standing tall enough to stick out above the surface or the water. The fence runs perpendicular to the shore reaching out about 20 to 30 meters with a heart shaped weir placed at the end. Lobsters hit the fence and are guided into the weir as they migrate. Once inside they are unable to

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find their way out. Fishermen checked their beach traps each morning during lobster runs to remove the lobster, crabs, and fish that corralled into their beach traps. A large bag of whole lobsters would sell for under a dollar in the local markets. Fishermen carrying their bountiful catches to Belize City during these Northers would frequently discard unsold quantities by the hundreds as the lobsters spoiled in the heat of the day in a glutted market.

**The Rise of Lobster**

It was not until the late 1940s and early 1950s that Belize’s export lobster fishery began its largest and current expansion. This expansion coincided with the colonial government passing its first fisheries legislation that regulated the lobster fisheries in British Honduras’ waters. Fishermen from Caye Caulker and San Pedro were among the first to participate in commercial lobster fishing in Belize and fishermen from both cayes still engage in the lobster fishery. Today, however, fishing is more vital to Caye Caulker than San Pedro, where tourism has developed more rapidly and extensively. Geography played a role in differentiating these islands’ development, particularly in the size of each caye and their proximity to productive lobster fishing grounds and Belize City, the country’s marketing center.

Ambergris Caye’s larger size supports a larger population, relative to Caye Caulker, and has allowed more and larger tourism developments. Some San Pedrano fishermen set traps south of Ambergris Caye, but the majority of the lobster fishing grounds in which traps are used are around Caye Caulker and in areas south toward Belize City. Caye Caulker’s location in the midst of these productive lobster fishing grounds and nearer the marketing and processing center confers advantages of place, but geography itself is not the determining factor differentiating it from San Pedro. This geographic setting has provided a context that promotes different options for social and cultural opportunities. For fishermen at Caye Caulker, this setting provided appropriate conditions for two institutions that have helped them assert control over access to the lobster fishing grounds, their livelihoods, and the direction of their community’s development—a territorial sea tenure system and a producer marketing cooperative.
Belizean lobster traps are made from two kinds of wood and although fishermen use a common design, trap dimensions vary with each fisherman. Fishermen nail together inferior grade “mahogany shorts” produced by sawmills to construct the frame of the traps. The shorts are rough cut, two inch by two inch boards that come in 10 to 14 feet lengths. Fishermen sometimes refer to the wood as Santa Maria and to the boards as “strips.” Traps generally measure about one foot in height and two-and-a-half to three feet in length. From the front and rear ends the frame is trapezoid in shape, with the base measuring one and half to two feet wide and the top tapering to a width of 12 to 16 inches (Figure 4.2). The frame is enclosed with Salt Water Palmetto lathes. Fishermen also use nails to secure the lathes to the frame to enclose the trap and to construct the entrance, which is a ramp construction that fishermen call the “step” (Figure 4.3). The mahogany strips are durable and can withstand several seasons of use in the salt water, whereas the palmetto lathes are less resistant to the sea water and need replacing more often, depending on their quality and thickness.

There are several ways fishermen organize and accomplish the work to build and repair traps. Historically, all fishermen built their own traps. Today several fishermen do all the work themselves or enroll other fishermen and family members to help while some fishermen hire others to do the work. Regardless of the organization, the work is usually broken into an assembly line, piece-work process generally consisting of five parts. Each trap requires three Santa Maria frames. Two form the back and center pieces and the third, which has an extra strip on each lateral side to serve as handles, form the entrance. Once a quantity of frames is accumulated, they are connected at the corners with four palmetto lathes, giving the trap its structure. These potential traps are then stacked as more Santa Maria frames are prepared. The next step is to enclose the trap with the remaining palmetto lathes. Three or four palmetto lathes and two short scraps of Santa Maria are put together to create a lid for each trap. The last step involves constructing the step and entrance. This is pieced together from short lengths of palmetto and a small scrap of Santa Maria. More palmetto lengths are attached to the inner sides of the entrance. Two short Santa Maria scraps are cut to fit in back of the step, extending down from the center frame to create
a hole at the top of the step. The step is inserted through the front of the trap. And finally, the Santa Maria length holding the palmetto lathes that make up the step is fit to a snug resting place between the lateral lathes in the trap’s entrance. The lids are placed on the top to complete the job.

Figure 4.2, New traps stacked in preparation for soaking, Caye Caulker 1999
Figure 4.3, Front view of new traps, showing the “step”

Figure 4.4, Old traps on jetty, Caye Caulker 1999
Repairing traps requires more experience. The fisherman must know which lathes are in need of replacing, whether the frame will endure another season, and how to select the appropriate replacement lathes to fit into the gaps left by worn lathes. The dried traps are fragile and care must also be taken when nailing these new pieces onto the weathered frames so as to not cause further damage to them. Even when fishermen hire out the work of building new traps, they often do repair work for themselves, and ensure the work is entrusted to someone with experience.

The traps in Figure 4.4 were removed from the water in January 1999. In May, these are being hauled ashore for repairs. A few weeks prior to the opening of the lobster season, after building and old work is complete, fishermen “season” their traps by tying them up in clusters and soaking them near their jetties to get them waterlogged (Figures 4.5a and b). Despite this seasoning, the water heavy traps remain buoyant. Fishermen use rocks or pieces of broken concrete (in the past, perhaps coral) as ballast to sink the trap to the sea floor. A pile of ballast rock is shown in the bottom of Figure 4.5b.
For over 70 years fishermen from Caye Caulker have set their hand-made wooden lobster traps in the shallow, clear waters of Belize’s Northern Lagoon. The entrance of the lobster trap that Foote introduced was originally constructed of a funnel shaped net and, because the lobster easily gnawed its way through the net, fishermen began experimenting with the trap’s design after Foote left Caye Caulker. A caye fisherman, Marcial Alamilla I, replaced the funnel shaped net with shorter lengths of the palmetto lathes to make the “step” entrance described above (Figure 4.3). Fishermen across the caye adopted this modification and have been using these traps ever since. During this period, fishermen established traditional use rights to areas of water in which they placed traps year after year, thereby reserving access to the fishing grounds closest to their village and between the caye and Belize City. This indigenous sea tenure institution was an initial step for fishermen in gaining more control over the direction of their livelihoods.

Figure 4.5b, Traps soaking on the back side of Caye Caulker, 1999
According to local custom, new fishermen, or established fishermen wishing to expand their operations, may set traps where another fisherman has not traditionally placed traps. New territories can be added in marginal areas where no one has set traps, or where a fisherman has abandoned an area he sees as unproductive. Once a claim is made and the fisherman demonstrates his ability to tend his traps, other fishermen are expected to acknowledge his claim to that area. This sea tenure system has been described by several authors (Gordon 1981; Price-Daly 1986; Sutherland 1986; and King 1997a, 1997b), but the fishermen themselves first documented their tradition in the minutes of their cooperative’s annual meetings. In the words of the cooperative’s managing committee:

In so far as most of our members fish by traps, we wish to state here that we recognize that there is a tradition among our fishermen that each one finds his area to set his traps and that it is not within the general accepted tradition for other members to set within the same area covered by that fisherman. Due to the expansion of the industry we can foresee that some problems will arise here and so we are asking all members to respect this tradition established by our fishermen, when and if they are expanding their operations, or for some when they start going into this business (NFCS 1969:11).

And,

It may not be necessary, but we still think it prudent to remind you [the members] of the accepted practice to respect another member’s right to set his traps in an area of his own choosing as long as it does not infringe on the rights of others. By this, we mean that members should not set their traps within the same area covered by that of another fisherman which was previously set (NFCS 1970:15).

This system of fishing rights resembles the territorial behavior of Maine lobstermen as reported by Acheson (1975, 1987, 1988). Acheson describes two types of lobster fishing territories: perimeter-defended and nucleated (1987:40-45; 1988:19-83, 153-159). Nucleated territories are large and based on membership in particular fishing communities or harbors. Acheson calls these groups “harbor gangs.” Nucleated areas have relatively fluid boundaries compared with perimeter-defended areas. Fishermen from the same harbor place their traps within the nucleated territory and reserve the rights to this area for fishermen from their home harbor only. In this respect nucleated territories are community based (Acheson 1988:48-52), where the defense of the territory is against intrusion by fishermen from other harbors. Perimeter-defended areas are much smaller, individually defended territories with more precise boundaries compared to nucleated territories. Perimeter-defended territories also define some level of group membership, but the lines are drawn around smaller groups, usually along kin lines.
Traditionally, access to fishing grounds in Belize has been reserved for local families living in coastal or caye villages in closest proximity to them. This convention holds at Caye Caulker, where community membership and access to lobster fishing areas have been synonymous as young fishermen have inherited areas in which to set traps from their fathers, uncles, or other kin with whom they have worked. In this respect, access to the local lobster fishing grounds parallels the nucleated type of territoriality practiced among Maine lobstermen. Individuals and kin-based groups divide the fishing grounds surrounding the caye into more defined territories which are held by the respective person or family from season to season. These are the “areas” referenced in the cooperative report excerpts cited above and they resemble Maine lobstermen's perimeter defended territories.

During the early years of Belize’s lobster trap fishery, the fishermen of Caye Caulker worked long days pulling ten to twenty traps from locally made smacks. Reaping the lion’s share of the lobster’s market value, foreign companies paid fishermen a pittance for their effort supplying lobsters to the export market. Prices between the 1920s and 1950s remained low and fishermen earned very little relative to the profits the foreign companies realized (Vega 1979; Gordon 1981). By the 1950s fishermen received about 1-5 cents per lobster for whole lobster and between 15 and 40 cents ($BH) per pound for cleaned tails from foreign buyers. Lobsters were abundant and the cash earned for them was not, so the low prices motivated fishermen to increase their efforts when the export market for lobsters expanded in the 1940s and 1950s. However, their locally made sailing smacks were ill suited for hauling the increasing number of lobster traps they set to meet the growing demand and by the 1960s many fishermen had adopted motorized skiffs to increase the efficiency of their effort.

Motorized skiffs allowed fishermen to increase the number of traps they worked and they began to expand the size and number of areas they fished. Caye fishermen expanded their territories southward among the uninhabited cayes towards Belize City, westward toward the brackish waters along the coast, and northward to meet fishermen expanding south from Ambergris Caye. It would not be long before fishermen claimed all unoccupied area within the Northern Lagoon’s lobster grounds. This advancement allowed the fishermen to consistently supply a larger quantity of lobsters for the export market.
Recognizing their own value as reliable producers supplying this market, they took another pioneering step toward their economic democracy when they organized the Northern Fishermen’s Cooperative Society—the colony’s first fishing cooperative.

The Development of Fishermen’s Marketing Cooperatives

In the 1940s, the colonial government of British Honduras enacted legislation to promote credit unions and cooperatives. These community-based institutions were advanced by catholic priests as a means for rural agriculturalists and fishermen to improve their economic condition through collective action (Price-Daly 1986:62-3). Fishermen at Caye Caulker first learned about the credit union and cooperative movements in the 1950s (Vega 1979; Gordon 1981). Villagers from the caye organized a credit union shortly after this new legislation. While they pooled over BHS3,000, the credit union did not last too long and their initial attempt to organize a cooperative was not successful (Vega 1979:49; Gordon 1980:132-4; Sutherland 1986:52). The fishermen did not give up, however, and in 1960 they redoubled their efforts and sought assistance from their area representative to the colonial government and other officials from the colony’s agricultural research station at the Central Farm. The fishermen were advised to demonstrate their ability to manage their collective effort as a means to prove their capacity to run a cooperative business.

In July 1960, at the opening of the lobster season, a band of fishermen from Caye Caulker followed through on this advice by negotiating collectively for higher prices from the foreign seafood buyers in Belize City. In September of that year, the fishermen achieved formal recognition from the colonial government and were registered as the Northern Fishermen’s Cooperative Society. The cooperative

20 Vega (1979) provides a detailed account of the cooperative’s origin, organization, and early development. This source is based on a speech her father, a founding member of the Northern Cooperative, delivered in 1973 telling the story of the fishermen’s fight to organize. See also, Craig 1966, Gordon 1981, Price-Daly 1986, and Sutherland 1986. There are some discrepancies as to the number of fishermen who founded the cooperative. Some sources report 38 (Sutherland 1986), others report 44 (Price-Daly 1986; and see also Vega 1979 and Craig 1966). There were three women who joined the cooperative as founding members and have been largely marginalized in the telling of this history. These women played an integral role in getting the fledgling cooperative off the ground, as the colonial government was adamant about the fishermen’s ability to meet a threshold number of members to be
processed, stored, and marketed the lobster fishermen sold to it and fishermen were earning up to US$2.00 per pound for lobster tails by the middle of the 1960s, and prices have continued to climb since then. Collective marketing provided fishermen with the institutional means to appropriate most of the value created through the processing and sale of marine products, bringing them higher returns for their labor and capital inputs in their fishing operations.

Fishermen from other parts of the colony observed the advantages collective marketing conferred to the fishermen of Caye Caulker and they began organizing their own cooperatives. However, most fishing cooperatives in Belize have failed and today only four remain in operation (see Chapter Three, Table 3.1). The Northern and National cooperatives experienced dramatic growth in membership during the 1980s as they absorbed fishermen who had belonged to the failing cooperatives. Today these two are the largest fishing cooperatives in Belize. Both cooperatives base their operations in Belize City, where they have processing plants and storage facilities. The other two surviving cooperatives are the Caribeña Producers Cooperative, located in San Pedro on Ambergris Caye, and the Placencia Producers Cooperative, located in the southern reaches of the Stann Creek District.

The fishermen of one of the failed cooperatives live in Sarteneja, a remote village on Belize’s north coast. Although located on the coast, the waters nearby are not productive fishing grounds, particularly for lobsters because they cannot tolerate the brackish water near the coast. Sarteneja fishermen travel by bus to Belize City where the sailing boats they own or work on as crew are harbored near the mouth of Haulover Creek. Belize City is a more strategic staging point for their long trips to the Barrier Reef and outer atolls because it reduces the time they spend either working at sea or traveling to fishing sites. However, this choice of harbor has played a role in their cooperative’s demise.

The Northern and National receiving stations are also on Haulover Creek and by the early 1980s many Sarteneja members had begun selling their catch to the other cooperatives. With its members granted recognition. However, the women were asked to resign from the cooperative in the mid-1960s by a majority of men from the caye. My accounting through analysis of Annual Reports between 1968 and 1999 identified 42 members the cooperative documents as Founding Members.

21 See the table in Appendix F for annual average lobster prices received by NFCS fishermen.
selling their catch to other cooperatives and choosing to leave the cooperative without repaying the money they owed it, the Sarteneja cooperative was unable to pay its own bills and was forced to close its doors (Palacio 1996:34-6). So, while geography is one important factor contributing to this cooperative’s demise, the cause of the institutional collapse was directly attributed to its membership’s lack of commitment to marketing and debt payment.

Arnaiz-Burne (1996:127-31) describes how one leader of the Caribeña cooperative embezzled thousands of dollars from the cooperative’s accounts before fleeing the country. This event undermined members’ confidence in their cooperative and while the Caribeña did not close, it did not fully recover from this blow. With funding from the Inter-America Foundation, the cooperative repaired its worn-out processing and storage facilities. This assistance in association with its members’ continued commitment to collective marketing kept the cooperative active. Membership in the Caribeña cooperative remains low; it has only recently returned to a level of financial stability, and for several years has relied on one of the larger cooperatives in Belize City for marketing and export services (Caribeña Annual Reports 1997, 1999). In this case it is very likely that without member commitment to marketing this cooperative also would have failed. Despite the challenges and failure of several fishing cooperatives in Belize, they provide the structure by which fishermen achieve a high level of economic self-determination relative to the region (Gordon 1981; Sutherland 1986; Palacio 1996; King 1997a).

Belizeans fishing cooperatives buy several marine species including lobster, conch, stone crab, shrimp, several varieties of fish, and have in the past dealt in shark meat and fins, turtle meat and shells, conch shells, and sponges. Lobster has been the foundation of their trade. Fishing cooperatives buy all lobster that is exported from Belize. Figure 4.6 shows lobster production from Belizean fishing cooperatives between 1977 and 1998. Figure 4.7 separates lobster tail production by cooperative. The data supporting these figures are presented in Table 4.1. Nation-wide lobster production leveled off around 500,000 pounds annually in the early 1980s after peaking in 1983 with over 800,000 pounds.22

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22 The landings reported for cooperative production in Figures 4.6 and 4.7 only include legal sized lobsters and do not reflect landings destined for household consumption and the domestic tourism restaurant market.
Production still varies between 400 and 600 thousand pounds due to cycles in lobster migrations through Belizean waters, such as variables that affect recruitment, and disruptions to fishermen’s effort caused by hurricanes and other climatic events.

**Figure 4.6**

Belizean Cooperatives Lobster Production 1977-1998

![Belizean Cooperatives Lobster Production 1977-1998](image)

Source: Belize Fisheries Department
<table>
<thead>
<tr>
<th>Year</th>
<th>All Coops</th>
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<th>National</th>
<th>Caribena</th>
<th>Placencia</th>
<th>Other Coops</th>
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Source: Belize Fisheries Department
**Figure 4.7**

**Belizean Lobster Production by Cooperative, 1977-1998**

<table>
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</tbody>
</table>

Source: Belize Fisheries Department

**Contemporary Fishing Activities at Caye Caulker**

Apart from lobster, other commercial fisheries in which fishermen at Caye Caulker participate include conch, stone crab, and several species of fin and scale fish. In addition to commercial fishing, Caye Caulker fishermen fish for subsistence and as guides for tourists fishing for sport. Most fishing activities are carried out for market exchange and household use.

Fishermen use monofilament hand-lines and spear guns to catch a variety of fish at the Barrier Reef and around patch reefs, ledges, and caves in the shallow waters around the cayes within the reef.

Mackerels, jacks, snappers, barracuda, and grouper are the primary fish targeted. These and other species are also sought by tourists. Bone fish, barracuda, and marlin are some of the most popular sport fish, but various jacks, mackerel, and tuna are also sought in “the blue” outside the reef. The main menu items in local restaurants include snapper, grouper, barracuda, and king fish. Snapper is the most regular type, and anything simply labeled “fish” is most likely snapper.
Snapper is typically prepared whole and is either fried in a pan or over an open fire, served with rice and beans or with vegetables. While many fishing guides and recreational fishermen who fish for sport practice catch and release, several combine their angling with subsistence and marketing by keeping some of the day’s catch to eat and sell to local restaurants. The larger fish sought in sport fishing (mackerel, jacks, barracuda, tuna) are either filleted or cut into steaks and fried and served with the same accompaniments as other fish. Grouper is another common fish eaten in local homes. It is not a sport fish, and more frequently is produced for sale than for household use. Few caye fishermen sell fish to the cooperative because restaurants offer competitive prices and pay cash, whereas the cooperative will issue a receipt that the fisherman must take to the city to exchange for cash.

Several people who fish for subsistence do so from shore, either from one of the numerous piers extending from the windward side of the caye or from the seawall at “the split.”23 Fishing from shore is done almost exclusively with hand lines and the split is the most popular location. As the setting sun sees the tourists depart their perches along this favorite afternoon swimming hole, locals line the sea wall and toss their lines in the swift current. Small eating-sized snappers weighing one to two pounds are plentiful and the occasional larger fish in the five to eight pound range is landed with much celebration, envy, and crowding.

While some fishermen from the caye still dive for conch, most have ceased producing it commercially. Conch was over fished in the 1970s (Gibson, Stasdine, and Gonzales 1983) and remains far below lobster in value, yet some caye fishermen still sell conch to the cooperative and restaurants. Forty-eight villagers, of past and current fishermen identified at Caye Caulker in 1999, reported diving for conch either now or in the past. Among this group, 14 no longer participate in the conch fishery; 14 dive

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23 The split is a channel located north of the village of Caye Caulker that separates the caye in two. Its origin is a large part of local folklore related to the devastating 1961 hurricane (Hattie) whose eye crossed over the caye. Hattie increased the size of a small stream that connected the leeward bight and the sea in the front to allow fishermen to drag their boats from the front to the back without having to go all the way around the north or south points of the caye. Many guidebooks and locals explain how Hattie “split” the island in two. While this is partly true, the large channel that has grown since 1961 was more directly a result of the dredging in the early 1970s that made the small stream into a channel, which further aided in fishermen’s ease of commuting between the front and back side of the caye. It is also called “the cut.”
conchs occasionally and only for household consumption; and 20 reported selling their catch either to the cooperative or to restaurants. Fewer trap fishermen have been involved with the conch fisheries than fishermen who primarily dive; but, among the fishermen who fished conch in 1999, most of the trappers still sell, whereas only half of the divers produce for the cooperative or restaurants (Table 4.2).

Table 4.2: Conch Fishers Participation in Lobster Fishing

<table>
<thead>
<tr>
<th>Participation in Conch Fishing</th>
<th>Participation in Lobster Fishing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Diver, Laborer, or Not in Lobster</td>
</tr>
<tr>
<td>Markets Conch to Restaurants or Cooperative</td>
<td>11</td>
</tr>
<tr>
<td>Produces to Eat only</td>
<td>11</td>
</tr>
<tr>
<td>Used to Fish Conch</td>
<td>13</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>35</strong></td>
</tr>
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</table>

Fishermen sell stone crab almost exclusively to the cooperative. It is rarely kept for household consumption or sold to local restaurants. The stone crab fishery is under-utilized and relatively new to the fishermen of Belize, but it has potential to be developed into a more valuable renewable fishery resource. Only nine fishermen at the caye reported having stone crab traps, yet forty-one fishermen reported catching stone crab in the lobster traps as by-catch. Stone crab by-catch is also sold to the cooperative, but some fishermen save it to eat at home as well. I did not observe stone crab featured at any of the local restaurants. Its high renewal potential is because fishermen break off the larger of the crab’s two claws and return the living crab to the water. When the claw is broken cleanly, the crab will survive and grow a new one. Craig (1966), Gordon (1981), and Price-Daly (1986) do not mention it in their descriptions of
the Northern Lagoon’s fisheries; however, Sutherland (1986:35, 57) describes “rock crab” as one of the primary marketing categories the cooperative reports. In recent years, the entire catch has been sold to a single restaurant in Houston, Texas.

Among all the fishing activities at Caye Caulker, lobster fishing is the most important commercial fishery and trapping and diving are the most common methods fishermen use to capture lobster. Beach traps and hammos have become impractical for fishermen, as the cost to build beach traps has increased and the large lobster migrations associated with the seasonal Northers have diminished. Most fishermen at the caye participate in the trap fishery (n = 93) while some fishermen continue to free-dive (n = 23).

**Lobster Production, Use, and Marketing**

The seasonal schedule of lobster fishing has also played a role in the in the success story at Caye Caulker. Because much of the labor intensive periods in lobster fishing and in tourism do not overlap, it is relatively easy for fishermen to participate in both (see Table 4.3). Lobster fishing with traps demands intensive labor inputs during pre-season preparations from March through May and during June and July, the most productive months for most lobster fishermen in the Northern Lagoon area. Fishermen begin repairing and building traps between March and April. With losses from Hurricane Mitch in 1998 many fishermen had an extra-ordinary number of traps to build in 1999, relative to a typical season. Trap productivity wanes in August and tapers off to the end of the lobster season in February, at which time fishermen are required by law to remove their traps from the water. Trap productivity may increase slightly in October and fishermen typically leave their traps in the water until at least December.

By December tourist arrivals increase and the high tourism season extends through March. With the exception of removing traps from the water for the season closing in February, these busy tourism months require the least work for lobster fishermen. Fishermen reduce the impact of the labor intensive time of transporting of traps from the sea back to land for the closed season by removing their traps from the water gradually between December and the close of the season in February. They take a boat-load of traps out of production during their trips hauling traps in the latter part of the season. In addition to
<table>
<thead>
<tr>
<th>Month</th>
<th>Lobster Fishing Activities</th>
<th>Tourism Activities</th>
<th>Other Fishing Activity</th>
<th>Important Community Events</th>
<th>Weather</th>
</tr>
</thead>
<tbody>
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<td>March</td>
<td>closed season; Trap repairing and building; boat and engine repairs and purchases; cooperative assesses past year and plans for coming lobster season</td>
<td>Tourism season slows; Belizeans come for Holidays</td>
<td>conch</td>
<td>Easter Holiday</td>
<td>some rain/dry</td>
</tr>
<tr>
<td>April</td>
<td>closed season; Trap repairing and building; boat and engine repairs and purchases; Annual General Meeting and Second Payments</td>
<td>slow tourism, but Belizeans come for Holidays</td>
<td>conch</td>
<td>Easter Holiday</td>
<td>dry</td>
</tr>
<tr>
<td>May</td>
<td>closed season; Trap repairing and building; boat and engine repairs and purchases; Annual General Meeting and Second Payments</td>
<td>slow tourism, but Belizeans come for Holidays</td>
<td>conch</td>
<td>Mother's Day</td>
<td>dry</td>
</tr>
<tr>
<td>June</td>
<td>season opens June 15th; set traps; busy weeks labor intensive; prepare and set shades; first payments begin</td>
<td>slow tourism, but Belizeans come for Holidays</td>
<td>conch</td>
<td>Father's Day</td>
<td>Hurricane and Rainy Seasons Begin</td>
</tr>
<tr>
<td>July</td>
<td>open season; busy weeks; prepare and set shades; first payments</td>
<td>Busy w/ North American Students and Europeans</td>
<td>Lobster Fest</td>
<td>Hurricane, rainy</td>
<td></td>
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<tr>
<td>August</td>
<td>open season; traps get slow; first payments</td>
<td>Busy w/ North American Students and Europeans</td>
<td></td>
<td>Hurricane, rainy</td>
<td></td>
</tr>
<tr>
<td>September</td>
<td>open season; traps get slow; lobster income diminishes</td>
<td>Slow tourism, some come for holiday</td>
<td>Belizean Independence Day</td>
<td>Hurricane, rainy</td>
<td></td>
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<tr>
<td>October</td>
<td>open season; some increase; some lobster picks up</td>
<td>slow tourism</td>
<td>conch</td>
<td>Hurricane, rainy</td>
<td></td>
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<tr>
<td>November</td>
<td>open season; some increase; some lobster picks up</td>
<td>tourism starts to pick up</td>
<td>conch</td>
<td>Hurricane, rainy, northers</td>
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<tr>
<td>December</td>
<td>open season; season slows; traps start coming out; lobster income diminishes; may supplement with tourism sales</td>
<td>High tourism Season underway</td>
<td>conch</td>
<td>Christmas Holiday</td>
<td>northers</td>
</tr>
<tr>
<td>January</td>
<td>open season; season slows; traps start coming out; lobster income diminishes; may supplement with tourism sales</td>
<td>High tourism Season underway</td>
<td>conch</td>
<td>New Year's Holiday</td>
<td>northers</td>
</tr>
<tr>
<td>February</td>
<td>season closes February 15th; season ends; all traps out; lobster income diminishes; may supplement with tourism sales</td>
<td>High tourism Season underway</td>
<td>conch</td>
<td></td>
<td>some rain/dry</td>
</tr>
</tbody>
</table>
helping reduce the impact of a period of high labor demands at the end of the season, having fewer traps in the water to check during these months of lower trap productivity and more active tourism business reduces costs of production in these leaner months of the lobster season and gives more time and resources for work in tourism.

Setting and Hauling Traps

According to Belizean laws and fishermen’s ideology, the sea is open to anyone able to exploit its resources. Therefore, a fisherman diving for lobsters may visit any area of water or reef to capture lobster, except where prohibited within protected marine reserves and preserves. While the sea is considered open, traps themselves are personal property and divers may not tamper with or take lobsters from traps that have been placed in the water by another fisherman. Despite the law and indigenous ideology defining the sea as an open commons, trap fishermen participate in a sea tenure system that defines traditional use rights to areas of water in which they place their traps. This indigenous system of sea tenure emerged after the introduction of traps and the expansion of the export market for lobster. Fishermen set their traps in the clear, shallow waters of the Northern Lagoon within Belize’s Barrier Reef using their knowledge of each area’s micro-geography and the traditional boundaries separating their own and their neighbor’s territories and their experience with triangulation navigation techniques. Sutherland (1986:24-29) describes fishermen’s combined use of local geography, underwater topography, and triangulation well and their use of these methods has not changed since the early 1980s. Fishermen use contrasts in the seafloor created by differences in topography, vegetation, and bottom cover (mud, sand, rocks); island features (points, trees, buildings); and balisas (long wooden poles stuck firmly in the seabed and extending 1 – 2 meters above the surface) to choose the locations for setting their traps and to guide them in locating them when returning to haul them. Fishermen place balisas throughout the areas, but mainly around the perimeters, near the boundaries with other fishermen’s areas. They also carry one or two of these long poles with them when hauling traps and place them in key locations to guide them
through the different patterns of “runs” of traps set in their areas. The *balisas* are removed as the fisherman goes through the area so as to not give away the location of his traps.

Fishermen leave their traps in the water throughout the 8-month lobster season, which runs from June 15th to February 15th, and haul them every five to ten days, depending on the number of traps, location of the various areas in relation to one another and to the caye, weather, and the time in the season. The photograph in Figure 4.8 shows a fisherman locating a trap using land- and water-based markers. Figures 4.9 and 4.10 show his assistant, or helper, assisting in pulling the trap onto the boat. The traps are pulled from the bottom of the sea with a long, hooked pole, on which the trap in Figure 4.11 is resting.

Figure 4.8, Searching for traps using land- and water-based markers
Figure 4.9, Pulling lobster trap from the water onto the boat

Figure 4.10, Pulling trap onto edge on boat
Figure 4.11, Scrubbing trap, preparing to return it to the water

Figure 4.12a, Clean trap, searching for the next one in the line
After a trap is on the boat, fishermen remove the lobsters from the trap, keeping some and throwing the smaller ones back into the water. When accompanied by another person, the helper scrubs the sediment from the trap and prepares to heave it in to the water where they find the next trap (Figures 4.12a and 4.12b). The process repeats itself as the first trap is returned to the water.²⁴

The Organization of Work and Work Groups in Trap Fishing

There are several different types of work arrangements that structure the organization of production in the lobster trap fishery of Belize’s Northern Lagoon. Although the nature of the work itself has not changed much since the 1950s, after the adoption of motorized skiffs, the relations of production have changed and become more varied. The traditional organization involves one or two fishermen who work traps in one or several territories in which all parties have at least some ownership stake and the labor provided is based on kin relations and does not involve wage or other direct cash compensation. Two

²⁴ Notice in the background of the photograph in Figure 4.12b, the fishermen has begun to pull the next trap as his assistant heaves the previous one back into the water.
other common types of work arrangements include fishermen who own traps and hire wage labor to help haul them and a type of shares system in which traps are owned by one or more of the fishermen who work them and the catch is split based on a pre-arranged formula of each person’s contribution in labor and capital. These three variations are ideal types and any given operation may involve aspects of one or more of each type.

Traditional

An example of traditional relations of production is seen by looking at one of the founding members of the cooperative and how he organizes work with his two sons. This fisherman, Gerardo Guerra, and his sons, Felipe and Eduardo, work over 900 traps spread throughout several territories around Caye Caulker, Caye Chapel, and Long Caye. Gerardo has hauled traps since he was 14 years old, like most fishermen of his generation. His two sons began working with him at a young age as well; however, they only worked during breaks from school until after completing Fourth Form in Belize City. They joined the cooperative in the early 1980s, when their father began splitting the catch with them. At least two of the three will go to sea when hauling traps, but they all go out on a regular basis.

I interviewed them individually and their descriptions of their work arrangements were consistent with one another. Gerardo delivers about half of their total catch in his name and the sons split the remainder of the catch between them. Cooperative reports between 1996 and 1999 support this allocation method, in some seasons to the pound. Once Gerardo leaves the fishery, his sons plan to take over the

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25 These names and all others referenced in the examples provided are pseudonyms. I conducted my interview and surveys with the provision of anonymity. While villagers and others with local knowledge of the community may deduce the identity of these people based on the information used in describing their livelihood strategies, I am maintaining as much anonymity as possible. Therefore, for instance, I am not providing business names or other more explicit identifiers whenever possible. Most of these descriptions are in the following chapter.

26 Fourth Form is equivalent to high school in the United States. An additional level called Sixth Form is called college, and is most closely associated with a two year Associate’s Degree. Primary school and middle school are grouped into levels, beginning with Infant one and two followed by Standards one through six. Most fishermen of Gerardo’s generation leave school by Standard four or after having completing Standard six. Several fishermen of Felipe and Eduardo’s generation have completed Standard six at least. In families with multiple boys there may have to be a choice between continuing education and work in the lobster fishery. There is a Primary school at Caye Caulker that offers education through Standard six. Most students attending High School either make a daily commute to San Pedro or board with relatives in Belize City and return home on the weekends.
operation and continue working the traps. Although our interviews did not cover their future plans in
detail, their work in the fishery will likely move away from this traditional arrangement or their effort will
be reduced because of their involvement in tourism. Both sons also run a tour guide business, which
consumes some of their time each week, either in the office selling tours, attending tour guide association
and training events, or running one of their several tours. With the loss of their father’s contribution to
the fishing operation they will either have to reduce the number of traps they work, reduce their
involvement in the tourism business, or hire someone to assist in their fishing efforts or tourism business.
However, both sons have two sons of their own and the older two may be ready to enter the fishery within
5-8 years.

“Helpers” and Wage Laborers

One fisherman with whom I fished and built traps hires a “helper,” or assistant to work for him for a
daily or weekly wage. He inherited his traps from his father, but none of his three brothers or other kin
work with him hauling them. His helper works on the boat, but also helps in other capacities—building
traps, odd jobs around the yard, and on his water taxi. Both seem to appreciate this working arrangement.
This fisherman takes pride in continuing to work his father’s traps. His assistant, Leonardo, enjoys what
he sees as freedom in not having the obligations of ownership in the operation. Leonardo was born in
Guatemala, but has family at the caye. His grandfather was a founding member of the cooperative; his
mother now lives in the United States. This wage labor arrangement is becoming common as, on the one
hand, the sons of fishermen choose to leave fishing for other opportunities in tourism, careers resulting
from a university education, and migration to the United States and, on the other hand, as more labor
becomes available with the growing number of people migrating to the caye.

Partnership

The traditional work arrangement described above is an example of a partnership, but other types of
partnerships have emerged between non-kin as well. One example of this new partnership involves two
fishermen who own their own traps, but who work together hauling them. They do not own equal numbers of traps and neither has an interest or share in the other’s traps. Both fishermen also own their own boats and they take turns using each boat and paying for fuel. These fishermen sell most of their catch to the cooperative. After taking the cost of fuel from the day’s catch (paid to the owner of the boat they use that day), the remainder of the catch is delivered to the cooperative in the name of the member whose traps they hauled that day. If on a particular day they did not haul traps belonging to one of the fishermen, then he may get a small share for his labor. However, it is more common that they simply exchange one another’s labor as a means to reduce the capital necessary to haul the traps they own.

One of these fishermen works in a partnership with a third fisherman in the stone crab fishery. In this arrangement, both fishermen contributed capital and labor to purchase and build stone crab traps. They work the traps together and split the catch equally, less the share to cover fuel and maintenance expenses for the boat. I did not observe a partnership of this type in the lobster fishery, but it is certainly possible that one or more exist. I suspect that this arrangement is more common in the stone crab fishery because the areas in which stone crab are found, while overlapping, mostly occur outside the lobster fishing grounds and are new areas that are not covered by the traditional sea tenure system. For this reason, new kinds of relationships are open to emerge as this fishery develops and grows.

A Mixed Strategy

One fisherman who demonstrates a mixed strategy is Esteban. Esteban has fished lobster all his life. As a child he worked with his father, a founding member of the cooperative, and he joined the cooperative in 1963. His oldest son worked with him at sea while attending school up through Sixth Form education in Belize City, but now works in a professional job with a bank. Esteban’s other son, who was 12 at the time of research in 1999, now works with his father when he is not attending primary school. Esteban has several hundred traps, more than he and his young boy can work alone. While he works with his children when possible, he relies on hired labor and occasionally works a shares arrangement with one of his wife’s brothers to get the work done in his large fishing operation. In
addition to hiring workers to help haul traps, he pays others to help build and repair them. Both Esteban and his wife think that their youngest son will take up fishing when he completes school. While he will be able to dedicate more time to the family’s fishing operation, they will still rely on outside labor to work the large number of traps.

Free-Diving

Fishermen from Caye Caulker who dive for lobsters are generally younger than trap fishermen and most do not have access to lobster territories in which to place traps. The minimum gear needed to dive for lobsters is fins, a mask, a gaff (a short, one meter, wood or fiberglass pole with a hook at the end), and a boat. Fishermen who dive for lobster visit the reefs surrounding the outer atolls, the Barrier Reef near the caye, patch reefs within the lagoon, and areas in the lagoon where they have placed artificial habitat. Caye Caulker divers prefer the first two of these destinations, but will make the long journey over “the blue” to the outer atolls—Lighthouse Reef, the Turneffe Islands, and Glover’s Reef, when the weather is cooperative and any partners are equally interested in making the trip. The use of artificial habitat is dependent on access to an area of water in which to place them within the lobster fishing grounds.

Fishermen have devised myriad ways to construct artificial habitats using several kinds of materials, including golf cart roofs, bed frames, and old appliances, but the most common type of artificial habitat is made from zinc roofing sheets nailed to wooden poles. These common forms are called shades, or sombras (also called casitas). This standard shade is about four by six feet in size, with the zinc roofing supported four to six inches off the sea floor. This creates an area of “shade,” like other natural habitat and lobster traps, into which lobsters will walk to escape the daylight. Divers who use artificial shelters find it impossible to avoid placing their shelters in the territories of fishermen who use traps. This is not against national fisheries regulations, but it does violate local conceptions of territorial use rights and divers are well aware that if a trap fisherman finds an unknown sombra around his traps that he will most likely turn it over, rendering it useless and forcing the lobster to seek another nearby shelter, such as one of his traps. To avoid this conflict, and perhaps as a result of it, most divers who use sombras either work
in partnership with fishermen who have traps or get permission to place their shades in a trap fisherman’s area, usually a friend or relative.

The work of diving natural habitats at reefs and its impact on the environment differs from diving artificial habitat. Diving natural habitat along the Barrier Reef and throughout the outer atolls involves first finding lobsters, which hide in and under small, but sometimes deep, crevices. The telltale sign of a lobster’s hiding place is the hair-like antennae protruding from a dark crack in the coral wall or from under the coral forming a patch reef. Lobster use these antennae as “feelers” to sense motion in the water. They are smaller and finer than the long, spiny antennae the lobster use for defense. Once a diver spots a lobster he positions himself to grab the antennae or to hook the underside of the lobster using a gaff. In order for divers to get at hiding lobsters they must often steady themselves in the current by grabbing the coral. This contact kills the coral and divers are often blamed for damaging the reef and, in turn, the whole ecosystem upon which many livelihoods in fishing and tourism depend. While this is a destructive practice obvious to conservationists and other outside observers, it is the only way divers are able to secure themselves at depths of 50-60 feet in current. For these reasons sombras are considered a far less destructive diving method than free-diving at the reef. Moreover, shades are set at depths between ten and twenty feet, making them safer and easier to work than diving at the reefs.

Several trap fishermen supplement their trap fishing with sombras because they believe these artificial habitats enhance the lobster fishing grounds and increase the productivity of their traps. Fishermen explain how shades “keep the lobster around.” This, they argue, adds to their total production because it increases both their traps’ production and the overall effort and output of an area of water. Trap fishermen who use shades may either dive by themselves or in partnership with other divers. The partnership may involve the trap fisherman providing one or more of the following: access to an area in which to set a few or several sombras, a boat to travel to the fishing grounds, and financing or materials to build the sombras. The catch from a diving trip to artificial habitats is then split based on each partner’s contribution to building the shades, providing the boat and fuel, diving and capturing the lobster, and use rights to the area in which the shades are set.
Preparing the Catch for Marketing and Household Use

Trap fishermen judge whether to keep a lobster by looking at it. They will estimate the weight of the lobster’s tail by evaluating the lobsters stage in molting, the time it has been in the trap, and its general size. Those deemed too small are shorts or rejects. Fishermen also encounter egg-bearing or soft lobsters in their traps or when diving and while these are not short, the cooperative would reject them. Lobsters may appear to be large enough to be legally harvested, but when they have been in the trap too long or are in the process of molting they are “mauger.” Mauger lobsters are less meaty and look droopy, as their shells appear to hang on them. This characteristic emerges when lobsters do not eat while inside a trap, so even if the lobster is three inches on the carapace its tail may weigh less than four ounces. To the fisherman, it is the tail weight that counts, not the carapace length, because the economic return is from the pounds delivered to the cooperative. However, fishermen’s estimates are not always accurate and they almost always take some small lobsters, intentionally or by mistake.

Fishermen bring their catch in to their dock or to a small fish cleaning platform near the shore to clean and prepare it for sale or their own use. Cleaning the catch involves a process called *tailing-off* the lobster. Fishermen tail-off lobsters in different ways, but the more care given to the task makes a small difference in weight that adds up to a larger difference over the course of the season and a fisherman’s career. The fastest and least careful method of tailing a lobster is by grabbing it with both hands, one on the tail and one on the shell, and wringing or twisting the tail off in one quick motion. A more common method entails the use of a knife and a broken lobster antenna that has been scraped clean of its small, sharp barbs. Fishermen place the knife under the shell to cut around the meat from the top of the shell downwards, cracking the shell on the lobster’s underside where its abdomen connects with the tail. After the tail is removed, the fisherman (or an assistant) shoves the antenna through the lobsters’ anus to remove its intestine. Craig (1966:95) describes the process like this:

Lobster are prepared for market by “twisting,” a process that involves a series of deft hand movements which begin by seizing the struggling lobster by its tail. The point of a long-bladed knife is inserted at an angle under the carapace while the animal is being rotated to help make a clean separation of the tail from the rest of the body. The severed tail is passed to an assistant who removes the intestine or “vein” with a short section of a
lobster’s antenna. This improvised tool is forced into the anus with a jabbing motion that ruptures the sphincter muscles, whereupon the intestine can easily be removed by pulling it out from the front.

The photographs in Figures 4.13a-b and 4.14a-b show some fishermen cleaning their catches. After de-veining the tail, the fisherman places the lobster tails in a container of fresh water before delivering it to one of the cooperative receiving stations, bringing it to a restaurant, or keeping it for their own use. Fishermen refer to the lobsters sold to the cooperative as tails, selects, or product. Fishermen also call lobsters: bugs, crayfish, and langsota. The former terms are used in describing fishermen’s catch, whereas the latter refers to the lobster itself. Shorts and rejects are two other terms used to describe small, sub-legal sized lobsters fishermen catch. Fishermen use shorts to refer to any small lobsters under the minimum size limits set by national fisheries laws. Rejects are the portion of a fisherman’s catch the cooperative does not accept because the lobster is too small or it has a soft or cracked tail. The terms shorts and rejects can be used interchangeably, but do not always refer to the same set of lobsters. All shorts are rejects if delivered to the cooperative, but not all rejects are shorts.
Figure 4.13b, De-veining a lobster tail

Figure 4.14a, 1999 opening day at Caye Caulker
Lobster has been a part of the local diet for decades and fishermen have taken lobsters for household use “ever since,” as they say; however, no one fishes lobster only for subsistence and lobster comprises only a small portion of the local diet. I asked 20 households to record their meals and food shared with or accepted from other households between September and November 1999. One representative from each household recorded this information in a notebook and either my wife, Kristina, or I visited each household at least once a week to interview participants about what they had entered, asking for clarification on handwriting, meanings of food items, quantities, number and origin (household) of people eating the food, etc. Fifteen of the 20 journals were of sufficient quality and duration to be included for analysis. Eight of the households in the final sample were involved with lobster fishing, one was a single senior woman whose brother was a founding member of the cooperative, and the remainder consisted of a mix of local and immigrant households who worked primarily in tourism. Households that maintained food journals recorded their meals for a period of 45-60 days in October and November of 1999. From this sample, I found that lobster makes up only a small part of the local diet.

Fishermen reported keeping between eight and over 100 small lobsters per month for their personal use. Two fishermen reported that they did not like to eat lobster and another two stopped eating it for health reasons, citing its high cholesterol content. Household members participating in the food journal
reported eating lobster in 3% of their meals. Table 4.4 shows the number of times an individual from one of these households had a meal in which conch, fish, or lobster was included and the number of households whose members ate these items. Conch was eaten less than either fish or lobster, and fish was the seafood item most consumed. Only eight of the 15 households reported eating conch at all, whereas 14 reported eating fish and all of them ate lobster at least once during this time. Fish, however, was eaten the most and snapper is the most common fish consumed.

Lobster is primarily a commercial fishery and the portion kept for household use is either by-catch or an amount rejected by the cooperative. By-catch and rejects are typically shorts, but as described above may also include other illegal types of a fisherman’s catch. Fishermen’s cooperatives are the primary marketing outlet for lobsters; however, since the growth of tourism on the cayes, local restaurants are another major market.

Table 4.4: Number of Meals with Conch, Fish, and Lobster

<table>
<thead>
<tr>
<th>Type of Seafood Served as Main Item in Meal</th>
<th>Number of Households that Served each Seafood Item</th>
<th>Total Meals in which each Seafood Item was Served</th>
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</thead>
<tbody>
<tr>
<td>Conch</td>
<td>8</td>
<td>65</td>
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<td>Fish</td>
<td>14</td>
<td>762</td>
</tr>
<tr>
<td>Lobster</td>
<td>15</td>
<td>209</td>
</tr>
</tbody>
</table>

Spiny Lobster Production for the Local Tourism Market

Fishermen use small lobsters to supply both their own households and restaurants catering to tourists. Although all tourism restaurants do not buy small lobsters, several restaurants use at least some small lobsters to prepare the variety of dishes featuring this local cuisine. Interviews with fishermen, fisheries
officers, and local residents (including restaurant owners and staff) indicate that this domestic market for shorts is widespread and growing. Data collected about small lobster harvesting behavior suggest that equal amounts of small lobsters are consumed in restaurants as in private households (King, n.d.). However, it is likely that tourism’s impact on the rate of small lobster harvests is far greater than household consumption because tourists’ consumption of small lobsters, although equal in quantity, is greater per capita than household consumption. Tourists indulge in lobster every day during the eight-month lobster season. Caye Caulker has just over 500 beds to accommodate tourists and the hotels are rarely at full capacity. Therefore, assuming an average 30% capacity rate over the eight-month lobster season, an average of about 200 tourists a day are staying on the caye. This number consumes at least an equal number of lobsters as 1100 full time residents (King, n.d.). These estimates are rough and more work is necessary to fully understand and be able to predict the impact of tourism on increasing the number of small lobsters harvested.

The trade in small lobsters begins at sea as fishermen choose which lobsters to keep and which to throw back. Trapping lobsters is the best way to avoid taking small, molting, and berried lobsters because the lobsters are hauled into the boat alive and can be thrown back to the sea. Lobsters’ survival rate is high when fishermen handle them carefully and return them to the water quickly. except for the very few who use a small net instead of a hook, Fishermen who free-dive for lobsters do not have the advantage of capturing live lobsters, When fishermen hook lobsters with their gaff they injure or kill them, therefore, anything the fisherman catches he must sell, use, or otherwise dispose of. This situation is even more complicated, especially for inexperienced fishermen, because objects underwater are distorted to appear larger than they actually are. Additionally, divers cannot always see the lobster hidden under coral or rocks, so they take egg-bearing females more frequently than trappers. Trap fishermen more easily identify molting and berried lobsters and, therefore, trappers are able to discriminate what they keep more than divers. Taking “berried” females is especially detrimental to the reproductive well-being of the lobster population because the fisherman is destroying proven reproductive stock and the eggs of the next
recruitment generation. Fishermen are not the only culpable ones in the small lobster trade. Restaurants
do not have to buy the small lobsters, or any lobsters, that fishermen bring to their kitchens to sell.

The tourist market for lobsters is supplied predominantly through direct transactions between
fishermen and restaurants and only a few restaurants purchase through the fishing cooperatives.
Restaurants purchase both legal lobsters and small ones. Even if restaurants are known for selling shorts,
most of them also buy some legal sized lobsters. In 1999 restaurants were paying between BZE$5.00 and
BZE$10.00 per pound for small-sized lobster tails; most fishermen reported the price of BZE$7.00. Legal
sized tails fetched between BZE$15.00 and BZE$20.00 a pound; most fishermen reporting BZE$15-
16.00. Whole lobsters are also served in local restaurants, and in 1999, fishermen reported selling whole
lobsters to restaurants for BZE$10.00 a pound. The whole lobsters that restaurants serve are almost
exclusively legal sized lobsters because the size of the lobster is evident on the plate.

The tourism trade in lobsters is a relatively new and growing outlet for fishermen to market their
catch. The significance of the tourism market for lobster, and tourism growth more generally, is that
tourism reduces members’ commitment to marketing with the cooperative. The tourism market provides
competition for lobster which may otherwise be marketed to the cooperative and tourism more generally
provides livelihood opportunities outside of fishing. These opportunities in tourism draw fishermen from
producing lobster for the cooperative, either partly or completely. In this way tourism has a dampening
affect on member commitment to collective marketing with the cooperative. As fishermen put it, when
someone switches over and decides to market with the restaurants, they “leave the coop to go private.”
The other parallel effect of tourism development more generally is that is attracts fishermen (as laborers
and business owners) from lobster fishing into tourism activities. Whether fishermen are drawn
completely out of fishing or only partly by reducing the number of traps they work, they are marketing
less with the cooperative and their contribution to the cooperative’s production is reduced. So, while
collective marketing and cooperative credit set the stage for economic success and self-determination
some of the fruits of this success threaten the cooperative’s resilience, the institutional foundation on
which the continued economic democracy of Caye Caulker’s indigenous population is based.
Collective Marketing with the Cooperative

The NFCS has two receiving stations—at Caye Caulker and in Belize City. Fishermen queue up at the docks for a cooperative employee to inspect and weigh their catch. They look for damaged tails, tails with evidence of eggs, soft shells (evidence of molting), and tails that are under the legal four ounce minimum size limit. The acceptable portion of the catch is weighed and the tails under the four ounce minimum size, that have cracked or soft shells, or which show evidence of eggs being scraped from it are rejected and returned to the fisherman. The receiving station manager or another cooperative employee gives the fisherman a first payment receipt for the amount of product delivered. The rejects are added to the portion the fisherman had separated out prior to going to the cooperative and either taken home, dropped off to a relative’s house, or sold to a restaurant.

Fishermen must take their receipts, or “slips,” to the business office in Belize City to receive their first payments for product sold to the cooperative. Fishermen who deliver at Caye Caulker typically take their slips in to the city once a week or more often if they need cash immediately. After the eight month lobster season closes in February and the cooperative has delivered its last shipments to its foreign buyers, the cooperative is able to determine expenses and profits from the season’s sales. The accounting of these measures is the basis for the fishermen’s second payments, also called a liquidation payment, and any other divisible returns from collective marketing. These other returns include share capitalization and, in some seasons, a third payment, or rebate.

First payments are set as high as possible as an incentive for members to be loyal and sell their lobster to the cooperative. Members realize that the benefit to collective marketing lies in the deferred compensation received in second payments, share capital, and other rebates. Figure 4.15 shows a graph with first and second payments members received for lobster tails for the seasons ending in 1969–1999. First payments leveled off at BZE$10.00 per pound beginning in the mid 1980s. Some fishermen think that the first payment needs to be increased to compete with the growing market in tourism restaurants. The second payment represents the majority of the per pound profit for the lobster a fisherman delivers.
This second payment is calculated based on total pounds of lobster multiplied by the average price the cooperative received throughout the season, less the difference in first payment price, processing costs, loss and shrinkage, and other expenses, including administrative and financial expenses associated with maintaining outstanding debt to the cooperative’s credit pool. This second payment usually comes in April or May and can be quite substantial, depending on the prices the cooperative received throughout the season, the level of production a fisherman achieves, and how much debt he has with the cooperative. Second payments have fluctuated between BZE$7.00 and BZE$14.00 per pound for lobster tails since the mid-1980s (see Figure 4.15). Anxious, and often broke, fishermen await the beginning of the new season and news of the second payment amount travels quickly through informal channels. The official announcement of the second payment comes during the cooperative’s Annual General Meeting (AGM), held each year after the cooperative’s accounts are audited (as required by law) and before the lobster season opens, but news of the payment amount arrives through rumors and gossip well in advance of the meeting.

Shares are reinvested into the cooperative, but belong to the fishermen who contributed them. The cooperative uses members’ shares as a reserve fund for emergencies and lean years, specifically to cover delinquent members’ accounts that the management has deemed uncollectible and sometimes as working capital to supplement the institutional credit it uses to cover operating expenses. The structure of share capitalization and reserving is set by the Cooperative Act of 1948 and is a necessary measure to ensure financial integrity in the face of the uncertainties and risks of fishing and international markets. Once a member retires or quits the society, and his accounts are in good standing, he will be paid out the value of the shares he has contributed to the cooperative’s capitalization over the years.

Rebate, or third payments, are rare and have not been paid since the early 1990s. These payments amount to between $.10 and $.50 per pound and are deducted from members’ liquidation payments. The cooperative keeps the funds from these payments in an interest bearing account until the principal is distributed to members. In the past, checks have been made available near the end of the calendar year, serving as a type of bonus to supplement the traditional Christmas gift members’ receive.
The Development and Growth of Tourism at Caye Caulker:

Cooperative Success and Changes in Population and Livelihoods

In addition to providing fishermen with a reliable and constant market for their catches, cooperatives offer fishermen several important resources necessary for them to carry out their livelihood—competitively priced fuel and gear, inexpensive ice, processing facilities, and credit. Fishermen may sell their catch to places other than the cooperative, but with the deferred compensation of a second payment, cooperatives historically pay the highest price. Likewise, fishermen can obtain the resources listed above from other places, but again the cooperative provides them at more reasonable prices. Among these, access to credit is perhaps the single most important service the cooperative provides because it makes it available on favorable terms, distributes it around critical times in the lobster season, and structures
repayment with the payments fishermen receive from it for their catch. It has also helped fishermen expand their holdings, increase their earning potential, and serve as a source of capital for extra-fishing investments, although this is not a sanctioned use of cooperative funds. All of these advantages of cooperative credit have played a role in either directly or indirectly financing tourism development at the caye by assisting fishing families at Caye Caulker to develop tourism businesses. In this way, the cooperative has been a primary factor in providing for the economic success and socio-economic well-being that Sutherland (1986) describes for fishing families and the caye at large.

At the time of Sutherland’s work in the late 1970s and early 1980s, the population was comprised of nearly all fishing families. This success has transformed the village in many ways—in its size, demography, and economy. Further evidence to support the claims that the cooperative has provided economic success for the fishing families from the caye is seen by looking at demographic and livelihood changes over time and at the contemporary distribution of livelihoods and wealth among the caye’s population. While the cooperative and lobster fishing are the means to this success story, much of the form and extent of this success is expressed in, and has even been allowed to manifest, because of its coinciding with the development of tourism. Tourism emerged at a time when fishermen had for the first time excess capital from their increased earnings from collective marketing. Many fishermen used these earnings to invest in tourism.

Tourism Development

Water taxis and small aircraft ferry local and international tourists to Caye Caulker and Ambergris Caye, making them readily accessible and broadly affected by tourism and its growth. Tourists visit Caye Caulker to take in the village’s slow island pace, abundant recreational activities, tasty cuisine, and the company of its amiable and colorful residents. San Pedro also boasts its share of restaurants serving local dishes and tour services offering similar recreational activities, but it is distinguished from Caye Caulker by its numerous vehicles, dusty roads, active nightlife, large concrete hotels, and exclusive resorts. These characterizations highlight the main differences between tourism’s imprint on each community, but the
evidence of these different scales of tourism development are observed by the looking at growth in each community’s population and the number of tourism businesses.

Tourists began visiting at Caye Caulker around the same time as at San Pedro, but it was not until the 1980s that a few local people began to embrace this new industry as a viable and long term basis for earning a living. Figures 4.16, 4.17, and 4.18 show the number of hotels, rooms, and beds at San Pedro and Caye Caulker between 1972 and 1999. The number of hotels and restaurants at Caye Caulker doubled during the 1980s and nearly doubled again between 1990 and 1999 (see Table 4.5, page 122). While the number of hotels in each community has grown at a relatively constant rate since the 1970s, San Pedro has twice as many hotels with more than three times as many rooms and beds than what is found at Caye Caulker.

In addition to differences in the scale of tourism in these communities, another distinguishing factor is found in the position fishing holds in each community’s local economy. Tourism overtook fishing as the predominant occupation at San Pedro earlier than at Caye Caulker. Documenting the development of lobster fishing at San Pedro up through the 1970s, Gordon (1981) describes how the village’s rigid class structure, rooted in their dependence on copra export production organized through the plantation system, was transformed in the 1960s by the growing export market for lobsters and fishermen’s cooperatives. Several families improved their condition through the 1960s and 1970s with the cooperative, but by the late 1970s Gordon (1981:239-40) reports that San Pedranos’ participation in fishing was showing signs of becoming less egalitarian. Differences between fishermen who worked for themselves and those who worked for wages were becoming more common. Coinciding with this change, tourism was beginning to emerge as a new phase of development and class differences were more prevalent in this economic sphere. Control of capital and land concentrated in the hands of fewer people and more local residents began relying on wages despite several fishing families’ investment in the tourism sector (Gordon 1981:253-6). Arnaiz-Burne (1996) provides support to Gordon’s earlier view of this village economy, showing how fishing’s significance has diminished and has become a secondary livelihood at San Pedro since the emergence of tourism.
Figure 4.16

Hotels at San Pedro and Caye Caulker, 1972 - 1998

Sources: Arnaiz-Burne 1996; Abstract of Statistics 1976, 1999

Figure 4.17

Hotel Rooms at San Pedro and Caye Caulker, 1972 - 1998

Sources: Arnaiz-Burne 1996; Abstract of Statistics 1976, 1999; Craig 1966; Sutehrland 1986
Sutherland’s conclusions about Caye Caulker’s development are succinctly captured in the title of her book, *Economic Success in a Belizean Fishing Village*. Although fishermen at San Pedro benefit from cooperative organization and participate in tourism, they are not the primary figures in nor are they the primary beneficiaries of tourism development at Ambergris Caye. Tourism Development at San Pedro has been directed more by foreigners and non-islanders than by local residents. Fishing families were the first to start tourism businesses at Caye Caulker and today several of them still have successful fishing operations in addition to lucrative tourism businesses.

During the period between the late 1970s and early 1980s Caye Caulker’s tourism economy was beginning to grow beyond small enterprises organized and supplied entirely by the logic and means of household economies. Travelers visiting the caye in the 1960s and 1970s stayed on the beach in tents or hammocks, or found space with local families in their homes. Women sold meals from their kitchens and some began enclosing the space under their houses into make-shift guest rooms. From these simple beginnings, small domestic kitchens evolved into restaurants serving local cuisine at reasonable prices and hotels providing modest accommodation.
Table 4.5: Hotels, Rooms, Beds, and Restaurants at Caye Caulker and San Pedro, Belize

<table>
<thead>
<tr>
<th>Year</th>
<th>Hotels at Caye Caulker</th>
<th>Rooms at Caye Caulker</th>
<th>Beds at Caye Caulker</th>
<th>Restaurants at Caye Caulker</th>
<th>Hotels at San Pedro</th>
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Two such household enterprises started with the efforts of local women, both wives of fishermen, who began selling meals to the small numbers of foreigners visiting the caye. Their homes eventually grew into small restaurants serving sit down meals and take-out for breakfast and lunch. Tourists tend to eat in the restaurants, whereas caye people take advantage of the take-out. Both women’s husbands passed away in the late 1990s, but they continue to operate their restaurants to support themselves and some of their children. One of them works with her daughter and a rotating cast of granddaughters to serve breakfast and lunch at near full-capacity. The other householder-turned-entrepreneur has remodeled
and expanded her restaurant. This restaurant serves lunch and dinner and employs women from outside the caye to cook and serve the food.

Sutherland describes Edith’s hotel as one of the first on the caye, which began as small rooms enclosed under the family’s house. The husband of this couple worked in lobster fishing until the late 1980s when one of his sons took over his traps. Today, this couple and their youngest daughter run the hotel. Now occupying the entire building that used to be the house, the hotel has expanded since Sutherland’s account. The owners built a new home adjacent to the hotel and all their children but the youngest daughter have moved to their own homes across the caye. The daughter also runs the recently opened gift shop, also located in their yard adjacent to the new house.

Another fisherman built a hotel on the front street near the center of town in the early 1970s. This operation began with ten small rooms built in the traditional style elevated on stilts high above the sand. By 1980, he had added another five rooms and an office under the hotel. These rooms are a mix of single and double occupancy with shared baths upstairs and down. By 1988, this fisherman built onto the original structure to create four more rooms, with private baths. Today he divides his time between minding a small number of lobster traps (he has split most of his initial holdings between his oldest son and one of his sons-in-law) and watching the hotel. His youngest daughter helps with the hotel as well. While these examples of early entrants into the caye’s tourism economy still rely on labor from their household and the households of their children, most tourism businesses today employ at least some labor from outside the household. Some family members receive a wage or other payment in cash for their work. Relative to San Pedro, tourism at Caye Caulker remains small in scale and predominantly in the hands of local families, but the village has not been immune to change.

*Population Growth*

From modern settlement to the time of Sutherland’s research in the 1970s and 1980s Caye Caulker’s population has been almost exclusively *mestizo*, but Caye Caulker residents do not use that term. They refer to themselves as Spanish. They also identify themselves as *caye people*. No census records exist
that differentiate village population for Caye Caulker on the basis of ethnicity or race. However, ethnographic and historical accounts of the island community from secondary sources document the island’s nearly exclusive Spanish population. Craig’s description of fishing in British Honduras generalizes the Northern Lagoon to be a “mestizo culture area” (Craig 1966:61-67). While this ideal type and its implicit cultural determinism may be theoretically weak in describing the origins and causes of fishing behavior, Craig’s observations and research are supported by other work (Price-Daly 1986; Sutherland 1986). Sutherland writes:

…ethnic groups are not spread evenly in Belize and each area, city, or region is comprised of one ethnic group or another. On Caye Caulker, the dominant ethnic group is mestizo, which is locally referred to as Spanish. There is only one family of ‘African’ descent that is considered native to the island. A number of mainland Creoles and a few Black Caribs rent houses on the island on a semipermanent basis. Their residence depends partly on the availability of work….There are no Amerindians on Caye Caulker although various people speak of their ‘Mayan heritage’ with pride (Sutherland 1986:70).

Caye Caulker’s population remains predominantly Spanish, but it has transformed significantly since the emergence of tourism. The indigenous residents use the self-identifying label of “caye people” to differentiate the local “Spanish” population from the many Central American immigrants who comprise a large portion of the migrants who work in tourism. The Spanish speaking immigrants are also considered “Spanish” by locals, but they are not caye people. For example, someone may say in Creole “Dat lee Spanish bali” (That little Spanish guy), or “Dat Spanish gyal” (That Spanish girl).

The island’s growing population and its growing diversity are a result of Belizeans and foreigners moving to the caye temporarily and permanently to work in tourism. While non-islanders were occasionally drawn to the caye in the 1970s and 1980s, by the 1990s several had moved there more permanently as work opportunities increased with tourism. Figure 4.19 shows population growth for Caye Caulker and San Pedro between 1860 and 1999. Populations at Caye Caulker and San Pedro remained relatively small until tourism development accelerated in each area—in the 1970s at San Pedro and the 1980s at Caye Caulker, after which time populations on both cayes increase dramatically. Caye Caulker’s population has more than doubled since 1980 (see Figure 4.20), but it has grown at a slower pace than San Pedro’s, which has quadrupled in the same time.
People from the caye speak Spanish, Creole, and English. The latter is taught in the schools and used in dealings with tourists, while Spanish and Creole are spoken at home and in social settings. With the growth of tourism, villagers speak English and Creole more regularly, particularly the younger generations. Numerous Belizean nationals representing other ethnic groups and several foreigners from around the world have moved to the caye to work or start businesses. Non-English speaking immigrants (mainly Europeans and Chinese) learn to speak Creole to accommodate their need for English and some learn Spanish. Adult Spanish speaking immigrants (predominately from Honduras, Guatemala, and El Salvador) tend to rely on their native tongue, while their children who attend school on the caye learn English in the classroom and Creole on the playground. Although the caye’s population and culture remains Spanish to a large extent, tourism has transformed the community’s ethnic composition to be more representative of Belize’s overall national cultural and ethnic diversity.

Figure 4.19

Populations at Caye Caulker and San Pedro, 1861-1999

Year

"Dis da fu wi ailan!"

The Northern cooperative set a foundation of economic prosperity on which indigenous Caye Caulker residents have built small tourism businesses. In her description of the emergence of tourism on the island between 1972 and 1984, Sutherland (1986:129-39) emphasizes locals’ control of tourism businesses, ties to the cooperative as a means of financing, tourism’s small scale, and kin ties used to recruit labor. The emergence of tourism at Caye Caulker parallels fishermen’s control over the development of fishing after organizing the cooperative, whereby local families with control over local resources (land and fishing grounds) have developed businesses that accumulate wealth locally. While this community control has allowed caye people to reserve the benefits of lobster fishing and maintain
control over the development of tourism in their village, this base of influence is sometimes threatened at community meetings.

Village-wide meetings are held for several reasons, such as: to disseminate information about upcoming community events which need volunteers to organize, to provide a forum for hearing proposals for infrastructure development projects, and to share ideas for promoting their community as a tourist destination to a wider audience. These meetings have a mixed track record of attendance, but are attended by a wide array of the caye’s population, including long time residents, foreign business owners, and other recent arrivals from other parts of Belize, all segments representing varying ages, ethnic backgrounds, and nationalities. When a perceived threat arises it is not uncommon for one or more long-time caye residents to alter the tone of the meeting by invoking the vernacular Creole in a rising crescendo. This frustrates foreigner attendees and other new comers to the caye as their ideas and plans for tourism development are drown.

One may not be surprised to witness this interjection from one of the several older cooperative fishermen whose reputations for boisterous interruptions are well-known. However, the events of one community meeting stand out from others I observed. The meeting’s topic was about coordinating a tourism business association, spearheaded by several business owners who are not originally from the caye. Late into the night, well past any reasonable caye-person’s bedtime, the depth of the community’s conviction to maintain their right to determine village affairs was demonstrated by an otherwise soft-spoken senior housewife. She vehemently declared at the top of her lungs and end of her patience “Dis da fu wi ailan!!” (This is our island!!).

Speaking with meeting participants later, it is clear that caye people stand behind this mantra. Equally clear is the frustration outsiders express over what they view as ignorance and backwards looking approaches to business that hinders economic growth, growth that they see as benefiting everyone. Caye people, however, do not see the changes growth may bring as necessarily or absolutely beneficial. Their views and experiences are tempered by the lessons their neighbors at San Pedro have shared:
Mr. Pedro Salazar, Manager of Caribeña Producers Co-operative Society, was presented to the General Membership as the Guest Speaker….in opening his address [he] said that it was an honour for him to have such a forum to express his innermost thoughts on Co-operativism and he expressed thanks to the Managing Committee for giving him this opportunity to address the membership….He then continued by speaking briefly about the island of Caye Caulker. He said that the land was one of your most valuable assets. It was a rude awakening, he explained, to realize that “our nationals owned a mere third of the available land in San Pedro.” He said, “Your island is yet virgin territory, cherish it and be watchful lest the same misfortune befall you” (NFCS 1980).

By keeping control of land on the caye and rights to fishing grounds in the waters surrounding it, caye people have heeded these words by determining the growth and direction of tourism development in their village, resulting in their retaining a significant portion of the economic benefits this development has created.27

27 See also Gordon (1981:239-40, 252-6) and Sutherland (1986:133-4).
Chapter Five

Lobster Fishing, Collective Marketing, and Tourism Development at Caye Caulker since the 1980s: Economic Success, Revisited

This chapter documents socio-economic variation among Caye Caulker’s population and the benefits that cooperative lobster fishing contributed to fishing households. Historical census data and ethnographic descriptions of contemporary households on the caye show how tourism at Caye Caulker has grown over the past two decades, now employs more people than lobster fishing, and has benefited local cooperative fishing households. This qualitative analysis provides evidence to support and further document the economic success story Sutherland and several of her students tell about Caye Caulker’s development up through the early 1980s (Sutherland 1986). This success story provides an example of how community-based collective action can structure economic and social development to the direct benefit of local participants. In this case, economic well-being is enhanced over time through participation in a traditional sea tenure system and collective marketing through a producers’ cooperative. Further evidence to support this story is found by looking at the changes in the distribution of livelihoods in and benefits from tourism development and lobster fishing at Caye Caulker.

The historical aggregate data documents the growth of tourism at the caye, growth in the caye’s population, changes in the structure and importance of fishing and tourism livelihoods, and how different segments of the caye’s contemporary population have benefited because of their involvement in cooperative lobster fishing. The contemporary aggregate level data are then explored in more detail, supplemented with interviews and observations, to describe some of the different ways households engage in these aspects of the local economy. Two sections include brief qualitative descriptions of a non-random but representative sample of about 10% of the 346 households surveyed as part of the 1999 census. The sample households are representative of the population to the extent that they were chosen to account for variation in three characteristics: whether household members are local to the caye or not; whether someone in the household is involved with lobster fishing or not; and how the household is
involved with the caye’s tourism economy. The descriptions are contained in two sections; one focusing on households without anyone working in lobster fishing and one focusing on households whose members work in the lobster fishery.

The section focusing on the fishing households looks more closely at fishermen’s marketing and production to account for variation in how fishermen participate in lobster fishing. Differences in fishermen’s production are determined by looking at how much they market with the cooperative. This cooperative data are supplemented with fishermen’s classifications to create groups of small, medium, and large producers. Examples of fishing households in each group are provided, including local and non-local households involved in tourism in different ways. These descriptive accounts provide further qualitative evidence supporting the claim that cooperative fishing has conferred advantages to fishing households at Caye Caulker.

Looking for the Benefits of Collective Marketing
in the Distribution of Livelihoods in Fishing and Tourism

Sutherland (1986:69-71) reports that the primary distinction among people living at Caye Caulker is between islanders and non-islanders. In 1999, people at Caye Caulker still differentiated the caye’s residents based on their ties to the island. One difference in this area of local demographic taxonomy that has emerged since the time of Sutherland’s work in the 1970s and early 1980s is that there are many more non-islanders living at the caye now. This demographic shift is a result of the growth of tourism in the local economy. The basis for showing how lobster fishing and the cooperative have benefited some segments of the population more than others lies in looking at differences in how local and migrant households and fishing and non-fishing households participate in tourism.28 Participation in tourism as labor versus business owner is used to indicate differences in economic benefit in the tourism sector.

28 When referring to households and individuals in the following descriptions and analysis of changes in the populations’ participation in and reliance on lobster fishing and tourism I will also use the terms locals and migrants to distinguish islanders and non-islanders, respectively.
Because national census data do not report on households’ or individuals’ place of origin or migration status relative to the village there are no historical data on which to base comparisons over time, except for Sutherland’s qualitative descriptions of “several” Creoles and Garifuna and “a few” Central Americans and other “foreign” investors (mainly from North America) who had moved to Caye Caulker by the early 1980s (Sutherland 1986:138). With the exception of the few foreign investors who attempted, without success, to develop tourism resorts, Sutherland attributes these small changes in local village demography to opportunities in fishing. Based on this account of the population’s work in lobster fishing and tourism, it is safe to assume that by the early 1980s large numbers of people had not moved to the caye to find employment or business opportunities in tourism.

Table 5.1 summarizes the number of people participating in and the number of households relying upon lobster fishing and tourism for the years 1970, 1980, 1991, and 1999. In 1970, the Belizean national census recorded 410 people (229 males and 181 females) living at Caye Caulker spread among 95 households (CSO 1999). Of this number, at least 74 men worked in lobster fishing and belonged to the cooperative (NFCS 1971). However, the number of people working in tourism was negligible and it is certain that no one relied heavily or solely on tourism for income (CSO 1975). During her first visit in 1972, Sutherland (1986) notes that there were no hotels on the Caye. To the contrary, Craig (1966:65) reports that in 1963 there was “a defunct hotel” on the windward side of the caye north of the main pier and the Abstract of Statistics (CSO 1999) reports one hotel in 1972. Because hotels sometimes resemble private houses and that they do fall in and out of operation from season to season, Sutherland may have simply overlooked the one Craig and the Census statistics report. Considering these various sources, it is likely that between 1970 and 1972 at least one hotel was in operation and by 1975 as many as seven small hotels or guest houses were accommodating tourists.

The 1980 national census counted 435 people (232 male and 203 female) living in 116 households at Caye Caulker (CSO 1999). At least 88 adult men worked in lobster fishing and belonged to the cooperative (NFCS 1981). Tourism was beginning to pick up momentum, but there is no national census data on this for the village of Caye Caulker. However, growth in the number of hotels and restaurants at
**The 1990 Census Figures have a large number (142) "Don't Know/No Well Satisfied" responses for occupation. It is likely that at least some of these were
some of the growth between 1991 and 1999 is attributed to the different methods used to collect data.


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<td></td>
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<td>924</td>
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<td>410</td>
<td>97</td>
<td>116</td>
<td>229</td>
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Table 5.1: Residence on and Participation in Tourism and Fishing at Cave Caulker
this time indirectly indicates that the number of tourism related jobs and business was increasing (see Table 4.4 and Figures 4.16 – 4.18). During the early 1980s between 10 and 15 hotels operated at Caye Caulker, at least five restaurants were open to serve tourists, and regular water taxis and tour guide services for fishing and snorkeling were available and SCUBA diving services were beginning to emerge.

The 1991 national census recorded 688 people (342 male and 346 female) at Caye Caulker distributed through 127 households. Forty-eight percent of the population, or 328 residents, were over 14 years old, the age at which the Central Statistical Office defines the workforce (CSO 1991). Of this number, 163 (50%) were men and at least 118 of them (72% of men, 36% of total workforce) produced lobsters for the cooperative (NFCS 1992). Tourism services had expanded since 1980 and about 50 caye residents (15%) worked in tourism related jobs (CSO 1991; CSO 1999). By 1991 the number of hotels had jumped to 25, offering over 350 beds in more than 220 rooms, and at least 8 restaurants were open (see Table 4.4).

In 1999, I counted 1,131 people living at the caye full time (594 male, 529 female) spread throughout 346 households. Of this number, 765 (411 males and 353 females) were over 14 years of age and are considered part of the workforce. Table 5.2 provides a list of livelihood categories and the number of people who reported each as their primary means of work activity in the census I conducted. These categories are mutually exclusive for the 765 people constituting the workforce; however, several people engage in multiple income strategies. So, for instance, 156 people reported working in lobster fishing, but only 122 indicated that it is their primary occupation. Among these 156 fishermen, between 112 and 120 were producing members of the cooperative in 1998 and 1999 (NFCS 1998, 1999). No women reported participating in the lobster fishery during my visits to Caye Caulker between 1995 and 1999; however, eight women reported fishing for subsistence in the 1999 census.

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29 The split by age and sex for the workforce at the village level is not provided for in the 1970 and 1980 censuses. These more fine-grained data are only reported at the village level for 1991. For the 1999 census, I followed the Central Statistical Office use of age 14 to distinguish the working age population from non-working population.

30 The breakdown of sex in the parenthetic note does not include eight children for whom I have no sex recorded. These children were in households for which I did not conduct a census interview, but did collect information about from their neighbors.
Table 5.2 Primary Livelihoods for Caye Caulker Workforce (Age > 14), 1999

<table>
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<tr>
<th>Livelihood</th>
<th>Frequency</th>
<th>Percent</th>
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<tr>
<td>Student</td>
<td>39</td>
<td>5.1</td>
</tr>
<tr>
<td>Fisherman</td>
<td>122</td>
<td>15.9</td>
</tr>
<tr>
<td>Business Owner or Rents Property</td>
<td>95</td>
<td>12.4</td>
</tr>
<tr>
<td>Unskilled Labor/Employee</td>
<td>248</td>
<td>32.4</td>
</tr>
<tr>
<td>Skilled Labor or Trade</td>
<td>11</td>
<td>1.4</td>
</tr>
<tr>
<td>Domestic Work in Own or Other Home</td>
<td>149</td>
<td>19.5</td>
</tr>
<tr>
<td>BEL, BTL, or Bank Employee</td>
<td>14</td>
<td>1.8</td>
</tr>
<tr>
<td>Other</td>
<td>81</td>
<td>10.6</td>
</tr>
<tr>
<td>No Data</td>
<td>6</td>
<td>0.8</td>
</tr>
<tr>
<td>Total</td>
<td>765</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Among the working age population, 53% (408) owned tourism businesses or worked in tourism related jobs; while 20% (156) worked in lobster fishing as trap fishermen, divers, or hired labor ($X^2 = 4.505, p = .034; and see Table 5.3). While men and women participate in tourism, men participate at a higher rate than women ($X^2 = 5.951, p = .015; and see Table 5.4). Eighty-one percent of the population (911) rely on income from tourism related activities to meet their needs, whereas only 44% of the people on the caye (493) depend on income from lobster fishing ($X^2 = 5.951, p = .015, n = 1131; see Table 5.5). The same pattern appears at the household level, as 79% of households (273) depend on tourism to meet their household needs and only 37% of households (129) depend on lobster fishing to meet household needs. While 86% of households that are not involved with lobster fishing rely on tourism (187 of 217),
only 64% of households who participate in lobster fishing depend on income from tourism (83 of 129; $X^2 = 21.573, p = .000, n = 347; see Table 5.6).

### Table 5.3: Individual Participation in Lobster Fishing and Tourism Livelihoods

<table>
<thead>
<tr>
<th>Participates in Lobster Fishing</th>
<th>Participates in Tourism</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>95 (12.4%)</td>
<td>156 (20.4%)</td>
</tr>
<tr>
<td>no</td>
<td>313 (40.9%)</td>
<td>609 (79.6%)</td>
</tr>
<tr>
<td>Total</td>
<td>408 (53.3%)</td>
<td>765 (100%)</td>
</tr>
</tbody>
</table>

$X^2 = 4.505, df = 1, p = .034, n = 765$

### Table 5.4: Workforce Participation in Tourism by Sex

<table>
<thead>
<tr>
<th>Sex</th>
<th>Participation in Tourism</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>yes</td>
</tr>
<tr>
<td>male</td>
<td>235</td>
</tr>
<tr>
<td>female</td>
<td>173</td>
</tr>
<tr>
<td>Total</td>
<td>408</td>
</tr>
</tbody>
</table>

$X^2 = 5.274, df = 1, p = .022, n = 765$
Despite tourism’s ascendancy as the caye’s dominant economic development engine, lobster fishing remains a vital traditional livelihood for Caye Caulker residents. Tourism provides livelihoods for most of the people living at Caye Caulker; however, tourism’s growth at Caye Caulker has not changed the status nor the economic importance of fishing as it has at San Pedro (Arnaiz-Burne 1996). Moreover, many fishing households are involved in tourism enterprises and a household’s participation in lobster fishing plays a significant role in determining whether and how its members participate in and depend on...
tourism. Fishing families own several local tourism businesses and tend to participate in tourism as business owners more than newer residents, who comprise the majority of the labor pool in the tourism sector of the local economy.

Employment and business opportunities associated with tourism have overtaken fishing as the primary livelihood upon which Caye Caulker’s growing population depends to meet their needs. Both fishing and non-fishing households participate in tourism, although non-fishing households participate in it at a higher rate than households that participate in lobster fishing. However, in order to see how fishing and cooperative organization have benefited fishing families we need to look at how different segments of the population participate in tourism—as wage labor or as business owners, as locals or migrants, and as being involved in or not being involved in lobster fishing. Households were classified as local when they have members with kinship ties to families with extended roots on the caye. Migrant households are those without such kin ties or have moved to the caye in more recent years (since the early 1990s) for work in tourism.

Proportionately fewer local households depend on tourism than households whose members have migrated to the caye ($\chi^2 = 6.437, p = .011$; and see Table 5.7). Local households are more likely either not to be involved in tourism at all or to own businesses. Conversely, significantly more people in migrant households work as employees for tourism businesses and significantly fewer of them operate tourism businesses relative to local households ($\chi^2 = 45.951, p = .000$; and see Table 5.8). These data support the claim that participation in the trap fishery and the cooperative confers benefits beyond fishing to include economic advantages in tourism, shown by a higher rate of business ownership relative to non-fishing and immigrant households.

Two factors promote local fishing households’ ability to maintain control over and accumulate the benefits of the caye’s tourism economy: 1) the success they had previously established in the lobster trap fishery; and 2) the lobster fishing and tourism seasons schedule well together, complementing more than competing with one another. Households that have access to lobster fishing can easily participate in both sectors of the local economy, whereas newcomers to the caye are drawn to work in tourism related jobs or
run tourism related businesses and are not involved in lobster fishing. Another reason that lobster fishing takes a second place to tourism is that there is only half the labor available for fishing because only men fish lobster, whereas both men and women participate in tourism.

**Table 5.7: Household Origin and Reliance on Tourism**

<table>
<thead>
<tr>
<th>Household Origin</th>
<th>Relies on Tourism</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>yes</td>
</tr>
<tr>
<td>Local</td>
<td>97</td>
</tr>
<tr>
<td>Non-Local</td>
<td>173</td>
</tr>
<tr>
<td>Total</td>
<td>270</td>
</tr>
</tbody>
</table>

$X^2 = 6.437, \text{ df } = 1, p = .011, n = 347$

**Table 5.8: Household Origin and Nature of Tourism Participation**

<table>
<thead>
<tr>
<th>Nature of Tourism Participation</th>
<th>Household Origin</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Local Household</td>
</tr>
<tr>
<td>Not in Tourism</td>
<td>36</td>
</tr>
<tr>
<td>Employee/Labor</td>
<td>30</td>
</tr>
<tr>
<td>Self-Employed</td>
<td>18</td>
</tr>
<tr>
<td>Own a Business</td>
<td>50</td>
</tr>
<tr>
<td>Total</td>
<td>134</td>
</tr>
</tbody>
</table>

$X^2 = 45.700, \text{ df } = 3, p = .000, n = 344$
While fishing may not employ as many people, households involved in lobster fishing and whose members belong to the cooperative have used the economic advantages conferred by both to develop tourism enterprises. Most locally run tourism businesses emerged from caye residents extending everyday household activities of their domestic life to the growing number of visitors, such as cooking meals from their home kitchens and providing dry space under their stilt-elevated homes. This shows how success in fishing, achieved through the co-evolution of sea-tenure and cooperative organization, provided a means by which local villagers at Caye Caulker have been able to develop and maintain control over tourism in their village. Therefore, despite the spread of tourism, fishing remains Caye Caulker’s traditional livelihood and is at the base of its economy.

**Qualitative Descriptions of Households not involved with Lobster Fishing**

As seen in Table 5.9, most households on the caye are not involved in fishing and, therefore, do not have any direct involvement with or interest in the cooperative and its credit pool. This section relies on a sample of households to describe local and migrant households whose members are not involved with lobster fishing. Tables 5.10, 5.11, and 5.12 describe the variation in households' tenure at the caye and their involvement with fishing and tourism. These data show how fishing households tend to benefit proportionately more from tourism than non-fishing households do because of their higher rate of business ownership, whereas most of the non-fishing households are involved with tourism in some capacity as business owners or wage laborers. Most of the migrating households predominantly supply the demand for wage labor in the caye’s tourism sector. There are also a small number of households, however, that are not involved with fishing or tourism.

I am providing examples of the households not involved with fishing in order to show something of village life and economy across the caye’s increasingly diverse population. These examples and descriptions show some of the variation across the caye’s population in how each participates, or does not participate, in tourism activities. I begin by looking at households who are not involved in either fishing or tourism. I then turn to describe examples of households that have a majority of members who have
migrated to the caye to work in tourism. The third grouping of households include those who are local to
the caye and are involved in tourism but who reported not being involved with lobster fishing. While this
latter group does not fish lobsters, most have close ties to a fishing household and several of them have
worked as fishermen in the past.

### Table 5.9 Household Types, based on origin, lobster fishing, and tourism

<table>
<thead>
<tr>
<th>Household Type</th>
<th>Number of Households</th>
<th>Percent of Households</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migrant non-fishing household works for wages in tourism</td>
<td>102</td>
<td>29.48%</td>
</tr>
<tr>
<td>Migrant non-fishing household with a tourism business</td>
<td>41</td>
<td>11.85%</td>
</tr>
<tr>
<td>Local Lobster Fishing Household with Tourism Business</td>
<td>40</td>
<td>11.56%</td>
</tr>
<tr>
<td>Local Lobster Fishing Household not involved with Tourism</td>
<td>30</td>
<td>8.67%</td>
</tr>
<tr>
<td>Local non-fishing Household with Tourism Business</td>
<td>26</td>
<td>7.51%</td>
</tr>
<tr>
<td>Migrant lobster fishing household works for wages in tourism</td>
<td>25</td>
<td>7.23%</td>
</tr>
<tr>
<td>Migrant household not in fishing or tourism</td>
<td>20</td>
<td>5.78%</td>
</tr>
<tr>
<td>Local non-fishing Household working for wages in tourism</td>
<td>18</td>
<td>5.20%</td>
</tr>
<tr>
<td>Migrant Lobster fishing household not involved with Tourism</td>
<td>18</td>
<td>5.20%</td>
</tr>
<tr>
<td>Local Lobster Fishing Household works for wages in Tourism</td>
<td>13</td>
<td>3.76%</td>
</tr>
<tr>
<td>Local Household not in fishing or tourism</td>
<td>8</td>
<td>2.31%</td>
</tr>
<tr>
<td>Migrant Lobster Fishing Household with a tourism business</td>
<td>5</td>
<td>1.45%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>346</strong></td>
<td><strong>100.00%</strong></td>
</tr>
</tbody>
</table>
### Table 5.10

<table>
<thead>
<tr>
<th>Local or Migrant Household</th>
<th>Household involvement with Tourism</th>
<th>Household involvement in Lobster Fishing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>not in tourism</td>
<td>Not involved in lobster fishing</td>
</tr>
<tr>
<td>Local Household</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Relies on lobster fishing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
</tr>
<tr>
<td></td>
<td>wage labor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>business in tourism</td>
<td></td>
</tr>
<tr>
<td>Migrant HH</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>not in tourism</td>
<td></td>
</tr>
<tr>
<td></td>
<td>wage labor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>business in tourism</td>
<td></td>
</tr>
</tbody>
</table>

|                           | Total                           |                                        |
|                           |                                |                                        |

N = 346  
Local Household layer: $X^2 = 9.917$, df = 2, $p = .007$  
Migrant Household layer: $X^2 = 17.478$, df = 2, $p = .000$

### Table 5.11

<table>
<thead>
<tr>
<th>Household involvement in Lobster Fishing</th>
<th>Household involvement with Tourism</th>
<th>Local or Migrant Household</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>not in tourism</td>
<td>Local Household</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>wage labor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>business in tourism</td>
<td></td>
</tr>
</tbody>
</table>

|                                        | Total                           |                           |            |       |

N = 346  
Non-Fishing Household layer: $X^2 = 13.626$, df = 2, $p = .001$  
Fishing Household layer: $X^2 = 26.556$, df = 2, $p = .000$
The following sections provide descriptive examples of non-fishing households. The next main section following these descriptions presents similar examples of fishing households, including those that are and are not involved in tourism and those who are indigenous to and have migrated to the caye. I selected households based on my relationships with and knowledge of families or individuals in each and my evaluation of how they are typical of each type. The descriptions are derived from census data, interviews, observations, and in some cases information collected from households’ participation in the food journal project. All of the names used in the descriptions contained in the following sections are pseudonyms.
Local and Migrant Households that are not Involved in Fishing or in Tourism

The local population not involved in either fishing or tourism is small, numbering 11 people spread throughout eight households. Although members of these households are not directly engaged in these sectors of the economy, they all have kin in other households who are. Two examples of these include two sisters whose husbands passed away many years ago and a 40-year-old man who has spent many years traveling abroad, mostly living in New York City. The migrant households not involved with these aspects of the caye’s economy are of two general types: Belizeans who work in social service or utilities positions and foreigners who live all or part of the year on the caye. This group is larger, numbering 53 individuals comprising 20 households. Two examples of these migrant households are Jerod and Francine and their two children, foreigners who purchased land near the airstrip, and Jorge Ramirez, one of the three employees who maintains the BEL (Belize Electricity, Ltd.) diesel generator on the caye.

Selina and Yolanda Perez

I met Selina Perez in June 1995 during my first visit to Caye Caulker. She was born in 1927, one of five children all of whom were born on the caye. Selina spends nearly all her time between her yard and her sister’s hotel, rarely leaving the caye except for occasional day trips to Belize City to shop. Yolanda lives most of the year at the caye, but travels regularly to Belize City and Orange Walk to stay with relatives for weeks at a time. Yolanda is the younger of the two, while Jacinta, their sister who owns the hotel, is the youngest of all the siblings. Jacinta splits her time with her American husband between New York and Caye Caulker. One of the brothers still fishes lobsters and lives on the caye; the other now lives in Orange Walk. Selina and Yolanda live in the house in which they were born, one of the only ones remaining after the major hurricanes that swept across the island in 1931, 1947, and 1961. With Yolanda’s frequent sojourns across Belize, I spent considerably more time with Selina.

Selina lives across the street from the Roman Catholic school, a prime location for her only activity in the caye’s cash economy—a small store she runs out of her dining room located under her house. She sells candy, bottled soda, chips, and ideals (frozen fruit juice in a baggie, akin to a popsicle without the
stick) to school children and other passers-by. This is what drew me to her in 1995. Before too long I made sure to visit regularly. She acquainted me with many of the local families on the caye, generously supplemented with her version of gossip, and I offered her company to break up her day’s work.

In addition to her “little shop,” as she informally calls her operation, she is one of the few people who regularly collects and processes coconut oil for use at home and for sale. She also tends the yard and animals at Jacinta’s hotel during the months it is closed when her sister is in the United States. This daily task gets her out, as it is about block to the beach and another hundred yards to her sister’s place. She spends one to two hours each trip, cleaning branches and debris from the yard, feeding and watering the guinea hens, collecting their eggs, and resting in the cool evening breeze on the seaside bench after the chores are complete.

In addition to the eggs she collects from her sister’s hens, her brother on the caye and several of her cousins bring her fish and lobster on a regular basis. These food items are offered as gifts, but Selina reciprocates with meals she cooks, laundry services, coconut oil, and the labor she donates to her sister. The majority of her time is spent in her yard, cutting the grass from its hold in the sand, clearing debris as she does at her sister’s house, and cooking, all while tending her shop. When at the caye, Yolanda joins in these household chores and yard work. Yolanda also takes care of larger projects like painting and cleaning the rain vat and gutters as needed. Yolanda earns extra income from a modest rental house located on an adjacent lot, occupied by a one of the many migrant households who work in tourism at the caye. Although not engaged directly in the caye’s tourism and lobster fishing economies, both sisters are tied to these through Selina’s reciprocal exchange with kin and Yolanda’s small rental property.

Harrison Gentry

In 1999, Harrison was 40 years old. He worked as a fisherman after he left school at age 14. After three years of spear-fishing and diving lobster and conch he moved to New York City with his parents where he spent five years learning the craft of wood working. He became more interested in art and re-focused his attention to painting on canvas at age 23. This has been his profession ever since.
Harrison is from a local family with a long history in the lobster fishery and in boat building, but he has only recently returned to Caye Caulker. Harrison lives in a modest and clean two story house on one of the newly developed lots on the back street near the airstrip. The lot is shared with his mother, who lives in Miami, and his uncle and namesake, who lives in another smaller single level house on the same lot. All of his natal family moved to the United States when he did at age 17. His mother returns to the caye when she can make the trip on holidays. After many years abroad, Harrison is glad to be “home” where he plans to continue painting for the local art scene and the tourist market.

**Jorge and Maria Ramirez**

Jorge was 25 in 1999. He lived with his wife and three children (ages 6, 5, and 2) in a small house they rented on the back street. It is not in the new development near the airstrip, but closer in to the village on the road to the airstrip. He works one of the rotating eight hour shifts at the electricity generator located on the back side of the caye, near the back pier and the cooperative receiving station. His “assignment” to Caye Caulker is likely a temporary one, a position in which he can gain experience and perhaps get a different placement somewhere else in Belize. Maria does not work outside the home. Jorge’s mother and his youngest sister visit the caye nearly every weekend from San Filipe, a small village in the remote northwest corner of Belize near the border with Mexico. They make the long trip to sell sundry goods such as plastic bowls and Tupperware, pots and pans, and various articles of clothing. When they are not carrying their cache bundled in nylon netting through the streets waiting for an interested party to stop them, they display their wares on a blanket in the street.

**Jerod and Francine Stephens**

Jerod was 50 in 1999 and has lived on Caye Caulker since the early 1990s. He lives with his wife Francine, 29, and their two sons (newborn and age 2) on several adjacent lots near Harrison in the area near the airstrip. Jerod moved to the caye from Europe and worked giving tours on La Ruta Maya before settling down on the caye. He and Francine spend their time on their relatively large multi-lot parcel,
developing a nursery with an emphasis on organic horticulture. In 1999, Jerod was working hard to propagate new strains of coconut palms resistant to a insect-borne disease that “eats the heart” of the palm, killing the tree and causing its top to fall off. He calls these new trees “yellow dwarves,” of which he had 200 planted in 1999 and was selling them for $5.00 each.

Another part of the nursery business is building top soil, which they use in their business and sell by the cubic yard. Jerod spends time outside gardening writing grants and soliciting funds to promote his business and projects on the caye to encourage environmental awareness and stewardship. On the top of his list is the improvement of the water supply and waste water treatment on the caye. Despite their enthusiasm and commitment to improving the ecological well-being and people’s health on the caye, as outsiders Jerod and Francine mostly keep to themselves. They are cognizant of the strong resistance many locals have when foreigners come in to try and make change. They have adopted an approach to practice what they preach and let their actions speak for themselves—a slower approach than what most foreigners who have moved to the caye for tourism hotels and restaurants are willing to take.

Migrant Households Involved with Tourism but not in Lobster Fishing

Over 40% of all households on the caye have moved there to work or start business in tourism and are not involved with lobster fishing. Forty-one (11.85%) households operate businesses relating to the tourism trade on the caye, including such things as restaurants, hotels and guest houses, gift shops, and tour guiding services. However, migrant households whose primary means of livelihood involves working for wages in a tourism-related business are the most numerous, accounting for 29.48% (102) of all households on the caye. People migrating to the caye come from other parts of Belize, North America, Central America, Asia, and Europe. The number and diversity of this group make it difficult to fully capture all the motivations and situations bringing them to this small island community. The small sample presented here is a broad representation of this segment of the population.
Sarah James and Wendell Thomas

Sarah and Wendell are Americans who have lived at Caye Caulker since 1991 when they opened a small restaurant on the caye. Their business is among the most successful run by non-islanders at Caye Caulker. They began with a modest wooden building on short stilts with less than ten tables inside and a few picnic tables and sets of plastic lawn furniture in the yard outside the restaurant. They cater to tourists’ taste buds, offering local and American cuisine ranging from fried snapper with beans and rice to cheeseburgers and fries. My favorite is the catch of the day—grouper, mackerel, snapper, kingfish, or what-have-you, always prepared with the right seasoning grilled or broiled. Their prices are higher than most other restaurants, something that is reflected in the variety of food and distinctive menu items.

In 1996 they secured a lease on one of the most attractive sites on the island for a tourist business. This oversized beach lot is on the front street near the center of town and the main pier where water taxis load and unload passengers six to eight times a day. They constructed a new concrete building that houses the restaurant on the main floor and their private residence on the second. Their consistent good food, amiable attitudes to their tourist patrons, and relatively higher wages for employees are all ingredients in their success. Another factor that distinguishes their restaurant from others is their reputation for always serving legal sized lobsters. Local fishermen and other village residents all conveyed this praise despite many other less favorable attitudes they expressed about foreigners who have come in to try and compete with locals in the caye’s tourism economy, particularly in regards to foreigners having rights to one of the most lucrative properties on the caye for tourism business.

Tomas Padilla

Tomas Padilla began visiting Caye Caulker about 30 years ago, making regular trips from his home in Corozal to work for a foreigner who owned a large piece of beachfront property south of the main village. The foreigner developed a quaint resort setting with thatch-roofed stucco cabañas. Tomas earned BZ$24 a week doing odd jobs, cleaning the yard, doing repair work, and watching over the property when the owner was away. When she sold the property in 1996 she deeded Tomas a narrow strip of
beach that runs the depth of the property to the access road at the back of it; carving out a 40 by 250 feet beachfront lot.

Tomas quickly capitalized on this opportunity and built three modest cabañas close to the beach. Tomas’ wife helps with cleaning in the hotel and maintains their household. Their two sons, 26 and 17 years old, work in tourism as well. The older one captains a water taxi owned by someone else and the other works as a tour guide. All three occasionally fish for subsistence and none reported working in the lobster fishery; however, Tomas is listed as a non-producing member in cooperative annual reports.

Tomas’ small hotel stands in striking contrast to the pair of large two story concrete hotels on the neighboring property. The new owner of the larger portion of the original lot built this newer resort-type hotel. The difference between these two extremes of accommodation options is one piece of evidence documenting the range of tourists who visit the caye. In 1998, Tomas expanded the hotel with a stilted wooden building with three rooms upstairs offering shared bathing facilities. Tomas’ modest rooms are well suited for the backpacker, budget, and student travelers who can afford his rate of BZE$35 a night. The neighboring hotel caters to those requiring accommodation with more comfortable amenities like tile floors, air conditioning, ceiling fans, and private bathrooms, and who are willing to pay over BZE$150 per night for these.

Jamaica Rivero

Jamaica has been guiding snorkeling tours around the reef in front of Caye Caulker since 1990. He does not own land on the caye and in early 1999 he was renting a one-room house from a seasonal resident who was away for a few months. When inexpensive accommodation is unavailable he may sometimes take shelter in his boat. He works alone out of his 27-foot fiberglass skiff, powered by a 60 horsepower engine and adorned with a makeshift coconut frond canopy to protect his guests from the sun in between their stops along the reef.

Jamaica offers one of the more distinctive snorkeling tours among those advertised at the caye. He takes tourists to the “local” reef sites to snorkel and to swim with the eagle rays, which congregate around
his boat and have become accustomed to the free lunch his arrival signals. In addition to visiting the rays, the local reef tour consists of two snorkeling stops, one around an area spotted with several large coral patches within the Barrier Reef, an area known as the coral garden, and another stop at the main reef near the channel to the south of Caye Caulker. On occasion he may forage for one or two conch that he will use to prepare a bowl of cerviche to snack on between stops.

Jamaica lives a modest life, earns a better than average living from his small business, and has a fair reputation among the tourists who take his trips, keeping his tours full on most days. Locals have a mixed view of him and his business mainly because of his Rastafarian ideals, appearance, and tastes. Despite this criticism, several locals indicated that they respected his entrepreneurial spirit and continued success, which most also felt would be greatly enhanced if he reduced his alcohol and drug consumption, habits that he keeps separate from his work but which nevertheless consume his income. Others who are closer to him have more recently become concerned over other matters of his health—the deterioration of his hearing, a result of free diving for fish, lobster, and conch for his tourist guests and his own subsistence.

**Tomas Gutierrez and Vera Moreno**

Tomas and Vera are not married but consider their union a common-law marriage. They are a young couple, 23 and 24 years old, respectively, in 1999, and have one daughter. They have lived at the caye since 1997, both moving to the island to work in tourism. Tomas works for a prominent lobster fishing family in the main office of their hotel and rental business. Vera does the majority of housework and also works for another hotel, cleaning rooms and doing laundry. In addition to Tomas’ work with the rental business, he repairs bicycles during his free time in the evenings and on his days off from work.

I got to know Tomas pretty well and saw him nearly every day, at least four to five times a week, because my wife and I rented the apartment above the main office of his employer’s rental business. Tomas’ primary duties involve cleaning the small fleet of golf carts his employerrents, delivering ice that the business sells to restaurants and private households, and driving the “stretch” golf cart taxi when called to pick up people from the airstrip or main pier. He may occasionally assist in other odd jobs
around his employer’s yard depending on the demand of his regular daily tasks. On slow days, Tomas could be found relaxing in the shade of one of the golf cart’s awnings. I would join him some days with a coke or a beer and visit about life and work. He mostly enjoyed the freedom of his job, the flexibility of the hours, and the benefits of access to ice and golf cart transportation. Golf carts and ice are two strangely ubiquitous examples of Caye Caulker’s material culture; these amenities common to a golf course are markers of wealth and status on this small tropical island.

Tomas and I talked about fishing frequently too. Tomas enjoys fishing with hand lines for snappers and goes out whenever the opportunity arises. He has friends on the caye with access to boats and he joins them on evening or daylong trips to patch reefs in the waters around the caye at least once a week. His mother also enjoys fishing and eating fish. When she visits the caye from Orange Walk she accompanies Tomas when opportunities for a fishing excursion arise, and whenever Tomas travels to her home he fills a cooler full of whole snappers packed in ice. Near the end of my time at the caye, Tomas was contemplating a change of employment; he had been talking with one of his employer’s cousins, also a lobster fisherman, about joining him as a hired hand on his lobster boat.

William Pou

In 1999, William was 21 years old. He moved to Caye Caulker in 1991 with his sister Bea, aged 24 in 1999, from a Mayan village in the Toledo district in southern Belize. The two no longer live together, as Bea now lives with her common-law husband and their toddler son. At the time of the census, William was living alone in a one-room apartment, one of three ground level single room apartments the owner (a fisherman) rents to other laborers in the tourism sector. Both William and Bea work in Sarah and Wendell’s restaurant. Bea began in 1997 as a cook. William began waiting tables in 1994, the same job he was working in 1999. William’s income varies between BZES$200 and $300 per week, including tips, depending on the number of tourists on the caye. This is an average income for restaurant wait staff; others working in this capacity at the caye reported earning between $150 and $400 per week.
He remits money to his family when he travels back for visits every few months. Having left school at an early age to move to the caye, William has worked hard to make a living for himself and continue his education outside the nation’s formal education system. In 1999 he had nearly completed his high school equivalency exams, something similar to a GED in the United States. He feels fortunate to have landed on his feet after leaving home at such a young age, much of this good fortune he attributes to the generosity and opportunity Sarah and Wendell provided him.

Local Households in Tourism that do not Work in Lobster Fishing

Forty-four households at Caye Caulker are considered local and rely primarily on tourism, but are not directly involved with the lobster fishery as trappers, divers, or hired labor. Eighteen of these work for wages in tourism related businesses, whereas the majority, 26, own one or more tourism businesses. Several of the households in this grouping either have members who have worked in the lobster fishery in the past and belonged to the cooperative, have close kin (parents or siblings) who currently work in fishing and belong to the cooperative, or have a recently deceased household member who worked in lobster fishing and belonged to the cooperative. Moreover, those involved with tourism businesses have done so with the aid of resources from the cooperative, income from fishing, or both.

Marcus and Yvonne Muñoz

Marcus, 44, and Yvonne, 26, live in a modest house near the split at the north end of the village. Both Marcus and Yvonne are members of long time local families who have been involved in the lobster fishery, but neither is involved in it today. Yvonne works as a cook and waitress in the restaurant her mother owns, work she has done since her childhood. Yvonne continued this work at a reduced schedule after the birth of their first child in July 1999. Marcus works as a carpenter and handyman and spends an extraordinary amount of time volunteering for several community organizations. He describes his regular reliance on temporary work and odd jobs with the Creole term kech an kill. Kech an kill simply refers to
locating work and closing a deal to complete it within a specified time for an agreed price. Marcus reported earning BZE$60 a day for this work, which he may find up to four days a week.

I was initially surprised by Marcus’ reporting of this seemingly infrequent and lax approach to earning a living because I always see him around the village doing some kind of work; he always looks busy. When he is not working for wages, he dedicates many hours to volunteering at the school, as a special constable (village level peace keeper or deputy-type role), for a local scouting organization, and for different tourism and environmental groups. Marcus is well respected for his hard work and dedication to the community and is seen as someone who is willing to sacrifice his own personal gain for that of the community. This works to his advantage when seeking out work, and he is able to kech an kill work opportunities because of his reputation.

Ramon and Annika Guerra

Ramon and Annika are both 38 years old and have two children, Isabel (9) and Lucas (6). Ramon’s father was a founding member of the cooperative, but Ramon did not pursue lobster fishing. His brother Reymundo worked closely with their father since he was old enough to accompany him on the lobster boat. Their younger brother Henri did not enter the lobster fishery either because, he describes, “[Reymundo] was like a shadow of my father, it was as if nature intended him to take over my dad’s traps.” Ramon’s third brother, Abelardo, works intermittently as a fisherman, diving for lobster, conch, and fish. Reymundo is the only brother working their father’s old traps and areas. He shares access to the areas with Abelardo, where both have shades for diving lobster. Ramon did join the cooperative to fish, but not for lobster. He joined in the early 1980s and spent a short time in Canada to train in deep-sea fishing and navigation. He used these skills to fish snapper in the deeper waters outside the reef. After five years he changed course and began training for certification as a SCUBA instructor. Although no longer fishing, his name appears on the cooperative’s list of non-producing members.

Ramon’s skill in navigation and experience in the seas outside the reef has been a valuable asset contributing to his success in tourism as a dive master. Near the time that he left fishing he met Annika
and not long after that that the two of them began the first locally run SCUBA dive shop on the caye, which they opened in 1988. Annika was born in Europe and after spending time diving in Belize, decided to stay and to be with Ramon. Together they run one of the most well known dive shops in Belize and perhaps one of the most prosperous tourism businesses on the caye. Their highly regarded service and expertise helps keep their trips full. In addition to SCUBA diving trips to the several dive sites through the Northern parts of Belize and the outer atolls, they also offer PADI instruction and certification. They employ four dive instructors and guides and an office secretary that takes phone calls, distributes information to tourists, and books tours. They have four fiberglass boats for the tours they offer—two are specially designed for diving and two smaller boats have been modified to accommodate the special needs of this function. The location of the day’s dive site, the number of people on each trip, and the weather determine which boats are used on any given day. Their small fleet offers flexibility to be able to change plans quickly based on changes in the number of divers or the weather.

Among their employees, Ramon’s youngest brother and sister-in-law work as SCUBA instructors and dive masters. His brother had a smaller shop of his own, but after several trips abroad in recent years he and his wife decided to not re-open their business when they returned to the caye in 1998; however, they are planning to work into an arrangement to buy out Ramon’s business and run it themselves. While Ramon is passionate about his diving, he does not want to spend the rest of his life dependent on it. He is glad to have someone close to him interested in continuing his business, keeping it in the family and building on his legacy. Toward the end of 1999, Ramon and Annika were beginning their plans for life after the dive shop. They were building an addition onto their relatively new concrete house and beginning the planning for a small hotel with more luxurious amenities than most local accommodations. The transition of the SCUBA business to Henri and his wife Sarah will be slow; Ramon and Annika will maintain ties to it, hoping to enhance one another’s tourism ventures through joint bookings and referrals.
Carlos and Rosita Montejo

Carlos Montejo is in his early 30s, Rosita is four years younger. The couple has five children; the oldest was nine in 1999. Carlos’s paternal and maternal kin have deep roots on the caye and in the lobster fishery. Rosita moved to Caye Caulker from El Salvador in the late 1980s. Carlos has numerous cousins on the caye, several of whom are still involved with lobster fishing. Carlos worked as a lobster fisherman with his father from the time he left school at age 17 until he was 25. He left fishing in 1993 to start a business in tourism—a bar, which remains at the foundation of his livelihood today. Like his cousin Ramon Guerra, Carlos no longer fishes lobster, but remains on the cooperative’s list of non-producing members. Most of Rosita’s time is spent caring for their children, but she occasionally works in the bar, the extent of her involvement in work outside the home.

At the time of the census in early 1999, Carlos and Rosita’s family lived in a house owned by one of Carlos’s brothers who lives in the United States. This house is large by local standards having a concrete foundation and pillars that support the wood construction of the second floor, the building’s primary residence. The ground floor is a small hotel having four rooms and a shared bath. They moved into this house in 1997 when given the opportunity to run his brother’s hotel. The larger house accommodated their growing family and also provided them with extra income from renting their own house, which is located between his brother’s and parents’ properties on a small lot his father split off from his own lot. The primary residence is on the ground floor of a newer concrete building; the bar is on the second story of the same building.

In the middle of 1999, they moved back into their own house on Carlos’ property because the hotel was not producing enough income for them to cover the maintenance expenses of the larger house and hotel in addition to their own property and other business, a situation Carlos attributed to the tourism downturn after hurricane Mitch. In addition to the bar, Carlos also owns a 26 foot wooden boat with a small cabin. The boat was damaged by Hurricane Mitch, taking it out of commission for the upcoming tourism high season in 1999. This was a further blow to their income, but they were still able to rely on the bar. He had the boat repaired by the middle of 1999 and was preparing it to accommodate fishing and
snorkeling tours for later that year. Despite these setbacks, Carlos remains positive and looks forward to better days. He knows that depending on tourism is a risky strategy, but he is confident that his diversity of investments and constant stream of new ideas are valuable assets that, in association with his kin ties through the island, will allow him to rebound.

Luciano and Idelia Castillo

Luciano Castillo, 50, is also from a family with a long history on the caye. His great-grandfather was one of the caye’s original settlers, having fled the Yucatan during the Caste Wars and living for a short time at Ambergris Caye before buying land and moving to Caye Caulker in the 1880s. His family was involved with the cocal trade in the caye’s early history and later would also play a role in the development of the lobster fishery and cooperative. His father and uncles were founding members of the cooperative and he joined in 1963 at age 15. Idelia, 51, was born in Corozal and moved to the caye shortly before they were married.

Luciano worked as a lobster fisherman for 20 years, until 1982 when he and Idelia opened a hotel on the same property where their home is located. For many years, theirs was the premiere hotel on the caye, offering beach front rooms and cabañas with private baths, televisions and, later, air conditioning. They were still relatively small wooden structures, but much more than the common single room, shared bath accommodations offered by other early hotels. In 1988 they added a restaurant with indoor and outdoor seating. They offer guests taxi service with one of their golf carts and have satellites that they use to offer programming in their hotel. They employ several people in these businesses, including their three children. Their daughter works in the hotel office; their sons help with the restaurant. Both sons also worked in the lobster fishery for a short stint before turning to tourism.

Luciano reported quitting lobster fishing after starting his tourism business. However, he remained on the cooperative membership roster as a producing member between 1982 and 1994 and again from 1997 to 1999. Although he did not work in fishing after 1982, or at least for most of the years since then, he resigned from the cooperative in 1994 and returned in 1997. He is listed on the cooperative’s second
payment schedules as selling several hundred pounds of lobster tails for the 1997, 1998, and 1999 seasons. His sons show a similar pattern of behavior. Neither of them reported fishing as current livelihood strategy and both reported fishing in the past. While one son remains on the non-producing list of members, as Ramon and Carlos above, the other son, like his father, continues to appear on the list of producing members and the cooperative reports him as selling several hundred pounds of lobster tails in years after reporting having left fishing, between 1996 and 1999. This seemingly anomalous pattern of marketing lobster without working in the lobster fishery is elaborated in the next chapter.

**Differences among Fishing Households based on Fishermen’s Lobster Production, Household Origin, and Tourism Involvement**

Sutherland (1986) reports that up through the early 1980s most people moving to the caye did so in order to work in the lobster fishery. This segment of the population either has integrated with the local population through marriage or had existing kinship ties to local families and today is considered local relative to the influx of people who have moved to the caye since the early 1990s to work in tourism. There are still some non-local fishermen who have more recently moved to the caye for opportunities in fishing; however, the number of migrant households with members involved with fishing is small; most of these work as laborers or divers (32) and only a few work in the trap fishery (13). Considering only those households whose members actually produce for the cooperative, these numbers are even smaller (households with divers/laborers, 7; households with trappers, 13).

Using aggregate level data to look at the differences in how fishermen participate in tourism reveals that trappers tend to own business more than fishermen who dive and work for wages. Table 5.13 shows that fishermen who own traps tend to own businesses or be self-employed in other enterprises, whereas divers and laborers tend to work outside of fishing as laborers in tourism ($X^2 = 24.646, p = .000, n = 155$).

---

31 “Other enterprises” include such things as independent water taxi services and tourism and fishing support occupations as skilled laborers: mechanics, appliance repair, carpentry, and electrical work.
As would be expected, a similar pattern is seen in the relationship between tourism participation and membership in the cooperative ($X^2 = 19.208, p = .000, n = 155$; see Table 5.14).

### Table 5.13: Involvement in Lobster Fishing and Participation in Tourism

<table>
<thead>
<tr>
<th>Participation in Tourism</th>
<th>Involvement in Lobster Fishing</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Trapper</td>
<td>Diver or Labor</td>
</tr>
<tr>
<td>Does Not Participate in Tourism</td>
<td>49</td>
<td>20</td>
</tr>
<tr>
<td>Self-Employed or Owns Business</td>
<td>29</td>
<td>5</td>
</tr>
<tr>
<td>Laborer or Employee</td>
<td>19</td>
<td>33</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>97</td>
<td>58</td>
</tr>
</tbody>
</table>

$X^2 = 24.646, df = 2, p = .000, n = 155$

### Table 5.14: Involvement in NFCS and Participation in Tourism

<table>
<thead>
<tr>
<th>Participation in Tourism</th>
<th>NFCS Membership</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Member</td>
<td>Not A Member</td>
</tr>
<tr>
<td>Does Not Participate in Tourism</td>
<td>56</td>
<td>13</td>
</tr>
<tr>
<td>Self-Employed or Owns Business</td>
<td>33</td>
<td>1</td>
</tr>
<tr>
<td>Laborer or Employee</td>
<td>30</td>
<td>22</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>119</td>
<td>36</td>
</tr>
</tbody>
</table>

$X^2 = 19.208, df = 2, p = .000, n = 155$
There are 91 households with fishermen that have regularly delivered lobster to the cooperative between 1996 and 1999. The community-wide pattern of participation in tourism and household origin does not appear with this sub-set of the population as there is not a statistically significant difference in how local and migrant fishing households participate in tourism ($\chi^2 = .076, p = .782, n = 91$; see Table 5.15). However, when looking at how fishing households are engaged with tourism, the community wide pattern is present; however due to the smaller population the $\chi^2$ statistic cannot be calculated (see Table 5.16). Local households engaged in lobster fishing are more likely to own businesses when they are in tourism, whereas fishing households that have recently moved to the caye tend to work in tourism for wages. Again, because of the small numbers of cases the $\chi^2$ statistic cannot be calculated (Table 5.17).

### Table 5.15: Household Reliance on Lobster Fishing and Tourism

<table>
<thead>
<tr>
<th>Household Origin</th>
<th>Relies on Tourism</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>yes</td>
<td>no</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Local</td>
<td>45</td>
<td>26</td>
<td>71</td>
<td></td>
</tr>
<tr>
<td>Non-Local</td>
<td>12</td>
<td>8</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>57</td>
<td>34</td>
<td>91</td>
<td></td>
</tr>
</tbody>
</table>

$\chi^2 = .076, df = 1, p = .782, n = 91$

### Table 5.16: Household Reliance on Lobster Fishing and Tourism

<table>
<thead>
<tr>
<th>Tourism Involvement</th>
<th>Household Origin</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Local</td>
<td>Non-Local</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Not In Tourism</td>
<td>26</td>
<td>8</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>Wage Laborer</td>
<td>9</td>
<td>9</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Business</td>
<td>36</td>
<td>3</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>71</td>
<td>20</td>
<td>91</td>
<td></td>
</tr>
</tbody>
</table>
Table 5.17: Household Reliance on Lobster Fishing and Tourism

<table>
<thead>
<tr>
<th>Tourism Involvement</th>
<th>Household Origin</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Local</td>
</tr>
<tr>
<td>Wage Laborer</td>
<td>9</td>
</tr>
<tr>
<td>Business</td>
<td>36</td>
</tr>
<tr>
<td>Total</td>
<td>45</td>
</tr>
</tbody>
</table>

Another view of the relationship between access to lobster fishing and economic well-being considers the differences in the level of fishermen’s production and how they participate in tourism. Fishermen commonly classify one another based on the amount of lobster they produce. They use generic labels specifying fishermen as large, medium, and small producers. These groups are based on the amount of lobster a fisherman delivers to the cooperative (their production) more than the size of their fishing operation (number of traps they work); traps measures effort, whereas pounds-delivered measures production. Although level of production and number of traps are highly correlated ($r^2 = .534$, $p = .000$, $n = 39$), production is what matters to fishermen and fishermen equate high production with economic success because more lobsters entail more money.

Fishermen readily identify large producers as those who consistently produce substantial quantities of lobsters, most of which they sell to the cooperative, and most of whom have large numbers of traps. Fishermen also commonly distinguish small producers, who conversely work a small number of traps or

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32 The production of fishermen 999.0, on the far left in Figure 5.3, is not within the range of large producers. This fisherman is included as a large producer because several fishermen named him as among the largest producers, working between 1000 and 1500 traps. Fisherman 997.0, second from the right, is fisherman 999.0’s son. They together with the help of hired labor. Fishermen name the father as a large producer more frequently because of his length of time in the cooperative, his long history of large production, and that he is still involved with the family fishing operation even though he has not delivered large amounts of product in his own name in recent years. In the 1980s he is listed as one of the top three producers for the cooperative, producing between 3,000 and 8,000 pounds of lobster tails annually. Lastly, this fisherman is a long standing member of the cooperative’s managing committee. This fishermen’s decrease in production and his seeming anomalous position as a large producer are tied to the issues of central concern to the thesis: how production, marketing, and credit have changed with the growth and transformation of the cooperative and its membership. These issues and the interesting questions surrounding this particular example are elaborated below and in the next chapter.
dive and, in turn, produce only a modest annual catch. When I asked fishermen to name large producers, they distinguished a middle category of fishermen who produce a large quantity of lobsters relative to the population of caye fishermen, but whose production is much less than the largest producers in the broader population of cooperative fishermen. In this regard, medium producers are more of a residual category of fishermen who are not small producers and not large producers.33 The distribution of cooperative members’ production for the season ending in 1996 is presented in Figure 5.1.

There are no clear breaks in the distribution of cooperative members’ production, at least until the very end where the production of the cooperative’s largest producers shows a dramatic increase. This makes it difficult to distinguish “natural” groupings to represent large or small groups of fishermen. Therefore, I use the examples of medium and large producers provided through interviews with fishermen to differentiate among this wide variation. Figures 5.2 and 5.3 shows production for fishermen that were classified as medium and large producers, respectively. I use these fishermen’s mean production for the years 1996 to 1999 and qualitative data to distinguish fishermen’s level of production with the NFCS: Small, less than 500 pounds; Medium, 500 to 1600 pounds; and Large, greater than 1600 pounds. Because there is a break, barely recognizable in Figure 5.1, in the distribution between 1500 and 1600 pounds and that none of the large producers that fishermen listed averaged less than 1600 pounds, I used an average production level of 1600 pounds to distinguish large producers from medium producers. I used an average production of 500 pounds to separate medium from small producers because there is a small break in the average production distribution between 490 and 525 pounds, and because fishermen

33 In the late 1980s, another distinction among fishermen’s production emerged, what I call a super-producer. Super-producers are the outliers in the distribution of producing members of the cooperative (none lived at Caye Caulker). For example, in Figure 5.1, the right-most fisherman in this sorted order sold over 33,000 pounds of lobster in 1996. Others produced between five and fifteen thousand pounds. The super-producer type emerges in association with the cooperative ceasing to report its top three producers each year in its annual report. Moreover, this extra-ordinary class of member emerged along with the frequency and severity of member delinquency, credit problems, and filtering and buying lobsters (as opposed to producing them through their own labor in fishing) to enhance cooperative production. Super-producers are unique in that they are a mix of cooperative members who market extra-ordinary large quantities of lobsters to the cooperative and members who either supplement their production with or rely almost entirely on lobster they purchase from other fishermen. The significance of this distinction between producer and buyer is described in the following chapter, which delves into the important distinctions of fishermen who belong to the cooperative. One example of this distinction was given in the Castillo household described in the previous section.
referenced 500 pounds in different contexts to characterize a fisherman who is more serious and committed to marketing with the cooperative. Two examples of this latter self-classification included ideas to change the minimum amount one must deliver to the cooperative in order to receive a Christmas bonus or to run for a position on the cooperative’s managing committee.

**Figure 5.1**

*Distribution of Catch among NFCS Members, 1996*

Source: NFCS Second Payment Schedule, 1996; n = 375
Figure 5.2
Sample of Medium Producers Lobster Production, 1996-99

Source: NFCS Second Pay Schedule 1996-1999

Figure 5.3
Sample of Large Producers Lobster Production, 1996-99

Source: NFCS Second Payment Schedules 1996-99

Note: Codes 996-999 are not from Caye Caulker
Most of the caye’s fishing households are either not in tourism or own tourism businesses. There appears to be a tendency for medium and large producers to be more involved in tourism and to be involved as business owners, this relationship cannot be tested with the $X^2$ statistic because of the small number of cases (Table 5.18). This same apparent weak relationship appears when looking at whether the large, medium, and small producers are in local or migrant households. The large and medium producers tend to come from caye households, while more small producers are from households that are not originally from the caye, yet again due to the small number of cases this cannot be tested reliably with the $X^2$ statistic (Table 5.19). However, by grouping the large and medium producers together as a “larger producers” there appears to be a weak, but non-significant, association of larger producers originating from the caye ($X^2 = 3.239, df = 1, p = .072, n = 91$; see Table 5.20).

The descriptions in the following sections show some of the variation in fishing households’ participation in tourism and fishing. The sections are divided by households that have small, medium, and large producers in them. Fishermen’s use of cooperative credit is included where data is available.

### Table 5.18: Fishing Households Production and Involvement in Tourism

<table>
<thead>
<tr>
<th>Production Category</th>
<th>Not In Tourism</th>
<th>Wage Laborer</th>
<th>Business</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large</td>
<td>2</td>
<td>1</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>Medium</td>
<td>12</td>
<td>8</td>
<td>17</td>
<td>37</td>
</tr>
<tr>
<td>Small</td>
<td>20</td>
<td>9</td>
<td>14</td>
<td>43</td>
</tr>
<tr>
<td>Total</td>
<td>34</td>
<td>18</td>
<td>39</td>
<td>91</td>
</tr>
</tbody>
</table>
Table 5.19: Fishing Household Origin and Production

<table>
<thead>
<tr>
<th>Production Category</th>
<th>Household Origin</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Local</td>
<td>Non-Local</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Large</td>
<td>9</td>
<td>2</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>32</td>
<td>5</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>Small</td>
<td>30</td>
<td>13</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>71</td>
<td>20</td>
<td>91</td>
<td></td>
</tr>
</tbody>
</table>

Table 5.20: Fishing Household Origin and Production (2)

<table>
<thead>
<tr>
<th>Production Category</th>
<th>Household Origin</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Local</td>
<td>Non-Local</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Large/Medium</td>
<td>41</td>
<td>7</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>Small</td>
<td>30</td>
<td>13</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>71</td>
<td>20</td>
<td>91</td>
<td></td>
</tr>
</tbody>
</table>

$X^2 = 3.239, \ df = 1, p = .072, n = 91$

Small Producers

Forty three households at Caye Caulker have fishermen in them whose average annual production with the cooperative was less than 500 pounds between 1996 and 1999. All of these households have only one fisherman in them. Table 5.21 shows that there may be a difference among small producing households’ participation in tourism based on whether the household members are from the caye or not;
however, the same number of cases prevents a test with the $X^2$ statistic. The local households in this group tend to either own businesses in tourism or not be involved with tourism, whereas the households whose members are relatively new to the caye work for wages in tourism. The households with medium and large producers in them do not show this relationship (see their corresponding sections below). One reason why the small producers differ from the others in this way is that some small producers (like Reymundo Guerra, see description below) used to haul more traps, but they have reduced the number of traps they work in order to dedicate more time to tourism, a strategy used to balance the risks of two seasonal and often fickle livelihoods.

Fishing method is another factor distinguishing the smaller group from the medium and large groups. Only 27 of the 43 small producers own traps. Seven of the small producers primarily dive and nine of them work for wages some of the time rather than having product delivered to the cooperative under their name. The seven small producing households described below consist of one with no involvement in tourism, three who run their own tourism business, and three who work for wages in tourism. Three own traps, two of them work for shares and wages with a trap fisherman, and two others primarily dive.

<table>
<thead>
<tr>
<th>Tourism Participation</th>
<th>Household Origin</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Local</td>
</tr>
<tr>
<td>Not in Tourism</td>
<td>15</td>
</tr>
<tr>
<td>Wage Laborer</td>
<td>2</td>
</tr>
<tr>
<td>Business/ Entrepreneur</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
</tr>
</tbody>
</table>
**Jamie Montejo**

Until Jamie’s father passed away in 1996, they worked together as a typical traditional kin-based operation. Jamie’s father had over 300 traps spread across three areas of water. To supplement his production, Jamie occasionally worked with one of his uncle’s for a wage or small share of the catch. After his father passed away, Jamie only kept 125 of his father’s traps in one of the more productive areas close to the caye. He sold the other traps to his uncle who works a large operation of over 1500 traps, and Jamie now relies mostly on the wages or shared catch from working for his uncle. Jamie’s average production between 1996 and 1999 was less than 400 pounds.

Jamie and his family live in a house on the lot where his father had lived. One of his sisters returned to the caye to occupy their father’s vacant house. Jamie’s tidy wooden home sits elevated on stilts near the back of this lot on the front street. His wife Julia is a school teacher at the village’s primary school. Their three daughters are 15, 10, and 6; the oldest attends high school in San Pedro, in 1999 she was in the First Form. Neither of them works in tourism; instead they rely on Julia’s steady income from teaching to get them by through the lean months between lobster seasons.

**Reymundo Guerra**

Reymundo is a small producer in his 40s who works 300 traps and relies on income from tourism as well as fishing; he is the fisherman with whom I spent most of my time in 1998 and 1999. At the time of the census he lived with his wife Carmen and their two daughters. Carmen and Reymundo met in the early 1980s when she was visiting the caye from the United States. They married not long afterwards. In 1999, Carmen ran a gift shop from a small building in front of their house. Reymundo’s primary tourism activity is his water taxi, but he also has been intermittently involved with tour guiding, offering more distant trips to remote cayes for extended day trips, something for which his water taxi is better suited than the more common trips to the local reef snorkeling sites. Reymundo considers himself a jack of all trades and enjoys the variety of work split between lobster fishing and providing services to tourists.
At a very young age Reymundo began spending every available moment with his father, a founding member of the cooperative, building traps and at sea hauling them. After his father retired in 1980, Reymundo took over the entire fishing operation and worked over 500 traps, mostly alone. As tourism started expanding at the caye in the later 1980s and early 1990s he cut back his fishing activity to accommodate his water taxi and tour guiding businesses. In 1999 he worked 300 traps and had set out a dozen shades in one of his two territories. His current fishing efforts are described in Chapter Four as an example of work relying on wage labor. In short, he pays someone to help him haul his traps now. Only one of his three brothers works as a fisherman, diving lobster and conchs and catching scale and finfish that he mainly sells to local restaurants. The other two rely principally on tourism; many of these details are presented in the description of Ramon Guerra’s household (see pages 123-4).

The majority of the time I spent with Reymundo began in a discussion about vented lobster traps. I had shared the idea and results of an experiment with lobster traps having an escapement mechanism (Greenwood et al. 1982). He was interested in the idea and offered to try a similar experiment if I were to help build the traps. It was one of those moments of ethnography where a door opens into an unanticipated direction. Had one planned for it, access to that door would have been difficult at best. So, we began designing and building vented lobster traps and I eventually realized I had secured a position as a “helper” on a lobster boat.

Some of the other fishermen with whom I also worked closely questioned the amount of time I spent with Reymundo because they did not consider him a typical fisherman; he was only a small producer with a gringo wife. While that is true, he was also patient and willing to put up with my crazy ideas and constant questions. Moreover, it is not uncommon for ethnographers to make their best relationships with the more marginal segments of a target population; the outsiders hang together as it were. Others of these fishermen were interested to hear about the results of our experiment; some out of amusement, others out of genuine interest in knowing whether it worked (see Appendix E for results).
Ignacio Hernandez

Ignacio Hernandez moved to Caye Caulker from a small village in the north of Belize near Corozal in 1984. He married the daughter of a local trap fisherman in 1985. Ignacio, his wife Reyna, and their two children, ages 12 and 14, live in a modest home in the north end of the village on the leeward side of the caye. Although he shares a surname with several other Hernandez households on the caye, he is not part of this local island family. They do, however, share a more distant lineage as their ancestors all migrated from the Yucatan during the Guerra de Castas in the mid-1800s, some made it as far south as Caye Caulker, others remained closer to Mexico.

Reyna works in tourism, helping clean rooms in her parents’ hotel. Ignacio described her work in this capacity as “helping her mom” and did not consider her really working outside the home. It was unclear whether she earned wages or other compensation for her time. Ignacio’s primary livelihood is in commercial fishing, but he too is involved with tourism, offering guided fishing trips to tourists. Small hand painted signs placed throughout the village direct tourists to his home for this service. He dedicates significant time to this tourism activity, but mostly in peak periods during the North American winter months. Ignacio began fishing at the age of 13 in his natal village on the shores of Chetumal Bay. His commercial fishing activities at Caye Caulker involve diving for lobster and conch and catching scale fish with hand lines or by spear gun. He only produces a small amount of lobster for the cooperative (only one year between 1996 and 1999 was over 100 pounds), but also delivers fish and conch meat to total a more significant overall contribution to the cooperative.

Manuel Santos

Manuel Santos is in his 70s. Semi-retired, he moved to the caye in 1989 to work with Reyna Hernandez’s father hauling traps. He lives in a small two room wooden house that shares a yard with a camper/trailer and a larger house on stilts. He minds the property for the non-resident owner who had the property on the market for sale in 1999. His wife and sons live in Belize City and he travels there every
Manuel first joined the cooperative in 1972. At that time he worked as a diver from one of the several sailboats that harbor in Haulover Creek in Belize City. He produced enough to save money and access cooperative credit to purchase his own boat, which he used to continue diving until it was wrecked in 1988. This event motivated his move to Caye Caulker, where he has been working with Reyna’s father for a share of his catch. Manuel gets around very well for a man in his seventies, his good health he attributes to a life of working at sea using his body to earn his livelihood. He continues this lifestyle today, building and hauling lobster traps and pedaling his large tri-cycle around the village’s sandy streets. His wife, however, has not been as well off.

Manuel has requested credit from the cooperative to purchase the boat he wrecked in 1988 and to cover his wife’s medical expenses in the 1980s. With her health care needs and the unfortunate accident with his boat, Manuel’s debt has surpassed what he can pay. Manuel’s liquidation payment has been completely consumed each year since 1984 to cover this debt. Today, he does not take out loans for fishing because the fishermen he works for purchases all the material to build and maintain the traps. Manuel’s commitment to the cooperative is in some ways rare considering his circumstances. Unlike several cooperative members, most of whom have not crossed such dire straights, he continues to produce with the cooperative and pay his debts.

Donald Joseph

Donald Joseph is one of the few fishermen on the caye who is not of Spanish heritage. He moved to the caye with his family from southern Belize and has been working as a fisherman for 15 years, starting as a young boy in his natal home in the Stann Creek district. He and his wife Lindsey have three children and live on the Back Street not far from Isaac Mendoza’s extended kin. The land, however, is very low and has not been filled like Isaac’s property. Donald secured the land through government lease in 1992. There are over 30 people spread throughout six households on this small lot, most are Donald’s extended
kin, including two of his brothers, Darwin and Sheldon. Darwin fishes with Donald and lives with his wife and five children. Sheldon lives alone in a makeshift, one room, windowless structure with steps and a door and works *kech an kill* between the caye and Belize City. While Sheldon’s shack is minimally more than a shed, Ronald and Darwin’s homes are more comfortable wood structures on stilts with storage rooms and open work areas underneath. This is where the women and children can be found most days visiting, playing, and doing laundry.

The adult women in these households mostly work at home caring for the children and maintaining their households. They often work together and exchange labor to fulfill domestic obligations. Lindsey, however, works as a cook in Ceasar and Tamara’s restaurant. The other households in this yard generate additional income by selling a variety of locally popular baked goods: johnny cakes, key lime pie, coconut bread, and coconut cake, among others. Children in each household carry between one and three dozen of these items wrapped in cloth or plastic wrap in large plastic tubs throughout the streets, selling them for BZE$1-3 apiece. Tourists are a primary market, but locals also partake of them.

Donald employs a variety of methods to fish lobster, conch, and scale fish. He has a small wooden skiff powered by a 40 horsepower engine. He catches fish with a monofilament handline and dives for them using a locally designed spear gun, constructed from a short length of plastic conduit and elastic surgical tubing. He dives for conch and lobster, but also harvests lobster with an unconventional trap made from old tires. The tires are perforated along the sides, the lateral openings are covered with net or chicken wire, and a small entrance hole is cut out of the tire’s tread. I did not find other fishermen using this type of trap. I regret not having spent more time with Donald and Darwin to learn more about their uniquely marginal place in the caye’s community and lobster fishery.

**Teodoro Verde**

Teodoro Verde, his common-law wife Marialuisa, and their son Teodoro, Jr. live in small ground-level house behind Teodoro’s mother. Teodoro’s family has a long history on the caye; his father and several uncles were founding members of the cooperative. Marialuisa moved to the caye from a town in
Belize’s northern Corozal district; she cares for four year old Teo, Jr. and does not work outside the home. Teodoro works in fishing, mostly for wages building lobster and stone crab traps and at sea with different fishermen from season to season. His primary work in tourism is with a childhood friend from the caye who owns a tour guide shop offering sailing cruises, daytime snorkeling excursions and evening sunset cocktail cruises.

Teodoro used to work with his brother until they had a falling out over politics in the late 1980s. The national party politics at the caye are not as strong and blatant as in other parts of the country, mainly because of the community’s status as a village, which excludes it from certain classes of funding from central government. There are, however, strong supporters of the two primary parties, and signs promoting candidates and parties fill the light posts and yards during election years. This was the only intra-familial political rift someone offered to me, and I did not pursue the topic. In any case, Teodoro relies on his work from outside his family. His friend, Leonardo Montejo, is a medium producer and pays with a share of catch or wages, which range between $40 and $150 depending on the size of the catch. Teodoro’s 1996-99 average production is a modest 146 pounds.

Medium Producers

There are 45 fishermen that produce between 500 and 1600 pounds of lobster for the cooperative and they are spread throughout 37 households. The majority of these fishing households are local to the caye (32 of 37) and although the small number of migrant households prevents the calculation of a reliable $X^2$ statistic, the data presented in Table 5.22 shows that household origin does not make a difference in how the medium producers participate in tourism. That so few of the medium producer households rely on wage work in tourism is evidence that they are able to earn enough from fishing or have access to enough capital that they tend to own businesses or choose not to work outside of fishing. The group of medium producers is more varied than the large producers described below. This difference is a result of their differing stages in the household lifecycle, the changes in the number of traps a fisherman works through his career, and the different options households in each group have for work outside of fishing. It is rare
for a fisherman to enter the trap fishery with a large number of traps and for those leaving the fishery to exit it quickly. Larger producers become small as they gradually withdraw from the fishery and smaller producers grow into a larger operation as they increase their holdings or expand their effort by adding traps or shades to their current areas. Some medium producers are in this transition up or down; others simply are working at a level that meets their ability and overall livelihood strategy.

Like the large producers described below, medium producers consistently produce each year and are bound to the cooperative through its advantageous marketing arrangement and support services. The cooperative readily provides these fishermen with credit and other resources in order to keep their production with the society and in hopes that they may increase their effort and production. For the cooperative, these fishermen are a good credit risk because they depend on the cooperative to make fishing a viable livelihood alone or in association with tourism. Like the other groups of small and large producers, many of the medium producing households own tourism businesses. They have leveraged their success in fishing to participate in tourism as a means of improving their economic well-being and the overall quality of life for their families and community at large.

All but two of the fishermen in the medium group are trappers. Both of these fishermen are free-divers. One also works hauling traps with his father and supplements his cooperative production with the sale of tropical reef fish to an independent exporter. The other diver supplements his income from cooperative marketing with income from selling fish, conch, and lobster to restaurants and taking out tourists for guided fishing trips. Both of these divers are described below because they are unique among Caye Caulker divers in the volume of product they market with the cooperative. Because very few fishermen in the medium producing households originate from outside the caye and because there is no statistically significant difference between how local and migrant households in this group participate in tourism, the remaining other medium producing households described were selected to illustrate the range of tourism participation, regardless of whether they are from the caye or not. One of these households does not engage in tourism; one relies on wages earned from working in a tourism business; and two of the households have trap fishermen and own tourism businesses.
### Table 5.22: Medium Producers Household Origin and Tourism Involvement

<table>
<thead>
<tr>
<th>Tourism Participation</th>
<th>Household Origin</th>
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<td>Local</td>
<td>Recent Migrant</td>
<td>Total</td>
<td></td>
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<td>2</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Wage Laborer</td>
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<td>2</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Business/ Entrepreneur</td>
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<td>1</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>5</td>
<td>37</td>
<td></td>
</tr>
</tbody>
</table>

**Alfonzo Ramirez**

Alfonzo Ramirez was born on Caye Caulker in 1924; his wife, Isabel, in 1928 at San Pedro. Alfonzo and Isabel raised nine children at the caye, but only one, Alfonzo Jr., still lives there. Three of his children live in other parts of Belize and five have moved to the United States. Their children who live abroad regularly return to visit, annually or biennially, bringing grandchildren and gifts. Alfonzo particularly looks forward to the prime cuts of steak one of his sons-in-law packs for the family to enjoy at a barbeque with lobster. Neither Alfonzo nor Isabel work in tourism.

The couple now lives alone together in the two story wooden house in which they raised their family. In some respects their house resembles that of the Perez sisters described above, the main living quarters are upstairs and the kitchen and dining room are down. Their house sits on a large parcel of undivided land in the middle part of the village. As Sutherland (1986) described in the 1980s, fences have sprung up around most all yards to keep down the foot traffic and discourage thieves. Alfonzo, too, has a fence around his property, a sharply painted white picket fence, but the property remains in one piece, unlike several on the caye that have been divided or at least filled with additional houses to accommodate the owner’s children and their families. Another house for one of Alfonzo’s sisters is within the fenced yard, but according to the village tax records it is a separate lot.
Alfonzo has been a fisherman since 1947, when he began work in the fishery with his father. He joined the cooperative in 1963, being one of the few caye fishermen who did not organize to found the cooperative. He and other fishermen who did not join the cooperative from the start continued to sell to one or more of the foreign companies based in Belize City. By 1963 most of these remaining caye fishermen had realized that the cooperative was working and decided to join. Alfonzo produced lobster for the cooperative until 1990 when he resigned. He thought it in his best interest to withdraw the shares he had accumulated over the many years; however, he did not stop fishing and rejoined the cooperative in 1992 in time for the 1992-93 lobster season. Despite Alfonzo’s age he remains a vital fisherman, working over 300 traps in six areas spread throughout the fishing grounds from near the south end of Ambergris Caye to the back sides of Caye Caulker and Caye Chapel to the north point of Hick’s Cayes. More recently, since 1996, he has worked in partnership with his son Alfonzo, Jr. Between 1986 and 1996 his son was living in Belmopan and only returned infrequently to help with the traps, so during this time Alfonzo hired a helper for wages.

When I first entered Alfonzo’s neatly kept yard in 1995 he greeted me with skepticism, but that initial caution soon faded and I found a good companion in Alfonzo. I always enjoyed interviewing and visiting with Alfonzo because I could always count on him to be interested in the topics of fishing and the cooperative and patient with my intrusive and sometimes naïve questions. He enjoyed telling about the early days of the cooperative and how it has changed, how fishing and the livelihood of fishing has changed. He put it plainly early on, “Lobster is no longer a way of life; it is a business.” What the business means to fishermen and the difference in how they conduct it did not register with me until later.

In Alfonzo’s view part of this involves the increase in cooperative members who buy product from other members and turn around to sell it to the cooperative, the marketing option I described as filtering in Chapter Four. Alfonzo was the first to describe this type of intra-member transaction to me and it was in our conversations surrounding this type of marketing transaction that we got to know one another better. Alfonzo considers himself a small producer, but the volume of product he sells to the cooperative and his reputation as a mid-to large-sized producer place him here as a medium producer. This discrepancy
between his self labeling and what the cooperative data show is evidence for the small-scale filtering transactions in which he engages to enhance his production. More about filtering and its affect on the cooperative is presented in Chapter Six.

Isaac Mendoza

Isaac Mendoza lives with his wife Margarita and their three children, ages 1, 4, and 8, in a modest house on the very back side of the village. Margarita welcomed me warmly into their home when I first visited to conduct a census interview in early 1999, and it became clear immediately that I would be welcome to return and meet Isaac, which I did on several occasions. Like Mr. and Mrs. Ramirez, neither Isaac nor Margarita works in tourism. The location of their home is undesirable by most local standards due to the low lying land on this part of the caye and being located on the leeward side of the island, furthest from the windward breeze. Isaac’s three brothers and parents also live near the back, but all closer to one another and less remote from the main village.

Despite the poor and seeming unattractive location, Isaac has begun to develop this land into a comfortable living space. While he cleared and filled much of the land behind this small littoral strip, he maintained the mangrove tress behind his house on the shoreline, leaving him a more secure foundation and natural protection for his wooden, stilted house. The building faces east and the clearing opens the lot to accept some breeze in the evening, which brings relief from the most undesirable aspect of the location—mosquitoes and sand flies. To Isaac the location is ideal because the land was inexpensive and it was on the water, providing easy access to moor and maintain his boat and transport gear from it to storage under his house. A small natural marina runs the length of his lot on the north side. Although it is undeveloped, Isaac plans to build a dock along it for his boat. His success in building this home is a product of his hard work and dedication and at least partly due to his ingenuity in how he plies his trade as a fisherman.

Isaac is a young fisherman who primarily dives for lobster, but he also works in the trap fishery with his father Jose, a founding member of the cooperative. Jose is also a medium producer, with nearly 400
traps in four areas. Isaac is able to produce the quantity of lobster he does as a diver by supplementing this catch with what he produces with his father hauling traps. As a diver, he relies mainly on several shades he has placed in the areas of water where his father has traps. He has over 70 shades spread throughout three of his father’s four territories. He works with another diver, who is not listed in cooperative reports but who reported belonging to the cooperative. Isaac splits the catch with his father when trapping and his other partner when diving. In both partnerships, Isaac and his respective partner each contribute to the cost of gasoline and split the catch equally between them.

One thing that struck me most about Isaac was his hard work and thoughtfulness. Among the few divers I interviewed he stood out because of the careful consideration he uses in his work and the new ideas and opportunities he explores. One example is his involvement in the tropical fish market. Only three other fishermen on the caye reported involvement with this trade. It is a small market in Belize with conservative regulations overseeing export; although some fishermen and Belize FD staff mentioned some black market and illegal exporting. More striking to me was the way he dives lobster. He crafted a small hand net, something like a miniature version of the bully net, or hammo, to capture lobsters live when he dives. This simple and innovative gear allows Isaac to more carefully handle and select which lobsters he harvests. Additionally, it allows him to market whole live lobsters when the cooperative accepts them (it did not in 1999, but did for other years through the 1990s), a more valuable product requiring less labor investment for fishermen because it eliminates the tedious task of tailing off the catch.

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34 This other diver is in a household that has recently moved to the caye and he is one of two divers who reported cooperative membership but whose names do not appear in any of the cooperative documents I collected and analyzed: Annual Reports, the 1997 membership roster, or the second payment schedules for 1996-1999. Two things occur to me regarding this discrepancy. First, one or both of these fishermen could have another name, as one went by a shortened name like Tommy for Thomas, but none of the common formal names for this abbreviated name nor any of the surnames matched this fisherman in the cooperative reports as far as I could tell. Second, it could be that Isaac actually delivers all of the catch in his name and pays half its value to his diving partner. This explains his relatively high production for a diver, but is not consistent with his description of their arrangement. In any case, I did not count these two fishermen as cooperative members.
Phillip Chun

Phillip rents a small apartment on the third floor of a large wooden house owned and occupied by a trap fisherman. Phillip’s brother Rene lives with a friend in another small flat they rent from another fisherman; the three of them share a common Mayan heritage and Phillip is the only non-Spanish Mayan fisherman on the caye. Phillip and Rene were raised in a small village in the Toledo District in southern Belize. Phillip moved to Caye Caulker in 1992 and has been fishing ever since. Rene only recently moved to the caye in 1999 and was not yet committed to making the move permanent.

Phillip’s work ethic is praised by the several trap fishermen who know him, several of whom live in the households nearby his apartment. The house in which Phillip’s apartment is located next to Reymundo Guerra’s home and I spent many days between these two yards and on the owners’ jetties in front of them. Another single fisherman rented the ground floor apartment where Phillip lived; he described Phillip’s ceaseless work “Dat bali deh, hihn da werk, werk, werk aal alang. Hihn da wan masheen.”35 Fishermen frequently commented on Phillip’s dedication to fishing in this way and it was rare to find him sitting still or relaxing.

Phillip dives at the reef, has over 30 shades in areas throughout the Northern Lagoon around the caye, and makes the long journey to the outer atolls for lobster and fish. He sells most of his catch to the coop, but he also supplies restaurants with whole lobster and lobster tails, fresh fish, and conch on a regular basis. In addition to the restaurant marketing, Phillip also takes tourists on guided fishing trips to the reef and outside the reef in the blue. Phillip owns a few rods and reels and a down-rigger for this sport fishing endeavor and some of his friends, like the fisherman whose observations I included above, refer tourists to him. While some fishermen specialize in tourism sport fishing—like Ignacio Hernandez, a small producer I will introduce in the following section, Phillip arranges these trips on a part-time basis only.

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35 The translation of this Creole is, “That guy [Phillip] there, he is working all the time. He is a machine.”
Nadir Montejo and his wife Rosalba were both born at Caye Caulker. Two of their five children live in the United States, the rest live on the caye. Their son Carlos (described above as a local non-fishing household) and his family live on a small adjacent property his father split off for him. Their oldest daughter Francine, 34, and youngest son Luis, 19, live with them in the second floor of the wooden building that also houses one of the caye’s oldest full service restaurants. Rosalba manages the restaurant and Nadir now minds the till after having retired from lobster fishing after 50 years. The restaurant was opened in 1984 as a supplement to Nadir’s fishing income and now it provides their primary income. Francine used her Sixth Form education to secure a stable job in the branch bank on the caye, allowing her to support herself and contribute to the household.

Nadir left school and began fishing full time after Standard two when he was 12 years old. All of Nadir’s brothers and most of his brothers-in-law at the caye are cooperative members and have worked their entire lives in the fishery, as Nadir has. He started with lobster pots and beach traps in the 1940s and 1950s. Carlos worked with him for a time until he left fishing to open his bar. In 1996 Luis began fishing with his father. He started part time while also attending high school in Belize City, but has since left school to work full time since his father left the fishery, giving his traps to Luis. Nadir remains on the cooperative’s list of members, but quit delivering in 1997. Like his sister, Luis also is able to provide for himself, but also contributes to the household with his income from the lobster fishery.

This household is a typical example of how local fishing families leveraged income and other resources from cooperative fishing to develop tourism. As early adopters, Nadir and Rosalba have made a name for their restaurant, which is written up in several guidebooks as providing inexpensive and tasty local cuisine. While tourism investment has provided the additional income that put all of their children in high school, it is still part of a dual economy dependent on foreign trade having up and down times throughout the year. Nadir explained how income from the restaurant is very seasonal and that they have felt the impact of competition from the several new restaurants that have opened more toward the center.
of the village and on the front street. Luis’ ability and interest in continuing with the family’s fishing operation and his sister’s non-seasonal work in the bank help keep the household’s income secure.

Felipe and Eduardo Guerra

The Guerra family has a long history on the caye. Gerardo Guerra and his two sons Felipe and Eduardo were introduced in Chapter Four as a typical example of a fishing operation organized by the traditional kin-based work group and the details of their fishing operation is described above (pages 89-90). Between 1996 and 1999, each son produced an average catch of about 1200 pounds, placing them at the top end of the medium producers’ distribution. Some of the fishermen I interviewed listed all three fishermen together as large producers. However, with how I have defined fishermen’s production levels based on household rather than fishermen’s work groups, they are included here as medium producers.

Felipe and Eduardo live in separate households near their parents’ home. Both of their wives work only in the home, caring for their children and maintaining their households. In addition to their fishing operation, Felipe and Eduardo are partners in a tour guide business that specializes in snorkeling. They began taking tourists to the reef in 1985. At that time they were informally organized. They transported tourists to the reef with their fishing boat as the opportunity arose. Over the course of the next 12 years they accumulated specialized knowledge of the local snorkeling sites and adjacent reefs. They trained two other guides who now work for them and in 1998 they formalized their business and opened a small office on the front street near Felipe’s home. In this recent expansion they also purchased two 25 foot guide boats that are specially equipped to accommodate tourists with easy access in and out of the water, canvas canopies, and plenty of dry storage space.

Both brothers are active in the Caye Caulker Tour Guide Association (CCTGA) and other community organizations. Eduardo is more engaged than Felipe, however. Eduardo is a special constable, has served on the village council for over 10 years, and has run for a seat on the cooperative’s managing committee several times since joining the cooperative in 1984. Through the education and training required to earn their tour guide licenses they have recently adopted a conservationist ethic that they now work to apply to
their fishing and tourism businesses. Their experience in the fishery, their education and training, and a daily contact with “eco-friendly” tourists have made them well aware of their dependence on the ecosystems from which they derive their livelihoods and that maintain their families’ well-being.

Although Eduardo and Felipe both reported they do not need cooperative credit in order to prepare for or sustain their families through the lobster season, they both have used cooperative credit in all but two years since 1984. However, unlike many fishermen in recent years, they have not accessed credit in excess of what they are able to produce in lobster and have received handsome second payments in most of these years. Their ability to pool resources among three households and work closely for mutual benefit has paid off; they produce substantial quantities of lobster that provide high incomes. Their historically consistent production allows them to access credit when they need or want it. Again, these fishermen exemplify the advantages that cooperative organization has conferred to local households on the caye. By nurturing their relationship and using the strength of the traditional kin-based relations of production, these brothers have been able to sustain and grow their fishing and tourism businesses; advantages that have strengthen their business and increased their security and well-being.

Melvin Hernandez

Melvin is a young fisherman who hauls traps with his father and sometimes his older brother, Antonio Sr. and Jr. respectively. Both his father and brother have worked for several years as fishermen in the cooperative and have served more than once on the Managing committee: Antonio, Sr. through the 1970s and Antonio, Jr. in the 1980s. Only Antonio, Jr. has run since 1990, but has not been elected, a common fate for most candidates from the caye since the influx of members from Sarteneja. Melvin lives with his wife Gina and her sister in a small three room house on the same lot as his parents. At the time of the census in 1999, Melvin was 30 and Gina 27. While Melvin’s primary livelihood is fishing, he also works as a tour guide during months when lobster fishing demands less of his time. Gina works full time outside the home as a cashier in a gift shop catering to tourist.
Melvin’s production between 1996 and 1999 averaged just over 800 pounds. Melvin primarily works with his father and his other brother Martin, who lives with their parents. The three of them split their catch in equal shares. Cooperative records confirm this, as Antonio, Sr. and Martin’s average production is just less than 800 pounds. When Melvin works with Antonio, Jr. he is given the choice of taking a share of the catch for himself or being paid a daily wage; most of the time he takes the cash payment. Both Antonio, Sr. and Jr. place shades in their territories and the three sons dive them as well. They will also on occasion market snapper to the cooperative when lobster is slow. Melvin regularly accesses credit through his cooperative account and reports that “it is pretty hard to make it at the beginning of the [lobster] season” without help from the cooperative. In recent years he has used cooperative credit to buy materials for traps and a new engine for his boat, the one he, Martin, and their father use to haul traps. He continues to produce lobster at a consistent rate, but has not seen a substantial second payment check since the season ending in 1993.

Large Producers

Eight cooperative fishermen at the caye are large producers. Seven of these fishermen are the only fisherman in their household. The eighth fisherman, Esteban, was introduced in the previous chapter’s discussion of different ways production and work is organized in the trap fishery; he relies on a mixed strategy of working with his sons and hiring labor to help hauling his traps (see Chapter Four, pages 89-90). Other fishermen among this group work together with other fishermen, but in most cases their partners or hired hands belong to other households and have their own share of production they deliver to the cooperative. In addition to the eight households with large producers in them, two other households have two fishermen (both father and son teams) who work together to average over 1600 pounds of lobster. Individually, each of these four fishermen produces at a medium level, but because they are working for and within the same household they are included with the group of large producers in this discussion. Among all of the fishermen in these ten households, only two are not “caye people”. The
examples of large producers presented below include two of the local large producers and the two fishermen who are not originally from the caye.

All large producers are wealthy by local standards. They have several hundred lobster traps, work with other fishermen (as partners, by traditional kin-based relations of production, with hired labor, or using a mixed strategy), and sell nearly all of their catch to the cooperative. They are typically loyal and long-time members and depend on the cooperative for credit and supplies. The cooperative is glad to provide these resources to them because they deliver large quantities of product and, in turn, repay the accounts they have with the cooperative.

In addition to their lobster operations, several larger producers own other businesses. These large producers have helped build the cooperative through their consistently high levels of production and loyalty to the society. Like the small and medium producers, they have leveraged their success in fishing to start-up tourism and other businesses, which has enhanced their wealth and status and bolstered the local economy. Their enterprising efforts provide jobs and services that promote local wealth accumulation, rather than having it siphoned off to Belize City or some foreign nation; in turn, this brings economic and social benefits to the island community for those in and outside of the fishing economy.

Victor Hermosa

Victor Hermosa was in his late 40s in 1999. He and his wife Marleny have three children, ages 6, 14, and 22 in 1999. He first came to Caye Caulker in the late 1960s to work building the cooperative receiving station. Victor liked the opportunities he saw on the caye and felt that with disciplined hard work and ingenuity lobster fishing within the support of the cooperative could provide a very good living. It turns out he was right.

Victor began fishing in 1970 and joined the cooperative in 1972. He purchased a small 14 foot wooden skiff with an outboard engine of modest horsepower to set and haul the 75 traps he built for his first year at sea. Through 1975, he gradually increased the number of traps he worked to 250. He maintained this level for ten years and then between 1985 and 1991 he slowly expanded again until
reaching 600 traps. Victor was still working 600 traps in 1999. In addition to the traps, Victor has several shades placed throughout his territories. When the three of them harvest the shades, Victor captains the boat while the other two fishermen dive. Victor is a strong proponent of the value these artificial habitats bring to his fishing operation and the overall productivity of the fishery.

He worked alone until 1985 when he entered into a partnership and share arrangement with one of Marleny’s brothers, Bartolo. Victor began paying Bartolo the value of 1/3 of their catch until Bartolo joined the cooperative, at which time he simply delivered 1/3 of the catch to the cooperative in his name. In the late 1980s another one of his brothers-in-law, Lawrence, joined the cooperative and joined Victor’s fishing operation in the early 1990s; he eventually moved to the caye in 1994. In 1991 they began splitting the catch in quarters, a share to each fisherman and an additional one for Victor as the boat owner and principle contributor of capital for materials and maintenance. The allocation of catch among this group will be transitioning back to equal thirds as Lawrence and Bartolo assume some of the responsibility and financial obligation to maintain the traps and boat. In 1999, Victor’s partners were both medium producers.

In addition to the successful fishing operation, Victor and Marleny are involved with two other businesses. Marleny manages a shop in the lower level of the two-story concrete building in which they live; the second story serves as the family’s residence. Marleny, sometimes Victor, and their 14-year-old daughter typically tend the register, but they also employ between two and four others in different times of the year with the ebb and flow of the tourism seasons. Victor also owns a water taxi and belongs to the Caye Caulker Water Taxi Association (CCWTA). He rarely pilots the boat anymore, choosing to hire a driver to oversee its operation, but remains involved with the association, keeping alive his stake in this vital node of the tourism transportation infrastructure. Their oldest son is a successful and ambitious student, soon to be professional, as he was completing his MBA at an American university in 1999. While he is interested in the family business he will not take over his father’s fishing operations. He has interests in pursuing his own career path outside his natal household now that his formal education is
complete. However, during the few months he was on the caye in 1999 he had provided some management consulting to the CCWTA.

Ceasar Montejo

Ceasar Montejo has lived at the caye all of his life. His father and mother moved to the caye from the Yucatan before he was born, his father working in the lobster fishery. In the early 1950s at age 12, Ceasar joined his father working at sea and later joined the cooperative in 1963 after beginning to work on his own. He worked in lobster and scale fishing and oscillated between working alone and with a relative, usually one of several cousins or nephews living on the caye. Today he works over 1400 traps with the help of his son-in-law, Marcelo, and a brother-in-law, Augusto. Like Victor’s arrangement, Ceasar works in a shares system with his kin, splitting the catch in quarters, taking two shares for himself for his labor and as the sole owner of the traps and boat. “They have no expense,” he explained.

Ceasar and his wife Tamara have five children—four daughters and one son. Their oldest (Maria, 30) and youngest (Jasmaine, 13) daughters live with them, along with Maria’s seven year old daughter. Ceasar, Jr., 19, boards in Belize City while attending Sixth form and Evette, 25, works in the healthcare industry in Miami, Florida. Their last daughter, Carmita, and Marcelo live in a house on the opposite end of their lot. Ceasar and Tamara are also involved with the caye’s tourism economy, owning a hotel, restaurant, and golf cart taxi service.

Their hotel is a large two story concrete building, one of the early large hotels on the caye offering private baths and air conditioning. The restaurant is located nearby and offers a more rustic island ambiance, with its wooden construction and seaward views. While Ceasar can sometimes be found behind the hotel desk, enjoying an evening breeze outside the office, or watching the bar in the restaurant, Tamara is the principle manager of both the hotel and restaurant. Maria, Carmita, and Marcelo provide labor for the hotel and taxi service, but the large majority of the work in these businesses is supplied by labor they hire out—cooks, wait staff, dishwashers, and house cleaners. Ceasar also contributes lobster and other seafood to the restaurant. While he does not supply enough or enough variety for the
restaurant’s entire demand, his contribution is one way they can reduce their overhead. The kin-based labor pool and Ceasar’s contribution to the restaurant’s menu are common examples of how most tourism businesses, particularly those run by local fishing families, leverage surplus resources from their household and work in fishing to buttress and grow the earnings in their tourism enterprises.

Efrain Samos

One difference between Efrain Samos and the previous large producers, Ceasar and Victor, is that he moved to the caye more recently, in the mid 1980s. His place in the island’s socio-economic milieu is unique in that he arrived after the initial boom in lobster fishing in the early 1980s, is from Sarteneja, and has worked to find a niche in the locally controlled tourism trade. Another difference between Efrain and the others I have written about above is that I did not spend a lot of time with him. I interviewed and engaged Victor with conversation about fishing and the cooperative on several occasions, visited his shop every week, and got to know his oldest son after he returned from the United States. I did not speak with Ceasar as frequently, but he was more visible and vocal at cooperative and village meetings and his hotel was located between my flat and Reymundo’s house, one of the fisherman with whom I worked most closely. Therefore, it was easy for me to stop and visit Ceaser if he was sitting outside his hotel. I had frequented Efrain’s shop for soda, beer, and water during my first stay at Caye Caulker in 1995, but I did not know then that he was a fisherman. He was always at the store in the evenings and I had assumed this was his primary livelihood during my brief initial tenure on the caye. It was not until I interviewed his wife, Lenora, for the village census that I found out he had been a fisherman for over 20 years.

Efrain, Lenora, and their five year old daughter live in the upstairs of a two story wooden building. The ground floor houses the small shop. They have lived here and run this small grocery for eleven years. Efrain’s oldest son, Trenton, is from his first marriage. Trenton attends school in Belize City and splits his time between the city and the caye. When at the caye he divides his time between his parents’ homes and works part time hauling traps with his father. Trenton joined the cooperative in 1998, producing a small to moderate amount of lobsters in his first two years as a member—200 and 700
pounds, respectively. Efrain worked as a diver from his early years when living in Sarteneja, as nearly all other fishermen from that village, until moving to the caye and entering the trap fishery. Efarin’s production is at the low end of the large producers group, averaging just over 1600 pounds between 1996 and 1999.

The small store the family operates offers a wide variety of staple groceries, ice cream treats, and other locally appropriate necessities and niceties that parallel what one might imagine in an American convenience store. Lenora works in the shop in the daytime and the two of them share minding the store in the evenings. Efrain can be found sitting behind the counter occupying himself with a newspaper or the television, in front of the store relaxing in his hammock, or perched on the stairs that ascend to their residence. His daytime hours are spent between lobster fishing and driving his water taxi. Efrain has run his water taxi between the caye and Belize City for 15 years and, like Victor, he belongs to the CCWTA.

Marco Chavez

Marco Chavez was born in Yucatan, Mexico and has been fishing in Belize for over 30 years, starting as a diver before building his first traps in 1970. He works nearly 1000 traps spread across four areas around one of the cayes between Caye Caulker and Belize City. Because of his areas’ proximity to the city he will occasionally deliver his product there to receive the extra .15$ per pound the cooperative offers as incentive to reduce their costs in transporting lobster from the receiving station at the caye to the processing plant in the city. His average production between 1996 and 1999 is over 1900 pounds.

Neither Marco nor his common-law wife, Rosa, works in tourism. Rosa had previously been married to one of the cooperative founding members, Ricardo, and has several children from that marriage, some of whom live on the caye, but most have migrated permanently to the United States. Rosa and her ex-husband have an amiable relationship and Marco also gets along well with him; in fact they share many of the same values and views in relation to the cooperative and the changes it has experienced through its growth. Ricardo will also bring fish and other gifts to them. Both Marco and Ricardo are vocal members, but Marco is more so in recent years as Ricardo has grown apathetic. Although Marco is not from the
caye he is accepted by many local fishermen as one of their own. His acceptance into the community is not diminished by his willingness to stand up and speak his mind and to ask difficult questions of the cooperative’s leadership.

**Economic Success, Revisited**

The cooperative has brought economic well-being and, in turn, has improved the socio-economic well-being of the fishermen. This is largely the result of being able to accumulate the economic returns, the value their labor in the fishery creates—to keep wealth and economic gains locally to re-circulate these benefits through the community from which they were derived. This chapter has demonstrated this by showing how fishing households and local households are less dependent on tourism relative to non-fishing and migrant households, but that when local and fishing households do engage with tourism they are more likely to own tourism businesses than households whose members have migrated to the caye or who are not involved with lobster fishing. Moreover, those local households not currently involved with lobster fishing are either tied closely to one or more fishing households or someone in the household worked in the lobster fishery in the past, as, for example, several of the local households described in the previous section (see Tables 5.10, 5.11, and 5.12, pages 142-43).

During the period between 1970 and 1990 when the fishing households of Caye Caulker realized increasing prosperity through self-determined economic development, the cooperative was going through its own transformation. This chapter focused on the population of fishermen in the village of Caye Caulker to document their economic success. The next chapter looks into the effects of the cooperative’s success outside of the caye among its entire membership, and how this success has, and may in the future, affect caye fishermen’s continued prosperity and their cooperative’s resilience.
Chapter Six

The Effects of Membership Growth on Marketing and Credit in the
Northern Fishermen Cooperative Society

Although caye fishermen are well off relative to fishermen from other parts of the country, they see
the source of their prosperity as being threatened because of changes in the cooperative’s membership
structure, commitment, and opportunities for monitoring. The cooperative fishermen with whom I spoke
at Caye Caulker are most concerned by the membership’s growth and its changing composition since the
early 1980s. They are concerned with how these changes have affected how the cooperative is run and
the subsequent increases in costs to carry out the business of producing and marketing seafood. Several
cooperative fishermen have grown frustrated and apathetic in recent years as a result of these changes in
the cooperative.

This chapter describes some of the behaviors, institutional changes, and events that lead to what caye
fishermen see as a precarious fiscal position for the cooperative. In order to understand some of these
changes it is important to understand how the cooperative is organized, so I begin with an overview of its
organizational structure, how its leaders are chosen, and how decisions are made regarding its normal
business transactions and in allocating credit to members. From here the chapter turns to describe how
cooperative reports and fishermen classify members’ marketing and loan behavior. Changes in the
cooperative’s membership through its growth over the past 40 years are summarized. A description of the
filtering transactions introduced in earlier chapters brings the previous sections together to show how
membership marketing and commitment have changed with the membership’s growth and changing
composition. Lastly, I present some of the caye fishermen’s ideas about and actions responding to
increasing member debt and decreasing member loyalty resulting from this growth.
Common-Pool Credit in the Cooperative:

The Structure of a Multi-Tiered Collective Action Problem

Fishing cooperatives in Belize are marketing institutions first and foremost. They are organized to provide economic benefits to members. A cooperative’s collective production can be marketed together at reduced costs and increase returns per pound to all members who sell their catch to it. However, for this collective marketing arrangement to work, members must commit to selling their product to the cooperative in order that it can meet its contracts to deliver seafood to buyers overseas.

Fishermen’s decision to market their catch to the cooperative is a first order collective action problem. If all members sell their lobster to the cooperative then the cooperative can negotiate greater prices for this large aggregate catch by capturing efficiencies through economies of scale. Other rules also contribute to the increased returns of this arrangement. Some of these rules are supplied by resource management legislation and are intended for conservation purposes, but have residual effects in cooperative marketing as well; for example, not delivering damaged, soft, or mauger lobsters so that the catch is of consistent high quality.

As the Northern Cooperative’s membership grew in the 1960s, it began providing credit to fishermen as a means to increase the volume of lobster they could produce. The cooperative made it easy for members to finance the expansion of their effort and to modernize and experiment with fishing gear, methods, and technology. In this regard, credit has been the engine behind the society’s growth; the fuel for this engine has been members’ continued commitment to marketing.

The cooperative is able to provide credit services to members by securing loans from banks and other institutions against the value of the product that members are expected to deliver after the lobster season opens. These loans cover operating expenses and supply members with credit so they may prepare for the lobster season. According to this structure, the cooperative manages two levels of credit—institutional credit that the cooperative holds and credit that it allocates to members’ accounts. The cooperative’s managing committee distributes credit to members through an application process and bases their allocation decisions on members’ past production and perceived merit for the intended use of the funds.
In this way, the credit the cooperative provides to its members occurs as a common-pool. Access to this credit pool is determined by members’ marketing relationship with the cooperative. The Cooperatives and Credit Unions Act of 1948 structures the terms of repayment. This legislation states that cooperatives must collect debts members owe to them by deducting the value of the products they market to them. The Northern Cooperative’s common credit pool is structured as a second order collective action problem tied to the initial problem of members’ commitment to marketing. Therefore, in both the first order collective action problem with marketing and in the second order dilemma with common pool credit, members’ primary obligation to the cooperative is to sell their catch to it.

Historically, there are three types of credit fishermen have accessed from the cooperative. The most widely used credit is called members’ accounts receivable. Upon Managing Committee’s approval, members’ accounts are credited to purchase boats and engines and to cover expenses necessary to start the season, such as materials to build traps, gasoline, ice, and other supplies for longer trips at sea. Another form of credit, which was widely used in the 1960s and 1970s, is what most members view as a personal loan they call an advance. Members use money advanced to them for fishing related expenses and for other things outside of fishing, sometimes with and sometimes without the managing committee’s knowledge. A third form of credit comes from the Development Finance Corporation (DFC) of Belize. While these funds are distinguished on cooperative records, they are functionally equivalent to the loans fishermen receive from the cooperative recorded under their accounts receivable. Today the cooperative accounts for all loans under members’ accounts receivable.

Fishermen and cooperative management report that members sometimes use these funds for medical emergencies, travel expenses, home improvements, their children’s education expenses, and to simply have some spending cash to get through lean months between the tourism and lobster seasons; as in Manuel Santos’ request for his wife’s medical care. The cooperative no longer uses advances as an accounting category in their annual reports, and in recent years all credit is accounted in cooperative annual reports under members’ accounts receivable.
The cooperative collects payments on a member’s account by garnishing their first payment receipts between five and ten percent. The amount deducted from the first payment depends on the type of credit. Any remaining balance on a fisherman’s account at the end of the fiscal year is subtracted from the member’s liquidation (or second) payment. Members with outstanding balances greater than the amount of their second payment will continue to have their first and second payments garnished until the account is paid in full.

Fishermen’s willingness and ability to wait for the deferred compensation of the second payment is at the root of the greater overall financial benefit this collective marketing arrangement provides, and members’ commitment to marketing to the cooperative is of equal importance. The weakness of this system is that members can easily leave the cooperative without paying off their debts. This is a source of concern and frustration for loyal members because they end up paying for the interest and unpaid principle of both delinquent members who leave the society and those members who continually assume more debt than their production can cover. No matter how the accounting is structured to write off the debt, the net result is that the amount deemed uncollectible is an expense of doing business and these increased expenses diminish the collective profit from lobster sales and the individual returns of loyal fishermen who have marketed their catch to the cooperative.

Despite these challenges, the fishermen of the Northern Cooperative have succeeded in providing and maintaining the common credit pool. Their success in collective marketing has provided for their economic prosperity, and has attracted more fishermen from outside their community who desire a share of it. Many of these fishermen belonged to other cooperatives, but these cooperatives failed because their members did not follow the collective level rules that conferred individual advantages designed to promote economic success. The Sarteneja cooperative failed because its members stopped selling to it. Without member commitment to marketing, the cooperative was unable to collect money from members with outstanding accounts, which undermined its ability to pay debts it had with external institutions. The growth of membership in the Northern Cooperative from former members of the failed cooperative
concerns many Caye Caulker fishermen because they feel as though these new members have taken over their cooperative and are driving it to ruin just as they did with their first one in Sarteneja.

The theory presented in Chapter Three predicts that the Northern Cooperative’s collective action problems are challenged by the membership’s increasing size and changing composition, in both the first order problem of marketing and the second order problem of credit. These relationships will be tested in the next chapter. The remainder of this chapter provides more ethnographic context to support these relationships, which bring together fishermen’s views of their problems and the theory that aims to describe and understand them.

**The Northern Cooperative’s Organization, Membership Composition, and Growth**

The Northern Cooperative has grown from a small business run from a thatch-roofed house on Caye Caulker to a multi-million dollar seafood-processing and marketing operation with member-owners who live and fish throughout Belize. One fisherman put it aptly when describing the cooperative’s business, “This is no panade shop.”36 Although the cooperative’s growth has transformed it, many of the same structures and rules in place when it was founded remain in effect today.

Figure 6.1 shows how the cooperative views its organizational structure. The membership is comprised of fishermen who must apply to the cooperative’s managing committee and purchase BZE$5.00 in shares on their acceptance into the society. New members go through a probationary period of two years. During this time, new members must demonstrate their ability and commitment to fishing by delivering at least 300 pounds of lobster tails (or other specified amounts of other products). New members inducted into the society who are still minors are sometimes called junior members. Northern also gives special recognition to its founding members, the fishermen who were involved with organizing the cooperative; their names are distinguished in the list of members in each year’s Annual Report.

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36 *Panades* are small fried corn tortillas filled with any number of varieties of minced fish. One or two people will set up a little shop or table along the street to sell them during lunch or around highly trafficked areas outside bars on weekend evenings.
Figure 6.1 NFCS Organizational Chart (source: NFCS Annual Report 1979)
The Managing Committee (MC) is comprised of members who are chosen by the general membership to lead and manage the business. The MC structure is dictated by the Cooperatives and Credit Unions Act of 1948 and is a part of all Belizean cooperatives. The Northern Cooperative’s MC is comprised of seven members who must be active members of the cooperative. In April or May, before the lobster season opens in June, the cooperative holds its Annual General Meeting (AGM). At this meeting, the membership elects members to serve on the MC. Unless special circumstances arise, four of the seven MC seats are required to be filled each year during elections at the AGM. Members vote for up to four candidates, one vote for each vacant position, and members must be present at the meeting in order to cast their votes. The three members receiving the most votes serve for two years and the member with the next highest number of votes serves a one-year term. Annual Reports provide the results for the previous year’s elections as part of the meeting minutes.

While the members are owners and producers for the cooperative, several other roles and jobs are necessary to run the business. The cooperative employs an executive secretary, accountant, plant manager, security guards, clerical office staff, and laborers to receive, process, package, and store the members’ seafood in the plant. The executive secretary and accountant are the most directly involved with the MC and the management of financial matters, such as determining what the cooperative can pay for the second payment and what amount will be capitalized into members’ shares or given in rebates. The secretary and accountant work closely with the MC on these matters, but the MC is the governing body responsible for the society’s business. Other MC responsibilities involve admitting new members; resolving conflicts that arise among members and between members and individuals or institutions outside of the cooperative; deciding about development, marketing, and other business ventures for the cooperative; and deciding on credit allocation to members (including the members on the MC).

The organizational chart does not reflect additional distinctions made among the general membership based on their marketing and credit behaviors; however, these classifications are provided in the list of members in the cooperative’s Annual Reports. The following section describes how the cooperative and fishermen classify members in regards to their production status and commitment to the cooperative.
Two typologies of cooperative members are presented below, one based on members’ marketing behavior and one on their loan repayment behavior—producing/non-producing members and member loyalty/delinquency, respectively.

**Formal Statuses and Informal Labels: Discerning Member Productivity, Loyalty, and Delinquency**

Because fishermen’s marketing is the litmus test of their loyalty to the cooperative, their production status with the cooperative is a clear way to observe their commitment. The cooperative lists all members in their Annual Reports as either producing or non-producing. The terms describing members’ combined marketing and credit behavior are less formal and not explicitly designated in reports. References to this pair of classifications are found through the reports. Reprints of committee members’ speeches to the membership and other addresses given by invited guests call for members to be loyal to their society by selling their catch to the cooperative and not to over-extend their debts with it. Moreover, the mantra appears printed on the inside of the front and back covers and on the extra pages at the beginning and end of the report: “This is your Cooperative…BE LOYAL TO IT!”

Members also commonly talk about how other members are delinquent or loyal when discussing the behaviors of other fishermen. For these reasons, these descriptors are not easily ascribed to members without supplementing cooperative records with qualitative empirical data collected through interviews and observations. The first two categories are related specifically to member commitment in marketing, the cooperative’s first order collective action problem, whereas the latter two illustrate how the second order problem of member credit is nested within marketing.

Though there is some variation in how cooperatives define different types of membership statuses, all of them distinguish between producing and non-producing members. Producing members deliver a specified number of pounds of product in a given year. The amounts to maintain the status of a producing member are set by the managing committee and can only be changed through a majority vote in a membership meeting. For lobster fishermen, this amount is 100 pounds of lobster tails. Equivalent amounts are set for other marine species, such as conch and fish. Members who do not deliver any
product or consistently fall below minimum levels of production are classified as non-producing members. Non-producing members are occasionally expelled from the cooperative if they remain inactive for several years.37

A member’s ability and commitment to market his catch with the cooperative and repay his outstanding accounts with it indicate his degree of loyalty to the society. A loyal fisherman is one who sells his catch to the cooperative. If you were to split hairs about what really constitutes a loyal member, a corollary would add, “and to the cooperative alone.” Member loyalty in delivering their catch to the cooperative is significant in two ways. First, the cooperative needs to fill the orders made by foreign companies buying their products. To maximize their return on sales, the cooperative needs a large volume of product from which to select the highest grade and to meet buyers’ requirements for these grades. Second, the only way that the cooperative can recoup the money it has lent to its members is by deducting this amount from the value of the product members deliver to it. When fishermen fail to deliver to the cooperative, the cooperative cannot collect the debts they owe to it. Others refer to them as delinquent members and when describing a member’s status with the cooperative, fishermen use the terms non-producing and delinquent interchangeably. In most cases, this is accurate; however, because of the complex relationships created through filtering, not all members who are delinquent are non-producing.

Table 6.1 shows how these categories intersect. Each cell provides a brief description of the relative number of members falling into each category and some examples of past and present cooperative members that were introduced in Chapter Five. Some members may simply not deliver to the cooperative and take the money and run, as it were, by filtering or selling to a restaurant, leaving their debt with the society. Other delinquent members continue fishing, but they only deliver a portion of their catch to the cooperative, an amount less than is necessary to pay off the balance of their debt with the cooperative. They sell the bulk of their production to other members, to other cooperatives, or to restaurants. Some delinquent members maintain a minimum level of production to remain on the producing membership

37 Other cooperatives provide lists of probation members, consisting of both new and delinquent members.
list, chip away at their accounts receivable, and remain eligible for Christmas Bonuses. Therefore, in theory, producing members can be delinquent as well. For instance, if a member owes a large sum of money to the cooperative, but only delivers a few hundred pounds of lobster tails to the cooperative, he is considered “producing,” but is also delinquent in repaying what he owes the cooperative. This position in Table 6.1 defines a member’s loyalty in the middle of the scale. This grey area is never explicitly acknowledged in the cooperative’s annual reports, but it is described by many fishermen who related their frustration about what they see as abuses by the managing committee who accumulate debt over several seasons of taking out large sums of money beyond their capacity to repay in a single season.

<table>
<thead>
<tr>
<th>Degree of Loyalty to the Cooperative</th>
<th>Member Production Status with the Cooperative</th>
<th>Non-Producing Member</th>
<th>Producing Member</th>
</tr>
</thead>
<tbody>
<tr>
<td>high</td>
<td>Loyal</td>
<td>Few, retired but have not cashed shares, perhaps no outstanding accounts and have quit fishing, not producing but account is &quot;in good standing&quot; with the cooperative; example: Ramon Guerra</td>
<td>Many, delivers all or most of their catch to the cooperative and it is the product of their own labor; examples: Victor Hermosa, Cesar Montejo, Isaac Mendoza</td>
</tr>
<tr>
<td>Disloyal</td>
<td>Few, perhaps no outstanding accounts but delivers outside the cooperative, may include some &quot;sellers&quot; in filtering; examples are difficult to provide without access to cooperative reports</td>
<td>Some, perhaps several, includes &quot;buyers&quot; and &quot;sellers&quot; in filtering, produces but only delivers some of his catch to the cooperative; examples: Alfonzo Ramirez, Luciano Castillo and his sons, Largest Producer in Figure 5.3</td>
<td></td>
</tr>
<tr>
<td>Delinquent</td>
<td>Several to many, stopped marketing with cooperative and has left outstanding debts with it, includes &quot;sellers&quot; in filtering; examples: difficult to know without cooperative reports, perhaps Carlos Montejo</td>
<td>Few to some, may include some &quot;sellers&quot; in filtering, producers but only delivers a small portion of his catch to the cooperative; examples, the &quot;Low producing&quot; Large producers in Figure 5.3</td>
<td></td>
</tr>
</tbody>
</table>

Table 6.1 Matrix of Factors to Describe Member Commitment
For example, the member delivering the smallest amount of lobster between 1996 and 1999 in Figure 5.3 (number 999.0) was listed by his peers as a large producer because of his historical high level of production and that he works over 1000 traps with his sons (one of which appears at the opposite end of the line graph in Figure 5.3, number 997.0). This fisherman is also on the managing committee, and nearly every fisherman interviewed at Caye Caulker reported that he has the largest amount of loans outstanding with the cooperative. The cooperative data on catches does not suggest that he is buying lobster from other members to filter for a profit; however, because it is likely that he has loans far exceeding the value of what he has delivered between 1996 and 1999, and he helped produce some of what his son delivered, fishermen describe him as either delinquent or disloyal.38

Most NFCS members are loyal producing members, but the number and percentage of non-producing and delinquent members has increased over the years (Figure 6.2). The members I interviewed from Caye Caulker consistently report that 90% of the non-producing members listed in the NFCS annual reports are delinquent members.39 Loyal, productive members suffer from both member non-productivity and delinquency because these members leave debt and interest payments with the cooperative. These expenses are paid by the rest of the producing membership, which then experience lower returns on their second payments to account for increased expenses associated with the additional interest paid for the delinquent and non-producing members’ outstanding accounts. Before getting to the details of filtering, the next section looks at how the membership has changed in regards to the marketing and credit behaviors presented in this section and in Table 6.1.

38 I do not know with 100% certainty what is going on here with this fisherman and his son in terms of loyalty and delinquency because of the nature of working groups and not having access to this fisherman’s file and cooperative account. Without looking into a member’s account to know the level of debt they have, you cannot know for sure the intentions and actual results of his behavior and decisions in marketing with the cooperative. However, with the consistency with which I heard managing committee and this fisherman’s name in association with loans in excess of BZ$100,000, I am confident to include this “large” producer as an example.

39 Among 21 respondents, the mean number of delinquent members is 125, and the median and mode are both 100. The mean number of non-producing members in NFCS annual reports for the years 1996 to 1999 is 137.
Fishermen from Caye Caulker comprised the core of NFCS membership through the 1960s. Beginning in the mid to late 1960s several fishermen from other parts of the country began joining Northern, mostly from Belize City. The majority of new members during this period of growth were trappers like Caye Caulker fishermen. Members of the managing committee were no longer solely from the caye, as some were elected from the membership base in Belize City. Despite the growing numbers of fishermen from outside Caye Caulker, cooperative growth between the 1960s and 1970s did not affect the relative homogeneity of members’ gear and economic interests, in that trapping was the predominate method of capture and the largest producers delivered less than a few thousand pounds.

**Figure 6.2**

NFCS Membership Production Status, 1968-1999

![NFCS Membership Production Status, 1968-1999](image)

Source: NFCS Annual Reports 1968-1999
Since its inception in 1960, the NFCS membership grew steadily until the early 1980s (Figure 6.3). Through the 1970s and 1980s fishermen from other parts of the country began joining the cooperative in large numbers. During this time, the cooperative’s membership composition transformed from being relatively homogenous and community-based, centered on the trap fishery of Northern Lagoon, into a membership-base comprised of fishermen from across the country. In the early 1980s a significant jump in membership changed the structure of its composition. This change was associated with the dissolution of the Sarteneja Fishermen’s Cooperative in 1982. Because of the large number of fishermen who left this cooperative to join the Northern and National cooperatives and that its closing coincided with boom years of lobster harvests between 1982 and 1986 and the beginning of tourism growth at Caye Caulker, the early 1980s is a key period in this story.

Figure 6.3

Number of NFCS Members 1968-1999

Sources: NFCS Annual Reports 1968-1999
When the Sarteneja cooperative closed its doors, its members began applying to join the National and Northern cooperatives. When the number of Sarteneja fishermen applying for membership in the NFCS increased in the early to mid 1980s, the fishermen of Northern debated over whether they should admit the Sarteneja fishermen as individual members with equal rights and privileges as current NFCS members or as a single “cooperative” member with one vote. The Cooperative Act of 1948 allows for this category of “cooperative” membership. The issue must have been debated and the decision very close, because although the NFCS ended up admitting each member individually, Sutherland (1986:58) reports that the Sarteneja cooperative was admitted as a single member with one joint vote.

Looking at Figure 6.3 you see that between 1981 and 1986 the membership doubled from around 200 to over 400 members. The line graphs in Figures 6.4 and 6.5 show changes in cooperative membership by residence for the lobster seasons ending 1968 – 1999. By the 1970s, several non-caye fishermen joined the cooperative and some Caye Caulker members had migrated to Belize City, resulting in steady growth in the non-caye segment of the membership. Figures 6.6 and 6.7 show the number of members who dive and use traps between 1968 and 1999; this trend in diversified fishing methods parallels the growing residence shifts after 1982. The numbers of members and their production levels by place of residence for the years 1996 to 1999 are presented in Appendix F.

These data from the Northern Cooperative’s annual reports show that fishermen from Caye Caulker have been overcome by members from other places of Belize. The data also reveal increased diversity of gear since the early 1980s, as more members are diving rather than trapping. A decrease in membership commitment to marketing is also associated with these trends, evidenced by the increasing numbers and percentages of non-producing members since the early 1980s (Figure 6.2). This last factor has a direct effect on commitment to debt repayment because of the constitutional level rules that define cooperative

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40 Through the 1960s and 1970s members were regularly struck from the register of members. The Annual reports cite non-productivity as the reason in most cases, while some few members have been expelled for inappropriate and violent behavior toward other members or the Managing Committee. The frequency of “cleansing” the membership roster has decreased, but when it happens it is more substantial. This is seen most clearly between the years 1991 and 1992 with the dramatic drop in membership, applied mostly to non-producers from places outside Caye Caulker.
credit as a second order problem dependent on members’ marketing. The relationships among these things are tested in the following chapter.

### Figure 6.4

**Membership By Residence at Caye Caulker**

<table>
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<tr>
<th>Year</th>
<th>Number of Members</th>
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<td>1986</td>
<td>400</td>
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<td>1987</td>
<td>450</td>
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**Key**
- From Caye Caulker
- Not Caye Caulker

**Sources:** NFCS Annual Reports; Craig 1966; Interview Data
Figure 6.5

Producing and Non-Producing Members by Residence

Source: NFCS Annual Reports 1968-99, Craig 1966, Interview Data

Year

Source: NFCS Annual Reports 1968-99, Craig 1966, Interview Data
Figure 6.6

NFCS Members by Gear Type 1968-1999

Figure 6.7

NFCS Members by Gear and Production Status

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Sources: NFCS Annual Reports 1968-99, NFCS Second Pay Schedules 1996-99, Interview Data
Filtering: Intra-Membership Transactions Prior to Selling Lobster to the Cooperative

A member who has delinquent accounts with the cooperative may continue to fish, but if he does not sell his product to the cooperative (a choice that allows him to avoid repaying his accounts) at least two options remain for him. He can either sell his catch to a restaurant or to another member. The option to sell to other cooperative members provides the opportunity for otherwise loyal, producing members to act disloyally by buying this fisherman’s catch in order to deliver it to the cooperative for themselves. In this case, the member buying lobster is not delinquent, but neither is he acting loyally. The transactions underlying these delinquent and disloyal behaviors are what I call filtering.

Fishermen, however, do not use the term filtering for these types of transactions. Fishermen distinguish between members who “produce” and those who “buy,” and describe these transactions as selling and buying, depending on whether they are referencing the non-producing, delinquent seller or the disloyal, profiteering buyer. Producers and buyers both “deliver” to the cooperative, but producing entails the work of harvesting lobsters, whereas buying entails using the production of another’s labor that you purchase for your own individual gain. While these buying members, which some also referred to as “land fishermen”, have sold several thousand pounds of lobster to the cooperative, they have not produced it. In this regard, the fishermen of Caye Caulker share the values of the 1948 Cooperative Act’s intent, which states that members may only contribute to the collective endeavor of their operations with the product of their own labor (Coops Act 1948, Part III Section 16).

Filtering is a marketing option fishermen described to me whereby a cooperative member purchases a quantity of lobster from another fisherman for a price higher than the first payment the cooperative pays, but lower than the anticipated total compensation with the second payment. The member then sells this lobster to the cooperative in his own name and will earn a profit on the transaction when he receives his second payment. An example of the filtering process works as follows. A member buys lobster from another fisherman for BZE$15.00 per pound, a price that fishermen commonly reported. The member will take the lobster to the cooperative and sell it for a first payment of BZE$10.00 per pound to build up
his annual production. He is investing in the historical certainty that the second payment will be more
than the BZE$5.00 differential between the first payment and the amount he paid for the lobster.

The first time this type of transaction was related to me the fisherman from whom the member was
buying the lobster was a delinquent cooperative member. I conceived of filtering to capture the idea of
the product passing through an additional transactional layer that circumvents the cooperative’s ability to
recoup the debts the delinquent member owes to it. Because the cooperative cannot collect on member
accounts unless the member delivers seafood to the cooperative, the member is able to free-ride on the
system by not paying his debt. The buying member cheats the system by promoting and profiting from
the delinquent member’s free riding. There are several variations of filtering practiced by cooperative
fishermen and not all filtering involves transactions with a delinquent member. Each variation affects the
cooperative in different ways depending upon who is involved in the transactions.

At the most basic and benign level, fishermen who need some extra cash sell an amount of product to
another member for a price higher than the first payment price, but lower than the combined first and
second payment price. The fisherman buying the lobster makes a profit on the transaction and the
cooperative maintains its production. Fishermen regularly buy lobster from those who are not members
of the cooperative. Most fishermen I interviewed do not see this type of behavior as a problem as long as
the member buying the lobster either uses their own money or when they take loans from the cooperative
to buy the lobster that they repay the loan in full. However, the fisherman buying from the non-member
is skimming cooperative profits because if the non-member fisherman were to deliver his lobster to the
cooperative himself, the cooperative as a whole would appropriate the value of the second payment rather
than the buying member, because the cooperative does not mkae second payment to non-members.

If the fisherman from the paragraph above buys lobster from a delinquent member, he undermines the
ability of the cooperative to reclaim the money owed to it by the delinquent member. Fishermen who buy
lobsters from delinquent members sell them to the cooperative to bolster their own production. In this
way the delinquent member’s lobster is “filtered” through the other member. While the latter member
may be in good standing with the cooperative by delivering all or most of his catch to the cooperative and
being up to date in paying his accounts, his loyalty to the society is less clear. Although he may sell his entire catch to the cooperative, thus acting loyally, he may be considered disloyal because he benefits financially from filtering and in doing so contributes to the delinquency of the member whose product he is buying. Members who buy from delinquent members encourage delinquency and contribute to the problem of non-productivity. Most caye fishermen see filtering that involves delinquent members as a negative thing, hurting the cooperative and their own returns from marketing with it.

Another more serious type of filtering behavior has evolved to include members who take out loans from the cooperative in order to buy product from delinquent members and other non-member fishermen. This is the most malignant degree of filtering and the source of frustration and anger among Caye Caulker fishermen. Cooperative management is concerned about this problem as well, but justifies the behavior of the buying members with the following logic: “at least it is a member of our cooperative who is buying the delinquent member’s product, keeping our production for us, rather than letting it go to another cooperative or to a restaurant.” Management maintains that the cooperative has to keep production high in order to sustain the cooperative’s growth, for the cooperative to be able to make its payments, and to fulfill its obligations to its buyers overseas. Therefore, while the cooperative’s management is concerned about this behavior, the leadership appears to be most concerned with maintaining and increasing their level of production. In the meantime, filtering has grown into a more serious problem that perpetuates non-productivity among delinquent members and increases the total debt of the membership.

The additional transactional layers created in filtering inflate buying members’ production capacity, promote member delinquency, and reduce members’ commitment and loyalty. In addition to the negative consequences of delinquency already described, the perilous part of inflated production lies in the fact that members’ production capacity is used to determine loan capacity. Therefore, if a member’s production is enhanced by buying and filtering and the MC uses this “production” level to determine loan amounts, then this member is seen to be capable and worthy of larger loans. The way this common-pool credit and marketing system has co-evolved with the cooperative’s growth, more loans will lead to more filtering and promote more member delinquency. In the end, the buyers gain more profits as the loyal and
productive members pay for delinquent members’ accounts once they are deemed uncollectible. The following excerpts from interviews with fishermen and field notes of participant observations relate the nature and variation in how fishermen view filtering and delinquency.

No member should buy lobster on the wharf…No member should take loans to buy. All this buying and loans are bad for the coop, worse it is the managing committee who do it. You can’t stop it because these guys are doing it as a business. They making some profit there and it’s the only way delinquent members get some money, so this makes it hard to stop.

- Salvador Cruz, medium producer, September 1999

The purpose of the coop is not to make the secretary or one person rich, it to give each member an equal opportunity. They [in the managing committee] use my money to get others richer…It is supposed to be a fisherman’s skill and labor that makes production, not others who only buy product or hire out the work and take the product for themselves. This taking of loans to buy product is wrong, it is totally ridiculous. Their idea is to get as much production they can so they can get the best price when they go to sell it to get members more money on our return. Giving these loans to land fishermen to buy product is bad management….There is nothing wrong with using your own money to buy product from fishermen who don’t belong to the coop.

- Antonio Hernandez, Jr., medium producer, September 1999

Taking loans to buy product is not a good idea. There are people who take loans and say it’s for an illness, but they use it for other things. These are tricks in the system, there is no way to tell if they are buying [product], the Managing Committee knows but they won’t reveal who….It ends up that other members pay the interests on loans that benefit the few, and then these guys stop producing and don’t pay…I think the Managing Committee is doing alright, but I am not completely satisfied with them either. Most of their efforts are not in areas where the society needs it, like retirement for senior and founding members and taking care of the outstanding debt from delinquent members.

- Jesus Ramirez, medium producer, October 1999

The members who are taking loans from the cooperative to buy product is something bad, it hurts the society. It’s ok to buy from others, but not with money from the society. If you do this go get money from the bank or a friend, once one person starts this then everyone will want to do this…and those who buy from delinquent members, then they are taking advantage of other fishermen.

- Roberto Hernandez, small producer, September 1999
These members taking money from the coop to buy product, it is bull shit they are using my money to make money, running up interest that I have to pay while he boosts his production. Those members doing this are taking money from me and encouraging delinquency. And it’s not just members, it’s the [Managing] Committee too….Members who use their own money to buy product, there is good and bad. Some are fishermen who want to live better, it’s ok if he uses his money, but he is also encouraging others to be delinquent….Some members think Northern is heading down like Sarteneja Coop and they blame the Managing Committee for this. We [caye fishermen] can’t get into the committee and the ones in now don’t want to leave. There must be something sweet up there; they don’t want to come out.

- Filipe Guerra, medium producer, October 1999

I don’t think it is a good idea for members to take loans to buy product because it encourages delinquency, these members end up competing with the society….It is ok to buy from non-members with your own money, but not from members, they should sell their product to the coop.

- Melvin Hernandez, medium producer, September 1999

It is not right for members to take loans to buy product, in the by-laws it says you can’t do this. I think it is mostly the Managing Committee who do this. If you are in the Managing Committee you should not owe to coop, they should have production over 500 pounds and only have loans that they are able to pay back.

- Thomas Gentry, founding member and medium producer, September 1999

Not everyone in the cooperative views filtering and “buying” in the same way. Most caye fishermen view it in a negative light, while others are not so critical. Filtering, and using cooperative loans to conduct the transaction, is mostly considered disloyal when it involves a delinquent member. Moreover, and regardless from which fishermen the lobster is purchased, filtering undermines the collective returns of the producing membership because the “buying” member captures the second payment value for himself. If the “selling” fisherman marketed his catch directly to the cooperative, the cooperative is able to appropriate any profit realized from this transaction. In the case of non-producing and delinquent members, if they were to sell to the cooperative instead of to “buyers,” their outstanding accounts would be credited, reducing the expenses to maintain the common member debt. In the case of non-members, because they do not receive a second payment, the difference between the first and second payments is
distributed to the producing membership as a marginal increase in the aggregate second payment or as undivided earnings.

Some fishermen see the cooperative management’s point and agree that members delivering product that they have purchased from others as loyal. The “selling” practice is seen as loyal to the extent that the “buyer” is obtaining product for the cooperative that may otherwise not go to it. Therefore, some members appreciate management’s view and agree that this enhances and grows the cooperative’s production. While this “growth” looks good on paper, mainly as more pounds and higher sales, this additional production is not an absolute gain for the cooperative. If delinquent members are involved in the filtering and members use cooperative loans from the common credit pool to appropriate their production, then the delinquent member still does not pay his debt and the buying member is only encouraging and legitimizing his delinquent choices. Furthermore, this problem is exacerbated when the buying member takes additional loans from the cooperative in order to buy this product from the delinquent member because the aggregate member debt is increased.41

There is nothing wrong with members taking loans from coop to buy product because the product goes to the coop and what you need is production, but some see this as bad because they [the “buyer”] get a second payment from this…but buying from members with outstanding accounts that is bad…they are stealing from other members, that’s how I see it. They [delinquent members] are not paying their loans.

- Jorge Cano, small producer, non-producing in recent years, September 1999

I am satisfied with the Managing Committee and how they have been running things, but there is too much foolishness, the are spending money like crazy…Sometimes I buy lobster, from delinquent members and non-members and just when people want money right away; but only when they come to me.

- Jose Fuentes, small producer, September 1999

41 I spoke with managing committee members only on a few occasions and never sat with them for extended interviews. I had attempted to interview some of the members who lived in Belize City, but they did not keep the appointments I made to meet with them. My summations of their “views”, as reported in the text above, for example, are derived from my infrequent meetings, attending cooperative membership meetings, their comments in annual reports, and several interviews I had with the cooperative’s executive secretary between 1995 and 1999.
I joined the cooperative in 1963. I was doubtful of community cooperation, here now you see it worked. Lobster bring a lot to the village, people here get rich themselves not by government. But today we are heading for trouble….The cooperative is not working like a cooperative. Members owe 3.5 million dollars, mostly the managing committee. There are many members who owe and don’t pay. I blame the secretary and accountant; they say that the Managing Committee is supposed to oversee the cooperative’s affairs, but the managing committee is made of fishermen—and they don’t want to be aware of business and money things….Then these new young guys join the cooperative for $5 in shares, they think that with their application the cooperative is suppose to help them. When these guys get accepted, first thing they ask for a loan to begin fishing, $25,000. After the season begin this new member sell all his product to the next person for more money—the next person get a second payment for a profit. This is against the rules of the society and the by-laws because another fisherman is encouraging him to not pay [what he owes the cooperative]….This doesn’t bother me, but it is a shame.

- Alfonzo Ramirez, medium producer, March 1999

Documenting specific transactions that constitute this filtering practice is difficult, particularly in regards to the more severe and large scale filtering that involves members using cooperative credit to purchase the product that will be delivered. However, this type of transaction between fishermen is a significant piece of qualitative evidence about how marketing and common-pool credit in the cooperative are embedded aspects of a complex, multi-tiered collective action problem. Filtering is a symptom of the problems of low monitoring in credit allocation and low commitment in collective marketing.

Figure 6.8 contrasts members’ second payments and undivided earnings (in black) and the level of members’ outstanding debt and financial expenses (in grey). The black solid and black dashed lines represent the aggregate second payment amounts and undivided earnings, a good measure of the members’ deferred compensation and expected benefit from collective marketing. The grey lines show the membership’s total outstanding accounts and the financial expenses associated with maintaining this debt. Two trends show how compensation the value the collective return on their labor and capital investments have fallen below the debt and debt expenses assumed to generate this return. Look at the top right of the graph where the line representing Member’s Outstanding Accounts crosses the line representing Members’ Second Payment. The other significant trend is seen at the bottom right, where the expenses associated with maintaining the cooperative debt have sharply increased relative to the downward slope of members’ undivided earnings.
These two trends concerned caye fishermen in 1999, mainly because they resulted in the cooperative having to take additional loans in order to meet a second payment price acceptable to the general membership (BZE$10.00 per pound). This pattern, and the crisis some members fear is emerging from it, speaks to the increasing use of credit and decreasing ability for members to produce enough to repay, a result of the managing committee distributing too much credit to too many members. While other factors, such as weather, climate, and natural fluctuations in the amount of lobster harvested in a given season, affect the cooperative’s production (and second payments) and are beyond anyone’s control, these things are known risks of the business of fishing and are typically, at least historically, factored into MC decisions concerning member credit and other cooperative business.

**Figure 6.8**

NFCS Collective Marketing Returns vs. Pooled Credit

![Graph Showing NFCS Collective Marketing Returns vs. Pooled Credit](image)

**Key**
- Aggregate Second Pay
- Undivided Earnings
- Outstanding Acct Rec
- Financial Costs

**Sources:** NFCS Annual Reports 1968-1999

**Note:** Controlled for Inflation, 1982-1984 = 100
Fishermen from Caye Caulker suggest large scale filtering with cooperative credit is isolated to a few members, whereas the smaller-scale transactions between members with their own funds is more common and occurs between delinquent and loyal members and between loyal members only. The former is potentially the most devastating type of filtering because it very easily becomes a vicious cycle. Many delinquent members and cooperative leaders have developed a client/patron-like relationship, where the leaders in the managing committee use these members’ patronage to maintain their position in the managing committee and the advantages this role confers. A common description caye fishermen provided me is summarized in the following hypothetical scenario.

A managing committee member promises to approve credit applications submitted by members who they know are not productive; or, alternatively, they may give loans to a member in excess of the member’s production level, thus exceeding his ability to repay it through his second payment at the end of the lobster season. In return for these favors, the members who are promised these loans vote for this managing committee member at the AGM. Once in office the committee member doles out as many loans as possible to fulfill the promises he made. Ironically, by granting these “bad” loans the committee member gains a positive reputation as someone who keeps his word and “helps out the little guy.” The members to whom he granted the credit may not deliver an amount of product to the cooperative that will have value enough to repay the outstanding account. These events concern productive, experienced fishermen, especially from Caye Caulker. Their frustration is compounded by the fact that the newer, smaller-producing, and delinquent-prone membership consists largely of fishermen from Sarteneja.

It would be different if a fisherman could run [for a MC seat] on his record [as a loyal producing member], but now you have to have money to run…It is getting to political, the voting is not fair, the [members in the Managing] Committee uses coop money to stay in there.

- Antonio Hernandez, Jr., medium producer, September 1999

The committee is giving money to members they know are delinquent, especially at election time to get votes.

- Eduardo Guerra, medium producer, September 1999
One of the problems in the coop is now the [Managing] Committee go and campaign. They go and give them [Sarteneja members] all they want to get votes to get in. From first we shouldn’t allow huge number of Sarteneja members to join, that is our first mistake. Most who join go and borrow, even if they have a skiff and engine, they still go and borrow.

- Donald Bradley, medium producer, September 1999

Just after getting the members from Sarteneja, then the campaigning start…We have to stop giving loans to heavy indebted members and take action to get security and collateral [to ensure] repayment.

- Tomas Hernandez, Jr., large producing member, September 1999

First thing Clark says as I approach for breakfast, “no questions about lobsters or restaurants or anything…”. Reymundo and Orlando were there as well. The weather was on the table for conversation. Everyone is complaining about the lousy weather for the past two to three weeks now, rain, overcast, cloudy, and wind from the north and west. Not good at all for hauling traps, nor for tours or much of anything else but inside activities. It is cool for the breaks in between the rain to do some chores on land, but no traps. After breakfast I did dare to bring up if anyone had heard about the meeting from the coop, about the loans….Clark was really against it, claiming it was brilliant idea to take out 6 million to pay debts of 4-5 million. He quipped, “Well, they all don’t have concrete houses in Sarteneja yet.” This produced agreeing laughs of frustrated apathy from all. Clark then continued “what is going on [with the coop is] you have members who go to ask for, say, $20K, but get a loan for $30K. Ten goes to the MC to approve it and 20 to the member for the loan, who then has 30 on his account.” I have never heard of this before. Reymundo mentioned how he was thinking about taking $25K and not paying it back. “Why should I”, he proclaimed, “all the producing members from the caye are not getting any benefit from the way things are working, so why not get what you can before there is no more to get?”

- Breakfast with Clark, Reymundo, and Orlando, November 1999

The changes in the cooperative’s membership composition, the members’ commitment, and the state of the cooperative’s common credit are important to caye fishermen because of how they have increased expenses to maintain collective marketing and the cooperative’s credit pool. Furthermore, the behaviors these changes have promoted (filtering and buying) have other detrimental aspects. These residual effects include, for example, the personal and community tragedies brought about by the anxiety associated with debt and other entailing obligations, and the impact these behaviors, as examples of leadership, have on members who will assume their roles. The result is a domino effect of open access, leading to ruin. On
the one hand, you have the Sarteneja cooperative that has failed; and on the other hand, you have the unfortunate case of a committee member’s brother who committed suicide over his debts that exceeded BZE$100,000.

Many of these new, young members think that’s what the coop for, to get loans. Many delinquent members take the money and use it up for other things….I think the Managing committee is who mostly take loans to buy product, they don’t say it, but we know. When you figure you are doing good by doing this it ends up worse, the money is tempting in there [in the MC]. There was one who killed himself from it, he quit fishing and only buy lobster, 30,000 pounds one season. Now we have members with 80 or 90 thousand dollars [in coop debt] and can’t pay. Talk to the coop, they have no money, only assets. All this managing committee think is we need more production, “If we don’t get it then National will, they have guys who buy too.” This is bad because they [MC and “buyer”] are using our business to make money for themselves.

- Luis Gentry, small producer and founding member, September 1999

All these loans for buying product is bad, I think it should stop, one is dead already.

- Manuel Santos, small producer, moved to caye in 1989

If the costs of providing credit increase for the cooperative’s productive members, they may shirk on their commitment to the cooperative by searching for other, more rewarding markets for their catch. Most fishermen from the caye have not yet given up on the cooperative in this way because the cooperative remains the most reliable and consistent market for them—it always buys their product, and they rely on the credit it provides. Attending cooperative meetings and speaking with fishermen about lobster marketing makes it clear how the prices they receive for lobster are a driving force motivating their continued commitment to market with the cooperative. From the fishermen’s perspective, his decision to sell his product to the cooperative is the result of his evaluation of the cooperative’s performance; a kind of voting with one’s feet or, in this case, one’s catch. Although most members do maintain a high level of commitment, there have been stirrings of dissent and in 1999 several of these loyal members from the caye took action to have their concerns heard and addressed.
Seeking Representation and Solutions to the Problems of Using and Allocating Common-Pool Cooperative Credit

A more subtle nuance of this socio-cultural system not apparent to me during my early visits to Belize is the complex intersection of pride and frustration members related concerning their cooperative’s success and growth. Several Caye Caulker fishermen are concerned about their cooperative’s growing membership and increasing level of non-productivity and delinquency. In short, their success has provided the conditions for growth, which now challenges the cooperative’s continued resilience.

Fishermen from the caye are frustrated because they feel a sense of loss; a loss of control over and representation in the affairs of their cooperative’s business. They worry that the success which has brought their village prosperity is threatened by these changes in the cooperative. Because the Managing committee decides on members’ loans and other significant business matters, the members from the caye feel eclipsed from the decision making process without more representation in the cooperative’s governing body. Past committee members from the caye claim that you need at least four committee members who see eye to eye in order to get anything accomplished, particularly when it comes to more serious matters regarding member delinquency and non-productivity. No more than three members from the caye have served in the committee since the early 1980s, and you have to go back to 1978 to find a year in which more than four members from Caye Caulker served on the committee (NFCS Annual Reports 1977-1999).

This situation has produced apathy in some members; others still have hope. The apathetic members have stopped voting for managing committee elections at the AGM. One founding cooperative member explained, “I haven’t voted for five years. We see the numbers and know about the campaigning; all they [the Managing Committee members] have to do is get the majority from Sarteneja to vote them in and no one out here [at the caye] has a chance. So why vote?” Despite this attitude among some members, others have run for committee positions in recent years, but with little success. Only one caye member has served for more than a single term on the committee since the later 1980s.
This member has played a leading role in the cooperative, having served on the Managing Committee for several terms in the 1980s and early 1990s. He claims that the leadership roles in the cooperative have been compromised with the cooperative’s growth and that too few people now control the fate of too many. His views echo those of other past committee members from the caye who think that the cooperative is not run enough like a business, that too often the leadership engages members with and makes decisions based on obligations outside the collective interest of the cooperative’s bottom line. While the cooperative can get away with some overdrafts because they have a relationship with the bank, these past committee members from the caye feel that if they ran their own family businesses the way the cooperative is run today, they would not be in business for much longer.

By gaining seats on the Managing Committee, the fishermen from the caye think they can gain power in decision making and be able to see and know more directly what is going on with their business and the decisions concerning it. Apart from representation in the Managing Committee, fishermen have access to other channels through which to affect change, from inside and outside the cooperative. From within the cooperative they can work through established forums and processes by their participation in cooperative meetings, what Ostrum (1990:50-55) would call their collective level rules. Another option is to seek out assistance from the Cooperative’s Department and the Registrar of Cooperatives. In trying to affect change from outside the cooperative, members look for support from higher-order laws that govern all Belizean cooperatives, what Ostrum (1990:50-55) calls constitutional level rules. In 1999, caye fishermen worked through these two avenues to air their concerns over member delinquency and decreased member returns from collective marketing.

During my interviews with them and in my observations at cooperative meetings, Caye Caulker fishermen advanced two ideas they thought would reduce filtering behavior and increase member commitment. One was to have a “special program” for non-member fishermen to sell to the cooperative, so that they would go directly to the society rather than through other members. The other idea involved a broader and less cumbersome approach of increasing the first payment price for lobster from BZE$10 to BZE$15 per pound. Members supporting this proposal thought it would entice delinquent members to
start delivering directly to the cooperative again and also accomplish the goal of the “special program” to motivate non-member fishermen to sell directly to the cooperative. The events of one meeting show how these issues were raised and supported by the membership and then eventually dampened by the leadership. This is a typical example of how difficult it is to affect change in the cooperative from within, without having support from the Managing Committee (see Appendix G for my expanded notes on this meeting). Meetings like this intensified members’ frustration as they tried to participate in the cooperative without success, one of the motivating factors for some caye members to look outside the cooperative for satisfaction.

Another approach the cooperative members took to appease their loss of control over the cooperative involved a two-tiered proposal to gain more self-determination over the benefits they realize from collective marketing with the cooperative and other cooperative business that affects them. They thought that they could achieve these objectives by gaining access to participation in the decision making process in the managing committee. With their failed attempts at affecting change in cooperative meetings and the impending crisis they observed in the past season’s annual report (see page 172 and Figure 6.8), several Caye Caulker fishermen approached the Registrar of Cooperatives to discuss their concerns and to learn about the options available to them.

Upon returning to the caye, the fishermen organized a meeting to share what they had learned. They agreed to send a letter to the Managing Committee and the Registrar to state their intended course of action. Two alternatives were discussed. One idea involved organizing Caye Caulker members to leave the cooperative. This course of action would have dissenting members withdraw from the society, taking the value of their shares in the form of cash and title to the Receiving Station located at the caye. With this foundation they would re-organize and register themselves as a new Caye Caulker Cooperative. The other proposal involved reorganizing the structure of the managing committee, a proposal that came to be known as “zoning.”

42 The letter was signed by over 60 cooperative members from the caye. It is included here as Appendix H.
Several of the fishermen who approached the registrar with these concerns were founding members. This is significant because several of them are close to retiring and have considerable pride in the cooperative they built; to consider leaving their cooperative and legacy shows their level of frustration. However, their concern and participation are not surprising. This segment of the membership had already stood up once to assert their rights to determine their own economic destiny.

The movement to form a new cooperative consisting of the Caye Caulker segment of the Northern Cooperative membership was a measure of a last resort, an option that was possible through their experience, high level of production, and large value of shares. The zoning proposal is what the members really wanted, but in order to get the MC and Registrar to consider this option the caye fishermen had to be prepared to carry-out a more drastic alternative. The zoning proposal was designed to give members more equal representation on the Managing Committee by allotting two positions to fishermen from Caye Caulker, Belize City, and Sarteneja and one remaining position to the communities in the southern districts. This alternative was aimed at promoting more accessible monitoring, a higher level of member participation, and more controls on financial decisions made in the society.

The difficulty the zoning option presented is that it required a change in the legislation governing cooperatives because the 1948 Cooperatives Act stipulates one member, one vote without provision for residence or zones. When this legislation was drafted the contemporary convention, and assumption, was that most members in any cooperative would hail from the same community or its surrounding area. This was the case up through the 1970s. The unforeseen concentration of fishermen in the two larger cooperatives has transformed the structure of fishing cooperatives. These events transpired between May and September of 1999. The Registrar of Cooperatives communicated to members that the 1948 Act was in the process of revisions, mainly to separate out regulations for credit unions from cooperatives with anticipated updates that could involve zoning. Once the Act was updated, the Registrar continued, every cooperative and credit union in the country would have to update their by-laws, which would open the door for a zoning structure to managing committee representation. The Registrar of Cooperatives in 1999 was replaced in 2000. Things have not changed to date.
Summary

Taimni (1998:2) points out that a common measure applied to judge cooperative performance is “the effectiveness in the use of resources and efficiency of their services to members.” The fishermen of Northern Cooperative measure the performance of their cooperative by its ability to offer high returns on the product they market to it. Filtering affects members’ commitment in marketing; this decreased commitment increases the cooperative’s expenses to cover non-producing members’ delinquent accounts, which, in turn, eats away at the returns members realize from their collective marketing arrangement. These problems have sprung from the cooperative’s growth and increasing heterogeneity of economic interests among members. The fishermen lobbying for “zoning” were trying to change the structure of the cooperative as a means to ensure that their needs were being serviced, by improving caye members’ representation and monitoring options and exercising more responsible fiscal management of the cooperative’s common credit pool.

The questions this thesis poses concerning how these institutional changes affect cooperative members’ individual returns from collective marketing and the resilience of the cooperative itself are significant in two distinct ways. On the one hand, these questions evaluate what fishermen think about the cooperative, its growth, and their future prospects with it. On the other hand, these questions evaluate how well the theoretical model of a multi-tiered collective action problem matches what caye fishermen think is at the heart of the cooperative’s fiscal concerns; does the theory adequately explain what is going on in this ethnographic setting?
The previous chapters present historical, archival, and primary and secondary sources to document the development of lobster fishing and, more recently, tourism at Caye Caulker. These chapters have shown that fishing is the foundation of the caye’s economy and that with the support of the cooperative fishermen in the village have been able to assert control over and benefit from economic development in their community. Although they are enmeshed in a dual fishing and tourism economy, both prongs of which are dependent on foreign exchange, their success at collective marketing provides a form of economic democracy rare to the Caribbean and Central American regions in its persistence and endurance. This chapter presents additional data from cooperative annual reports and other primary and secondary sources to test the hypotheses presented in Chapter Three and evaluate the relationships among the variables thought to make a difference in the resilience of the cooperative and the continued economic returns fishermen realize from it.

The cooperative’s early successes provided a foundation on which it has grown. In addition to growing in size, it has grown more complex. The nature of its multi-tiered collective action problem—of how they manage to sustain marketing and credit services to members—defines this complexity, which is akin to what Jentoft (1986) describes as multi-purpose functions. The relationships of the variables represented in the theoretical model first introduced in Chapter Three are presented in the correlation matrix in Table 7.1. These correlation coefficients are used in the following sections to evaluate each hypothesis. Discussions of the inter-relationships among the study variables and the value of qualitative analysis follow the hypothesis tests. A concluding section presents the significant empirical findings given the ethnographic and quantitative data presented; how this case and these findings compare to other cooperatives and group-based credit institutions; and how these former conclusions are relevant to the prospects for continued resilience in Belize’s fishing cooperatives.
### Table 7.1 Correlation Matrix for Study Variables

<table>
<thead>
<tr>
<th></th>
<th>Monitoring Index</th>
<th>Percent of Producers</th>
<th>Number of Hotels in Caye Caulker and San Pedro</th>
<th>Prior Year's Second Payment</th>
<th>Average Selling Price for Lobster Tails</th>
<th>State of the Cooperative's Common Credit Pool</th>
<th>Current Season's Second Payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homogeneity Index</td>
<td>0.793</td>
<td>0.814</td>
<td>-0.925</td>
<td>-0.349</td>
<td>-0.419</td>
<td>0.715</td>
<td>-0.256</td>
</tr>
<tr>
<td></td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.055</td>
<td>0.017</td>
<td>0.000</td>
<td>0.158</td>
</tr>
<tr>
<td></td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>31</td>
<td>32</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>Monitoring Index</td>
<td>0.736</td>
<td>-0.822</td>
<td>0.016</td>
<td>-0.068</td>
<td>0.875</td>
<td>0.089</td>
<td>0.089</td>
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<tr>
<td></td>
<td>0.000</td>
<td>0.000</td>
<td>0.934</td>
<td>0.710</td>
<td>0.000</td>
<td>0.627</td>
<td>0.627</td>
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<tr>
<td></td>
<td>32</td>
<td>32</td>
<td>31</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>Percent of Producers</td>
<td></td>
<td></td>
<td>-0.503</td>
<td>0.129</td>
<td>0.836</td>
<td>-0.052</td>
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<td>0.002</td>
<td>0.681</td>
<td>0.468</td>
<td>0.000</td>
<td>0.775</td>
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<td></td>
<td></td>
<td></td>
<td>35</td>
<td>32</td>
<td>34</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>Number of Hotels in</td>
<td>0.483</td>
<td>0.647</td>
<td>-0.839</td>
<td>0.277</td>
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<tr>
<td>Caye Caulker and</td>
<td></td>
<td></td>
<td>0.004</td>
<td>0.000</td>
<td>0.000</td>
<td>0.124</td>
<td></td>
</tr>
<tr>
<td>San Pedro</td>
<td>33</td>
<td>37</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prior Year's Second</td>
<td></td>
<td></td>
<td>0.822</td>
<td>0.020</td>
<td>0.641</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Payment</td>
<td></td>
<td></td>
<td>0.000</td>
<td>0.913</td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>33</td>
<td>31</td>
<td>31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average Selling</td>
<td></td>
<td></td>
<td>-0.005</td>
<td>0.948</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Price for Lobster</td>
<td></td>
<td></td>
<td>0.980</td>
<td>0.000</td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>Tails</td>
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<td></td>
<td>32</td>
<td>32</td>
<td>32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>State of the</td>
<td></td>
<td></td>
<td>0.175</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooperative's Common</td>
<td></td>
<td></td>
<td>0.338</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Credit Pool</td>
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<td></td>
<td>32</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Each correlation in the matrix includes Pearson's r, its 2-tailed significance level, and the number of cases.

All Variables that are monetary values are adjusted for inflation, chained 1982-84 = 100

### Membership Homogeneity and Monitoring Opportunities

Tables 7.2 and 7.3 show community membership and gear type for NFCS members. Table 7.2 shows a more detailed description of NFCS membership that includes a cross tabulation of residence and gear types for lobster fishermen, fishermen that do not fish lobster, and fishermen for whom residence and gear are unknown. Table 7.3 includes only NFCS lobster fishermen for whom gear type is known.

Fishermen’s residence is grouped into Caye Caulker, Belize City, Sarteneja, and Other. The latter category includes fishermen from San Pedro, Placencia, Dangriga, and Punta Gorda. The picture is clear that over time the cooperative grows away from Caye Caulker. As fishermen from other parts of the

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country join Northern, its membership becomes less homogenous in both residence and gear (see also Figures 6.4 and 6.5 in Chapter Six).

Table 7.2 Member Residence and Fishing Method 1968-1999

<table>
<thead>
<tr>
<th>Residence</th>
<th>diver</th>
<th>trapper</th>
<th>does not fish lobster</th>
<th>no information</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caye Caulker</td>
<td>8</td>
<td>220</td>
<td>5</td>
<td>2</td>
<td>235</td>
</tr>
<tr>
<td>Belize City</td>
<td>48</td>
<td>68</td>
<td>19</td>
<td>20</td>
<td>155</td>
</tr>
<tr>
<td>Sarteneja</td>
<td>253</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>256</td>
</tr>
<tr>
<td>Dangriga/Placencia</td>
<td>63</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>68</td>
</tr>
<tr>
<td>San Pedro</td>
<td>13</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>16</td>
</tr>
<tr>
<td>Punta Gorda</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Residence unknown, not Caye Caulker</td>
<td>43</td>
<td>13</td>
<td>6</td>
<td>96</td>
<td>158</td>
</tr>
<tr>
<td>Total</td>
<td>430</td>
<td>310</td>
<td>32</td>
<td>118</td>
<td>890</td>
</tr>
</tbody>
</table>

Table 7.3 Member's Residence and Lobster Fishing Method 1968-1999*

<table>
<thead>
<tr>
<th>Residence</th>
<th>diver</th>
<th>trapper</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caye Caulker</td>
<td>8</td>
<td>218</td>
<td>226</td>
</tr>
<tr>
<td>Belize City</td>
<td>48</td>
<td>68</td>
<td>116</td>
</tr>
<tr>
<td>Sarteneja</td>
<td>253</td>
<td>3</td>
<td>256</td>
</tr>
<tr>
<td>Other**</td>
<td>78</td>
<td>6</td>
<td>84</td>
</tr>
<tr>
<td>Total</td>
<td>387</td>
<td>295</td>
<td>682</td>
</tr>
</tbody>
</table>

$X^2 = 501.145, \text{df} = 3, p = .000, n = 682$

* Does not include missing data--Residence or Gear unknown, and those who do not fish lobster
** Other includes San Pedro, Dangriga, Placencia, and Punta Gorda
Another growing dissimilarity among the cooperative’s membership is seen in the contemporary diversity of economic interests in the lobster fishery. The Lorenz curve and Gini Co-efficient presented in Figure 7.1 shows the distribution of catch among the fishermen producing lobsters for the 1996 season. Although I do not have longitudinal data to show changes in this measure of economic interest over time, secondary sources do provide qualitative support to the claim that in the past the members’ economic status was more homogenous and egalitarian (Craig 1966, Price-Daly 1986, Sutherland 1986). The data plotted in Figure 7.1 is NFCS production data grouped in five percentile segments, and was used to calculate a Gini coefficient.43

**Figure 7.1**

Lorenz Distribution of 1996 NFCS Lobster Production

Cumulative Percent of Number of Members

Cumulative Percent of Pounds of Lobster

Source: NFCS 1996 Second Pay Schedule

Note: Gini = .66

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43 The Gini index for this data was calculated using a grouping method presented by Badenes-Plà (2003).
The Gini coefficient is typically used to describe the distribution of resources within a society or whether some kind of economic inequalities persist in it. I apply it here to measure the distribution of lobster catch among the population of cooperative fishermen. I use the total cooperative catch to represent the value of the lobster as a naturally occurring economic resource; in this way, the distribution of the lobster catch is a measure of the distribution of wealth and economic interest in the fishery. In this respect, a high co-efficient equates to inequitable distribution of catch or low economic homogeneity among fishermen and a low co-efficient signifies fishermen’s economic interests in the fishery are relatively homogenous. The Gini coefficient of .66 for the season ending in 1996 indicates that among this population of fishermen there is high variation, or low homogeneity, in regards to economic interests in the lobster fishery.

Associated with the changes in membership composition, the cooperative’s progressive move away from the caye made monitoring members’ transactions with the cooperative more difficult. By the latter half of the 1960s, the cooperative had moved its administrative office from the caye to Belize City; and by 1967, the area representative for Caye Caulker, Mr. Louis Sylvestre, observed the advantages of operating the business closer to where the membership lives and works. The following excerpts from the 1967 Annual General Membership Meeting Minutes are a typical example of the minutes reported for guest speaker addresses:

Mr. Sylvestre now proceeded with his address. He told the members that they had come a long way but still they had not achieved the goal for which they were formed. Mr. Sylvestre said that he had suggested a point for the agenda but did not see it in the agenda. The secretary replied that he had printed the annual report already. He told them that in the developing of a nation, roads and electricity was essential. He said that the consumers would not be enough to maintain an electric plant at the caye, and the only solution was for the Society to come in and help consume and maintain the Plant at the Caye. He said that the Northern Fishermen’s Co-operative was helping Belize City, not Caye Caulker. He said that the committee would have a closer observation if the business was being managed at the caye. His opinion was that other co-operatives were prospering with their businesses at home. Therefore, he suggested that the operation be transferred from Belize City to Caye Caulker. Mr. Sylvestre also suggested that the member agree that some of the swamp land be filled up for the plant. He said if the members wanted he would get the dredge to come over and fill the swamp because the machine was presently at Ambergris Caye. He said that he wanted some one to make a resolution to this effect in the meeting today. He told the members it depended on them if they wanted to stay in their present position. Mr. Sylvestre closed by wishing the members good luck, and said that he hoped they have a good season.
Later in the report, these matters are discussed:

Mr. Manual Marin moved that the committee find ways and means of disposing of the Belize City Plant and rebuilding a new processing plant at Caye Caulker as quickly as possible. This was seconded by Mr. Tiburcio Badillo. Counter Motion: Mr. Luis Heredia M. moved that this matter should be studied more carefully by the committee and the General Members. It was seconded by Mr. Antonio Gonzoles. The vote was taken with the Counter Motion having 22 votes and the motion 25 votes. The motion was therefore carried. Mr. Luis Heredia M. pointed out that we must be careful that we might run into a lot of problems. He personally believed it to be a good idea. However, he understands that the light plant being brought to the Caye is a very old Plant, and that in any case, the society will need to have a reserve electric plant. Mr. L. Sylvestre replied that the electric Plant will be one in good condition. Mr. Orlando Carrasco wanted to know when the first move to this end will be made. Members wanted to find out how much it will cost to fill up the swamp. The Chairman mentioned that he did not know how much it will cost, not to say exactly when a move will be made.

The cooperative did build a receiving station at Caye Caulker, but the cooperative’s business offices remained in the city. By the early 1990s, Caye Caulker’s representation on the managing committee had all but disappeared, less than a decade after the Sarteneja cooperative closed and its members began joining Northern. Members’ options and ability to monitor became more difficult as the cooperative grew beyond the village of Caye Caulker. While monitoring options were easier in the early years of the cooperative, members have always been able to inquire about cooperative business and other information concerning cooperative affairs. Today they must inquire at the main office in Belize City for information about, for example, the status of other members’ accounts, particularly those in, or suspected of, delinquency and what action the cooperative leadership is taking to remedy these instances of delinquency.

Data from several sources are combined to create indices to measure the membership’s homogeneity and monitoring. The homogeneity index is based on residence and gear observations from cooperative reports, interviews with fishermen, my observations while in Belize, and secondary sources. The monitoring index relies on the same sources and methods, resulting in three components of monitoring: 1) informal community-based monitoring, 2) cooperative reporting of member non-productivity, and 3) members’ access to others’ files. Both indices are described in detail in Chapter Three and the values and their ranks for the years 1968 to 1999 can be found in Appendix I. The relationships between these
measurements of the cooperative’s membership composition and the opportunities members have to monitor one another’s marketing behavior, credit behavior, and the leadership’s management decisions regarding each were posed in Chapter Three: There will be a significant positive correlation between monitoring opportunities and the homogeneity of the cooperative’s membership.

The Pearson’s $r$ co-efficient indicates a strong positive correlation between membership homogeneity and monitoring behavior ($r = .793$, $n = 32$, $p = .000$; Table 7.1). This leads us to accept this hypothesis because the positive correlation between the cooperative’s level of membership homogeneity and the membership’s opportunities to monitor credit allocation decisions is significant. When the cooperative is comprised mainly of fishermen from Caye Caulker and fishermen who use traps, monitoring options are more readily accessible. After the cooperative’s membership composition changes, to include fishermen from across the country and significantly more fishermen who dive for lobster, members’ monitoring opportunities decline.

**Variables Affecting Member Commitment**

After the mass influx of members from Sarteneja and the decrease in the percentage of Caye Caulker members in the early 1980s, both the number and percentage of non-producing members increased. Evidence of the increased tolerance of non-productivity is shown by the decreased frequency of removing non-producers from the register of members and the increase in the percentage of non-producers in the society (see Figure 6.2). Prior to the 1980s, managing committees were less tolerant of non-productivity and more frequently removed non-producing members from the society’s membership register. In 14 of the 18 Annual Reports from 1968 to 1985 a total of 119 members were struck from the registry for non-productivity. Between 1986 and 1999, only 107 members in nine of the 14 annual reports for these years were members struck for not producing. In later years, fewer members were removed for lack of commitment, and when they were removed it was less frequently. With the exception of the drastic reduction of 87 members in the 1991-1992 season, no year had more than five members removed. Appendix J shows the numbers of members struck from the registry of members for the years 1968-1999.
As discussed in previous chapters, members’ commitment is defined by their loyalty to marketing with the cooperative and is recorded in annual reports. The measure for the membership’s commitment for each year was observed as the percent of members who were active producers for the cooperative. This hypothesis was presented in Chapter Three to test the effect of the measures of membership homogeneity and members’ monitoring options on the membership’s commitment to marketing: Membership homogeneity and monitoring are positively correlated with and predict member commitment. The percent of producing members is positively correlated with both membership homogeneity ($r = .814, n = 32, p = .000$; Table 7.1) and their monitoring options ($r = .736, n = 32, p = .000$; Table 7.1). The strong correlation between membership homogeneity and monitoring in a collective action situation is consistent with theory about how group composition can affect collective action institutional resilience through mutual coercion. However, when these variables are considered together to predict member commitment, this inter-correlation confounds both variables’ significant effect. This high inter-correlation is partly caused by each variable having a residence component to it. This empirical fact about the nature of group composition and monitoring in small-scale collective action institutions in fisheries forces us to reconsider the validity of the theoretical relationship between group composition, monitoring, and member commitment in more universal and comparative terms.

The theoretical model presented in Chapter Three considers commitment to be affected by the previous year’s second payment amounts, as a measure of individual return from marketing, and opportunities for employment, business, and lobster marketing outside the cooperative, predominantly in tourism. These alternate income and livelihood strategies are measured by observations of the number of hotels at Caye Caulker and San Pedro. Hotels indicate the presence and growth of tourism and the market for services and lobsters in the Northern Lagoon. Two hypotheses were offered: 1) Member returns from collective marketing in year $t - 1$ is positively correlated with and predicts member commitment in year $t$; and 2) Alternate employment and marketing opportunities in tourism is negatively correlated with and predicts member commitment. The effects of these variables on member commitment are split.
Past years' returns on collective marketing do not play a significant role in determining member commitment ($r = -.076$, $n = 32$, $p = .681$; Table 7.1); whereas the presence and growth of tourism in the Northern Lagoon does ($r = -.503$, $n = 35$, $p = .002$; Table 7.1). Tourism opportunities appear to pull fishermen from cooperative marketing. The empirical ethnographic data from Chapter Five show this in two ways. First, several households from the caye have members who fished in the past and remain in the cooperative as non-producing members and most of these households now work in tourism. Second, and alternatively, many large and medium producers have reduced the number of traps they work since the early 1980s and are now today medium and small producers with tourism businesses.

The latter observation is not described in the correlation above because these fishermen are still producing for the cooperative, but they are producing at a potentially reduced capacity because of tourism. This may be part of the reason for the high Gini coefficient reported above: more fishermen are producing less lobster. These findings suggest that the cooperative membership tends to be more committed to collective marketing when monitoring options are more readily available, when the membership is relatively homogenous, and when alternate income or livelihood strategies in tourism are infrequent or low. It is likely that because the cooperative consistently offers the best price for lobster, past returns per pound do not affect members’ decisions to market with the cooperative.

The Relationship between Member Commitment and the State of the Credit Pool:

The Intersection of First Order and Second Order Collective Action Problems

The empirical case presented here provides the opportunity to test collective action theory centering on how institutions respond to multi-tiered, or nested, collective action dilemmas. The previous chapters illustrate how the relationship between marketing and common-pool credit in Belizean fishing cooperatives is an example of a multi-tiered collective action problem. As the fishermen of the Northern Cooperative strengthened their collective marketing institution, banks and other lending institutions accepted the cooperative’s anticipated production as collateral that the cooperative could use to provide the credit pool. Without members’ commitment to marketing, there are no collective assets, value, or
capital that can be leveraged as collateral to financial institutions to supply the credit to which they share access as a common pool. The credit pool is tied to marketing in two more ways.

First, according to members’ accounts and cooperative by-laws, members are allocated credit based on their production. Their production represents the share they will contribute to the collateral that is used to provide the credit constituting the common pool. A member, then, can claim a part of the credit pool based on his anticipated contribution to the cooperative's total production. Second, in order for the cooperative to collect on members’ debts to this pool, members must follow through on their commitment to marketing because of the constitutional rules governing debt relationships between cooperatives and their members. The cooperative can only collect payment from members by deducting the value of the seafood they market to it (see Chapter Three). Therefore, the theory predicts that if commitment is low, then the state of the credit pool will be poor. The state of the credit pool is determined by the ratio of members’ outstanding accounts and the financial expenses to maintain this debt to the aggregate second payment amount and other undivided earnings that are distributed to members based on their production, as described in Chapter Three where this hypothesis was introduced: The percent of producing members is positively correlated with and predicts the state of the cooperative’s common credit pool. Member commitment has a strong positive effect on the state of the cooperative’s common credit pool ($r = .836, n = 32, p = .000; Table 7.1$). When cooperative members stop marketing their catch with the cooperative they are failing to replenish the cooperative’s common financial pool.

The Causes of Variation in Members’ Returns from Collective Marketing:

Why Does Collective Marketing Pay off?

In relating their frustrations surrounding issues of members' non-productivity and delinquency, fishermen complained that the increased frequency of filtering reduces members' commitment and promotes delinquency among the cooperative’s membership. They explained how these behaviors led to higher outstanding loan balances, increased interest expenses, more overdrafts, and other bank fees. Fishermen perceived these highly visible expenses as damaging the cooperative’s bottom line, hurting its
reputation with lending institutions, increasing the costs of doing business, and driving down their second payments. Their worries about this came to a head in 1999 when the cooperative had to take additional loans at the end of the lobster season in order to meet a second payment price acceptable to members (see Figure 6.8 in the previous chapter).

These observations fit well into the theory that decreasing commitment and a deteriorating state of the cooperative’s credit pool leads to decreased returns from collective marketing; the setting for a tragedy of the cooperative’s financial commons. The members fear that these circumstances may be leading their cooperative to a similar fate realized by others, like the Sarteneja Cooperative. Despite these fears, for over 40 years the members of Northern have prospered. In doing so, they have established a strong connection to higher paying markets. The prices the cooperative negotiates for lobster in these markets is another important factor that determines members’ second payments. These amounts are observed in the cooperative annual reports as the average market price for the season, a combination of the per pound first and second payments for lobster. The following hypotheses were presented in Chapter Three: 1) There is a positive correlation between the second payment prices members receive for marketing lobster to the cooperative and the state of the cooperative’s common credit pool; 2) There is a positive correlation between the second payment prices members receive for marketing lobster to the cooperative and membership commitment measured by the percent of producing members; 3) There is a positive correlation between the second payment prices members receive for marketing lobster to the cooperative and the average selling price received through the season.

After the cooperative’s membership expanded rapidly in the 1980s, fishermen observe the cooperative not making payments to the bank, resulting in overdrafts, both of which are associated with increasing member debt and decreasing member loyalty. Both the fishermen and theories describing the effect of monitoring, commitment, and group composition on common pool resources recognize that reduced commitment to the cooperative leads to an over-extended financial commons. However, neither member commitment nor the credit pool’s state predict the second payments members receive as their deferred benefit in collective marketing ($r = -.052$ and $r = .175$, respectively; Table 7.1). The average
price the cooperative receives for lobsters it sells on the foreign market explains almost all the variation in the second payments they get ($r = .948$; Table 7.1). These findings lead us to reject the first and second hypotheses concerning members’ economic returns and accept only hypothesis three, that market prices for lobster determine the economic benefits members realize from collective marketing.

This is not surprising because market price is the basis for calculating second payments. Moreover, this finding is consistent with a pattern common among rural communities dependent upon commodity production oriented to export markets, that fickle forces outside any direct control of local constituents play the most significant role in determining the benefits that shape choices in and the outcome of livelihood strategies. However, this result also runs counter to what our theory says and fishermen think about the effects group composition, commitment, and monitoring have on the resilience of collective action institutions and the benefits conferred through them to members. To explore these relationships more thoroughly, I now return to some of the ethnographic details presented in earlier chapters to provide additional context to the relationships among our study variables as they are re-evaluated with regression and partial correlations.

**Discussion and Analysis of Research Findings**

Figure 3.1 shows a model of the relationships among the study variables whose correlations are presented in Table 7.1. One problem with the correlation coefficients presented here is that they are measuring relationships among a complex system of variables that are very likely affecting one another in unforeseen, and perhaps confounding, ways. The relatively large number of variables, the complexity of the theoretical relationships among them, and the small number of observed cases prevents a more sophisticated statistical analysis that controls for potential confounding effects. However, we can regress the independent variables in Figure 3.1 against the second payment for lobster to see how these variables interact (Table 7.4).
The nature of monitoring and homogeneity in this empirical setting raises questions about the observations made to measure these variables and the underlying theoretical relationships between them. Both of these variables have residence components in them by definition because residence is known empirically and proposed theoretically to be an appropriate aspect of each variable in rural fishing communities that have organized community-based collective action institutions. Because these two variables and others shown in Table 7.1 are highly correlated, the statistical significance of this regression model is not reliable. Although there is nothing we can do about this co-linearity problem, we can however return to the more reliable ethnographic data and rely on these quantitative models as more of a gauge to evaluate the qualitative findings.

Market price for lobster is an important variable to consider in understanding what determines the level, or monetary value, of economic the economic returns collective marketing confers to fishermen. However, three facts about the nature of the relationship of second payments and market price for lobster make it worthwhile to re-examine our hypothesis controlling for the effects of these variables. Market price for lobster is the basis for how the cooperative sets second payments for a given season, both of these are also highly correlated with prior year’s second payments, and market price is outside of the cooperative’s control. Because this variable is outside of the fishermen’s and the cooperative’s control, it is instructive to look at how the other variables interact together when we control for market price. By
controlling for these variables we might be able to determine what other variables, *among those that fishermen and the cooperative do have some control*, effect the dependent variables in our hypotheses. Therefore, it is appropriate to rely on the ethnography to re-evaluate and interpret these quantitative findings and then determine which relationships are most significant. Our initial analysis of the variables affecting second payments in H4 and Table 7.4 show that market price is the single most important variable determining members’ returns on the catch they market collectively through the cooperative. However, when market price is controlled for using partial correlation, commitment and the state of the cooperative’s common credit pool show a significant correlation with members’ second payments (Table 7.5). The correlation coefficients in all cases increase, providing further evidence that the relationship may also be causal.

| Table 7.5 Partial Correlation H4, Controlling for Average Selling Price for Lobster Tails |
|-----------------------------------------------|-----------------------------------------------|
| State of the Cooperative's Common Credit Pool | Current Season's Second Payment               |
| Percent of Producing Members                  | 0.7932                                        |
| P = .000                                      | 0.5368                                        |
| df = 29                                       | p = .002                                      |
| State of the Cooperative's Common Credit Pool | 0.5382                                        |
| P = .002                                      | df = 29                                       |
| df = 29                                       |                                               |

All Variables that are monetary values are adjusted for inflation, Mean(1982-84 ) = 100

The effect of all the study variables on second payments can be re-evaluated as well, using a new regression model that removes the effect of market price (Table 7.6). This model was created using a backwards removal technique, which also removed the effect of homogeneity because it did not add significant explanatory value to the model. It appears that all of these variables have a significant effect in determining the cooperative’s second payment price, when market price is controlled. Moreover, it is likely that the relationship among these is causal because the partial correlation coefficients are higher than the zero-order correlations, providing further evidence to support our theory.
Table 7.6 Regression of Variables Effecting Second Payments, controlling for Market Price

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<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-19.5(7.53)</td>
<td>-2.586</td>
<td>0.015</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitoring Index</td>
<td>6.70(2.30)</td>
<td>0.568</td>
<td>2.914</td>
<td>0.007</td>
<td>0.223</td>
<td>0.489</td>
</tr>
<tr>
<td>Percent of Producers</td>
<td>15.90(7.78)</td>
<td>0.492</td>
<td>2.042</td>
<td>0.051</td>
<td>-0.052</td>
<td>0.366</td>
</tr>
<tr>
<td>Number of Hotels</td>
<td>0.13(0.03)</td>
<td>1.674</td>
<td>4.804</td>
<td>0.000</td>
<td>0.277</td>
<td>0.679</td>
</tr>
<tr>
<td>State of the Cooperative's Credit Pool</td>
<td>0.25(0.12)</td>
<td>0.666</td>
<td>2.072</td>
<td>0.048</td>
<td>-0.038</td>
<td>0.370</td>
</tr>
</tbody>
</table>

R = .735; R² = .530; F = 7.919, p = .000

The relationship evaluated among the variables considered in H2 (homogeneity, monitoring, tourism opportunities, and prior year’s second payment) are also affected by the effect of market prices for lobster because of its direct effect on the second payment. After controlling for prior year’s second payments, the partial correlations for remaining variables thought to predict member commitment mostly show higher correlations than the zero-order coefficients presented in Tables 7.1 and 7.4 (Table 7.7). This indicates that group homogeneity and tourism may play direct causal roles in fishermen’s commitment to collective marketing with the cooperative, giving more support to theory concerning the effects of group composition and alternate livelihood opportunities on commitment to collective action institution rules.

Table 7.7 Partial Correlations for Commitment (H2), Controlling for Prior Year's Second Payment

<table>
<thead>
<tr>
<th></th>
<th>Homogeneity Index</th>
<th>Monitoring Index</th>
<th>Number of Hotels in Caye Caulker and San Pedro</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent of Producers (Commitment)</td>
<td>0.830</td>
<td>0.637</td>
<td>-0.855</td>
</tr>
<tr>
<td></td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>df = 28</td>
<td>df = 28</td>
<td>df = 28</td>
</tr>
<tr>
<td>Homogeneity Index</td>
<td></td>
<td>0.715</td>
<td>-0.912</td>
</tr>
<tr>
<td></td>
<td>0.000</td>
<td>0.000</td>
<td>df = 28</td>
</tr>
<tr>
<td></td>
<td>df = 28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitoring Index</td>
<td></td>
<td>0.000</td>
<td>-0.800</td>
</tr>
<tr>
<td></td>
<td>0.000</td>
<td></td>
<td>df = 28</td>
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</tbody>
</table>
Summary and Conclusions

I supplemented quantitative data with ethnographic context using multiple methods. This approach permits a clearer picture of a complicated multi-tiered collective action situation than one relying solely on qualitative description or formal quantitative modeling. This study demonstrates the value ethnography adds in understanding empirical problems and our theoretical propositions about them. It helps us evaluate theoretically complex and empirically anomalous socio-cultural phenomenon; without which, cases where sample size and issues of reconciling empirically appropriate observations of variables and their relationships confound statistical requirements concerning them would not be possible. Formal statistical analysis does not define the requirements of what constitutes a relevant and theoretically important story. Without ethnography, several important stories and empirical cases that help us advance knowledge about the human condition would remain untold. This ethnography has added to our understanding of the roles group composition, monitoring, and commitment play in shaping institutional resilience under a multi-tiered collective action situation.

Historical and ethnographic data presented in this thesis document how the Northern Cooperative has achieved the successes promised by grassroots development that relies on community-based collective action. Although this is indeed a success story in grassroots development, the cooperative’s economic successes have transformed it, their community, and the economic opportunities and resources available to them. The questions this thesis asks revolve around how institutions and their members cope with and react to their success and its effects on the institution, their communities, and their livelihoods. More specifically, this thesis considers the effects that several changes within and outside of the cooperative through its history have had on its continued prosperity and its resilience.

Jentoft (1986) cites institutional complexity and multi-purpose functions as characteristics that frequently challenge cooperatives’ effectiveness as institutional mechanisms to provide economic development in fisheries settings. Through Northern Cooperative’s growth, the emergence of credit services added to the cooperative’s institutional complexity and the diversity of its functions. Credit adds to multi-purpose functions in that it is a service outside the cooperative’s primary purpose—seafood
marketing for fishermen. It adds to institutional complexity in how it is structured as a multi-tiered collective action problem related to the primary problem of collective marketing. Over time, as members’ use of the credit pool grows, their commitment to marketing becomes more important in determining the cooperative’s resilience. When members fail to repay an increasing amount of outstanding debt by continuing their marketing transactions with the cooperative their delinquency affects both the cooperative and other, loyal members. Member delinquency diminishes the cooperative’s ability to pay its debt and loyal members’ economic returns because the costs to maintain and provide the credit are increased and spread among those who remain loyal and market with the cooperative, respectively.

Members market to the cooperative because of the services and benefits it provides to them (high prices, credit, fishing supplies, gear, etc.). They realize several individual benefits from their collective action, several benefits and resources that otherwise would not be available. While the direct economic benefits of second payment levels per pound of lobster are determined by forces outside their control (the market price for lobster), that fishermen are able to access the market that provides this economic benefit at all is an advantage in itself. Why do fishermen belonging to the cooperative shirk on their commitment to marketing if it is the source of so many direct and collateral benefits? Several interesting practical questions are derived from this one, and the remainder of this chapter focuses on addressing them: 1) Why has member non-productivity increased and commitment to marketing decreased over time?; 2) Given this trend, why has the cooperative not failed like others before it and why have most members continued marketing with cooperative?; and 3) What can we take from the data presented from this empirical case in order to “make things better,” or to help improve tendency for members to be loyal?

The ethnographic and quantitative data presented in this and previous chapters help answer the first question as to why, over time, member non-productivity increases and commitment to marketing decreases. These data show that membership composition and monitoring are significant factors shaping fishermen’s commitment to marketing with the cooperative. Over time, the cooperative’s membership has grown to be more heterogeneous and members’ opportunities for monitoring others’ transactions with the cooperative have declined. The changes in the cooperative’s membership composition and
monitoring options are paralleled by the expansion of tourism development throughout Belize and the
Northern Lagoon. This new industry provides several new kinds of livelihood strategies for rural
residents in places like Caye Caulker. While tourism and lobster fishing seasons schedule well to
compliment one another, tourism also provides competition, particularly in new domestic markets for
lobster outside the cooperative and in more lucrative business opportunities and reliable options for wage
work. A steady decrease in member commitment to marketing is associated with these developments
within and outside the cooperative (see H2 and Tables 7.1 and 7.7). These findings provide further
empirical evidence to support claims about the importance of group composition, monitoring
opportunities, commitment, and alternate livelihood strategies in determining resilience for collective
action institutions.

The first part of the second question noted above asks why the cooperative has not succumb to these
changes and failed like the others. This question is informed, again, by the ethnographic facts of this case
alone and in comparison with other similar cases. This case has a relatively large membership, it gives
out more substantial loans, and, to date, it has been successful in resolving the issues of complexity and
multi-purpose functions raised by the nested marketing and credit collective action problems. Although it
is faced with challenges in member commitment, these problems are not as critical as seen in other
settings, as for example in the Bolivian case described by Tendler (1988). While some fishermen have
decided to favor their individual short-term interests by free riding on the cooperative’s credit pool, the
total number of fishermen doing so is relatively small. Although serious and potentially threatening the
cooperative’s resilience, the problems raised by reduced member commitment and increasing member
delinquency are not yet endemic nor beyond repair. Most members remain loyal and continue marketing
with the cooperative (see Figure 6.2) One question this finding raises for future consideration is whether
there is a threshold of some kind that would push this cooperative, or other collective action institutions
more generally, to institutional collapse and failure and how one would go about finding it.

The second part of the second question asks why have most members continued marketing with
cooperative, given, for example, the reduced monitoring controls and proliferation of alternate livelihood
strategies in tourism. The answer to this question is more difficult to isolate, but several pieces of
ethnographic and historical data provide insight to it. Some of the qualitative reasons behind members
remaining committed to the cooperative are symbolic and are manifest at the individual, community, and
national levels. The dozen or so founding members who still produce for the cooperative have a deep
sense of pride in being part of the first fishing cooperative in their country. Their cooperative has
withstood, to date, many crises and endured where others failed. Other members’ pride is buried under
frustration, anger, and apathy; these members continue producing, but are concerned that their years’ of
dedication have been for naught and the cooperative is headed for trouble. Like these founding members,
members from Caye Caulker and several other long-time members from Belize City have great pride in
the cooperative’s accomplishments. The pride members have in their society is rooted in the legacy of
providing economic self-determination and socio-economic well-being for their families and village and
this is where the cooperative’s endurance begins to transcend individual sentiment and become symbolic
for a broader community.

The village of Caye Caulker maintains a sense of ownership over the cooperative, despite the
cooperative’s growth beyond the island. The cooperative’s Annual General Meeting is still held at the
caye, the cooperative and lobster fishing are revered during the village’s Lobster Fest celebration, and the
many residents who have ties to fishing and the cooperative, through kinship, marriage, and history, speak
with pride about the cooperative’s roots in the community and its importance for the fishermen. Finally,
the cooperative’s endurance has placed the it on a national pedestal; it is offered in scholarly research as
well as in school children’s lesson books as the model of success in grassroots development. These
narratives of success may likely contribute to fishermen wanting to continue their association with the
cooperative, particularly when they also receive individual benefits in doing so.

In addition to these emotional sentiments, most members have realized improved standards of living
because of the resources and benefits the cooperative provides. A common characteristic of resource
dependent rural economies around the world is that people’s livelihoods and their economic well-being is
largely determined by the demands for resources and commodities their labor produces. When the price
of a commodity rises or falls on the world market (for any number of reasons completely outside any of the producers’ control) the effects are felt, for good or ill. In fisheries, this is a particularly tricky business because of the chaotic fluctuations of catch caused by equally fickle variations in weather and climate, factors also outside of the fisherman’s control. This double dose of uncertainty demands that fishermen be adaptable and flexible in how, when, and where they work and how (or whether) they organize their fishing. The fishermen of Belize’s Northern Lagoon are dependent on the markets that pay for the lobster they produce. However, they are not without determination in this situation.

When fishermen from Caye Caulker began realizing their dependency on foreign markets and observed the high prices foreign companies were getting for lobster, the fishermen saw the potential for individual gain by pooling their resources through collective marketing. They used their cooperative to assert some control over their economic destiny. Fishermen who produce enough to earn a decent living by local standards have individual interests in committing to the cooperative because without it they lose access to the foreign markets that provide the consistently high returns, just as the cooperative’s founders realized. An additional motivation to commit to collective marketing today is that if the cooperative fails fishermen will also lose access to the common pool credit, which supports their fishing operations and provides an emergency fund in desperate times. Members’ continued commitment in marketing determines whether the cooperative will continue providing this same level of benefits to fishermen. How many or what percentage of members must remain loyal is not certain as this threshold is not understood; however, this case indicates that at least 70 – 80 % has been enough to keep this cooperative afloat.

The significance of the analysis presented above is that commitment to marketing and sustained access to credit play some role in determining the resilience of the cooperative itself, that it will be solvent and able to provide the institutional means necessary for fishermen to access the markets that offer the best prices and second payments at all. The cooperative provides access to whatever price the market offers, and this price is better than anything the local markets in Belize provide. Therefore, while the small amount of variation in second payments explained by commitment and the state of the credit pool is not statistically significant in the shadow of the market, these aspects of member loyalty are
significant to fishermen’s economic self-determination and overall socio-economic well-being because they sustain the cooperative. As the theory adopted here predicts, membership commitment is enhanced when the group is relatively homogenous in terms appropriate to an ethnographic setting, in this case fishermen’s residence, fishing gear, and their economic interests in the lobster fishery. However, while the cooperative is not facing collapse, there is certainly a need to addressing several concerns members voiced to me and related in the data presented here. This leads to the final question: What can we take from the data presented from this empirical case in order to “make things better,” or to help improve members’ tendency to be loyal?

There is no single proposal that this research can offer to resolve any of the problems this cooperative faces in reconciling member commitment and managing its credit pool. Rather, the significant findings presented above in association with my observations of particular behaviors and events while in the field produce a set of proposals that may prove useful in promoting monitoring opportunities, member commitment, and enhanced returns on seafood marketed to the cooperative. These suggestions fall within each of the three levels of analysis Ostrum (1990) outlines layered structures that shape behavior in collective action institutions: the constitutional, collective, and operational.

To provide a better environment in which the remaining larger fishing cooperatives might develop and promote more effective and fishermen defined monitoring opportunities involves the changing the national legislation governing cooperative societies in Belize. Cooperatives are a sound type of organization through which the benefits of economic development can be generated for rural fishing communities. The Northern Cooperative is a prime example of this. However, Jentoft (1986) argues that cooperatives fail because they have a flawed organizational model. While it is true that cooperatives sometimes fail because they are not well organized, poor organizational structure is not an inherent trait of all cooperatives. Cooperatives have the potential to succeed when they adapt the general organizational model of cooperatives and incorporate institutional mechanisms that promote commitment to the organization’s goals. However, constitutional level rules that govern their organization define, and limit, the scope of the rules they can formally institutionalize.
At the time of research, cooperative members elected managing committees by a popular vote, through direct democracy. As the cooperative’s demographics changed, the election results also changed; and members from Caye Caulker were soon out-voted by the more numerous membership constituencies from other parts of the country. Changes in leadership led to changes in policy and practice in allocating and managing the cooperative’s credit pool and general business operations. The findings presented above show that changes in the cooperative’s membership composition and monitoring opportunities affect the cooperative’s resilience through their effect on commitment.

Fishermen from the caye acknowledge this relationship, and proposed that the cooperative’s leadership structure be changed to something akin to proportionate representation, in what they called the “Zoning” proposal. This change in management structure, they thought, would improve monitoring and other controls over the cooperative’s finances. For instance, some members from the caye thought that this change would make it more likely to return to old practices, such as requiring collateral or co-signatories for all or larger loans. However, this kind of organizational change at the collective level cannot take place until revisions to the constitutional level rules that govern cooperatives in Belize empowers cooperatives to make them. The fishermen’s proposal reached the appropriate government and cooperative officials to instigate this change. I do not know whether this change was implemented as part of a new or revised Act for Cooperative Societies. Until this constitutional level change takes place, any monitoring changes will likely have to be instigated by the cooperative leadership. However, this kind of internal change under the current organizational parameters is doubtful given the historical non-response toward caye fishermen’s concerns over member delinquency. In the meantime, fishermen will continue to determine their livelihoods by the means they have available to them and, despite the difficult road to make collective change within a restrictive constitutional arrangement and non-responsive collective level leadership, there are several reasons to be optimistic about how fishermen and cooperative leaders can make a difference in this regard.

Cooperative leaders since the 1990s have worked to diversify the cooperative’s business. They have invested in real estate around their processing facility to generate rental income and as a means to prepare
for expansion in processing that may require more space. Some of the diversification in fishing included live lobster exports to Asian markets and a successful venture into shrimping. The live lobster project was at first a success, but by the latter half of the 1990s it had floundered after the economic downturn in several national economies in Asia. The shrimping venture, however, has proven more successful; and in 1999, the cooperative began to realize more significant profits from the operation of two trawlers they had purchased. More recently in 2003, one of the cooperatives primary customers sponsored an exploratory research project into lobster farming. The logistics of this operation are difficult and complex, but the type of collective level creativity and experimentation that may yield higher returns for members. However, this particular type of venture may cause problems for local ecosystems and patterns of fishing. Fishermen and local fishing communities will benefit from appropriate environmental, social, and economic impact assessments that should be carried out in association with this kind of experiment.

Research and outreach that explores and then promotes viable fishing methods, new and traditional technologies, and innovative ways to create value-added products to market can enhance the value of the fishery, the pay-off of stewardship, and the attractiveness of committing to the cooperative. Fishermen are entrepreneurs tied closely to their resource base. Some are exploiting the resource and the cooperative for short-term benefits. Some others see the value in practicing stewardship and committing to the cooperative to ensure long-term advantages from their livelihood. Most, however, are in the middle, they are mostly committed loyal members and practice “normal” fishing methods; they take some shorts to eat, rarely sell them to restaurants, and are mostly interested in earning a living for their family. By instituting research and outreach agendas that engage progressive members’ practices and ideas, the cooperative can develop collective level structures that provide opportunities for fishermen to enhance their income earning potential, which may motivate members to continue producing and others to return to marketing more regularly.

This leads us to the operational level behaviors where members can create, through their practice, the foundation for future rules and institutions. Fishermen make small decisions each day about how they carry-out their livelihood. Alone, the outcomes of these choices make small differences in the well-being
of the cooperative and the lobster fishery. Taken together, these small differences accumulate to have a more substantial effect in the fishery, the outcome of fishermen’s livelihoods, and the well-being and resilience of their cooperative. Because little of what fishermen do affects the price they get for lobster, the primary variable determining their second payment, the little things they do to affect the things they can control are of the most significance.

Although the market price determines members’ second payment and this is out of members’ control, fishermen are not without control over their economic returns. Because these fishermen depend on precarious and unpredictable variables that determine the outcome of their fishing operations, the things that they can control, their commitment in marketing and the state of the credit pool, can make a more significant difference, particularly during years of shortfall and crisis. By delivering their catch to the cooperative and by practicing sound stewardship when harvesting their catch, fishermen can affect the prices the cooperative negotiates for their production on the market because both the quantity and the quality of their catch matter.

The quantity of catch is important for two reasons. If members do not deliver their catch to the cooperative in bad years, the ill effects of any outstanding accounts are amplified because individuals and the aggregate membership have likely taken out loans in excess of the value of their low catch in a poor season. Regardless of the quality of the season, but again more importantly in bad years, the more lobsters the cooperative has to choose from, the better position it is in to offer the best product and receive a higher price on the market. For example, if the cooperative has orders for 30,000 pounds of lobster and the price depends on the quality and select sizes of tails, with 50,000 pounds in stock they are in a good position to fill the order with the product that offers the highest return. This position of being able to fill orders with the most desirable types of lobsters is also affected by the quality of catch members deliver. The cooperative will have the best product to offer on the market to demand the best possible price among the highest offers available when fishermen do not harvest soft lobsters, egg-bearing lobsters whose tails must be scraped, and tails with cracked shells from hook sticks. By following these rules and others, like
not taking short lobsters, fishermen also enhance the overall well-being of the lobster fishery and its reproductive potential.

Fishermen at Caye Caulker showed me that they are interested in changing the way they fish and organize themselves in order to ensure their continued prosperity and that they have ideas about how to accomplish this end. Together they demonstrated this by proposing changes to how the cooperative’s management is structured. This was described in Chapter Six as the Zoning Proposal. Individually, several fishermen showed how they are willing to adopt new fishing methods that enhance their production and decrease their impact on the well-being of the lobster population.

Fishermen’s use of artificial habitats in their fishing territories enhances the fishing grounds by providing more shelter for lobsters to “stick around,” as fishermen put it. Investment into the appropriate size, material, and locations of different artificial habitats may prove to enhance the fishery’s productivity even more, in addition to providing and improving habitat for other varieties of marine life. The fisherman I described in Chapter Five who used a net instead of a hook stick when diving contributes to the improved quality of catch for the cooperative and allows him to have more control over his harvesting decisions. Capturing live lobsters while diving does not break the shell, does not kill the lobster, and allows him to return the small ones to the sea if he so chooses. These opportunities to be more selective in how one fishes benefits the fishery and the cooperative, both of which ultimately benefit all fishermen.

Capturing lobsters with a net is beneficial because if the lobster is too small, bearing eggs, or soft from molting, the fisherman can still return it to the sea with a high chance of survival, thus reducing mortality. In addition, hooking lobsters can sometimes damage the shells and rupture blood vessels leading to discolored meat (turned black from the lobster’s copper-based blood). Lobster tails with damaged shells or discolored meat are of inferior quality and are not exported. The cooperative rejects some of these lobsters, but does buy some of them. This portion of the catch, however, is held back for the domestic market. When the domestic supply from the cooperative is of such inferior quality, tourist restaurants are not likely to find the cooperative an attractive supplier. This leads restaurants to search for fishermen to supply them with higher quality product, which then the cooperative is not able to buy. In
addition, throwing small, egg-bearing, and molting lobsters back helps reduce labor expenses in the receiving stations and processing plants because the inferior product is not there to sort out. The use of shades and nets instead of hook sticks are two independent changes that compliment one another to the benefit of all.

One fisherman with whom I worked closely agreed to participate in an experiment with vented lobster traps. This experiment provided evidence to suggest that vented traps are at least no worse than traditional traps and they may be more efficient. With more experiments, modifications to this design may produce a trap that reduces the costs of trap construction, the time and fuel spent at sea, and fishermen’s effect on lobster mortality. Several of these measures require little modifications to traditional fishing technology and may contribute to the long-term sustainability of the fishery (see Appendix E).

These small differences do not require expensive or intrusive changes to the traditional methods of fishing, but do help the cooperative provide a quality product to the market, and many fishermen have adopted them. All of these examples show how fishermen are not simply conservative resource exploiters, but are willing to experiment with new ideas and adapt technologies to their needs to improve the fishery and their livelihoods. Fishermen’s daily decisions on the boat, the little choices they make in deciding how to harvest their catch, which lobsters to keep, and where to market his catch, make a difference in the future resilience of the cooperative and the lobster fishery on which it depends. When the institutions that fishermen have available to support their livelihoods promote and engender good sets of options so that they have the opportunity to make the locally appropriate (“right”) choices for their households, communities, and ecology, then their successes will likely continue. The cooperative is one institution that can provide a foundation for making good choices available.

The cooperative is likely to persist as long as the benefits of collective marketing surpass those generated for the majority of fishermen in a marketing environment without the cooperative. Fishermen calculate this level of benefit in their daily marketing decisions using their historical experience with foreign merchants and in their knowledge of the value of their product in the domestic market when
saturated (historically in Belize and contemporarily in tourism). The cooperative is the most consistent and reliable market for them, and it will be as long as most remain loyal to it. Once the reward from taking the risk of going it alone, without the cooperative’s favor, outweighs the expected benefits conferred by the cooperative, delinquency will overcome loyalty and the cooperative will fail.
Appendix A

Belizean Marine and Fisheries Resource Management Institutions

In addition to the Belize Fisheries Department and the fishing cooperatives, several other institutions play a role in fisheries and marine ecosystem management issues in Belize. This appendix provides some details about some of the more influential ones, including: the Caricom (Caribbean Community) Fisheries Resource Assessment and Management Project (CFRAMP), the Belize Fishermen’s Cooperative Association (BFCA), the Fishery Advisory Board (FAB), and the Coastal Zone Institute (CZI).

CFRAMP has helped place Belize at the forefront of fisheries management in the Caribbean, particularly in the lobster fishery. CFRAMP maintains one of its regional offices in Belize City and hosts the organization’s center for research in lobster and conch fisheries management. This umbrella organization provides education resources, extension services, and research in the Caribbean region that aims to assist local fishing communities and economies in developing along a sustained path. CFRAMP works in association with local institutions, such as the Fisheries Department, the Coastal Zone Institute, and fishing cooperatives to assist in fisheries management efforts.

The BFCA was organized to provide technical assistance, educational opportunities, natural resource management training and guidance, and other services to all Belizean fishing cooperatives. It was intended to act as an umbrella organization similar to larger agricultural cooperative associations found in the United States. Member cooperatives’ annual dues, state contributions, and external grants have funded association programs and projects. The NFCS withdrew from the BFCA due to conflicts over allocation and use of resources donated to the Fisheries Department. The FD was misusing boats the BFCA supplied to them to patrol the southern border regions where Guatemalans and Hondurans poach in Belizean waters. When NFCS members were harassed and treated badly by patrols using the boats in the Northern Lagoon they reported the incidents to the Managing Committee. The NFCS saw the patrols in the Northern Lagoon area as a breach of trust and agreement on the part of the FD. BFCA has struggled since the NFCS withdrew from it.
The FAB is the Minister of Agriculture, Fisheries, and Cooperatives’ expert fisheries management panel. It consists of several academic experts, governmental and non-governmental personnel, and business leaders with a wide variety of interests in fishing, the coastal zone environment, and the economic development activities affecting them (particularly tourism). The board meets monthly and is mainly a forum to discuss and make recommendations to the Minister concerning the natural resources making up the coastal zone, fishery resources, and other natural resources. All of the fishing cooperative’s Managing Committee chairmen sit on the board as the representatives for the nation’s fishermen.

The CZI is a research-based institution that promotes local research in Belize’s coastal zone. Through liaisons with other Belizean institutions and international organizations it provides information to government that advocates ecologically sound principles to guide management planning and policy. The CZI represents the scientific and environmental conservation views on the FAB.
Appendix B

Census Data Collection and Defining Households as a Unit of Study

The purpose of the village census was three-fold. First, I wanted to get to know the village and identify the population of fishermen beyond the small number of families of the fishermen I had met in 1995 and 1997. Second, I wanted to obtain basic socio-economic and demographic data about the entire population in order to be able to compare the lobster fishing households with those that were not in lobster fishing; in particular, those households involved in tourism and others who had migrated to the caye since the time of Sutherland’s research in the 1980s. Third, by visiting all the households on the caye, I could let the people get to know me and learn about what I was doing.

I counted and approached 378 households on the caye. I was granted interviews with 347 of them, was turned away by four, and no one was home or answered the door to my calls for the remaining 26. I defined a household primarily based on dwellings or houses, members were included as those living in the home at least some of the time. Because I did not intend for my counting to be used outside of constructing a sample frame from which to define a population of fishermen, I was not overly worried about most of the methodological and policy considerations Wilk and Miller (1997) raise in defining a household as a unit of observation. My primary concern was to be consistent in how I accounted for households and that I was using a method that was locally meaningful to how people organize themselves into domestic units. For this and other reasons, the results of my census do not provide a good comparison with past National censuses. However, the more precise and meticulous accounting for full-time and part-time residents, people who were present and absent at the time of the interview, and the duration of time I was able to dedicate to the task allowed me to learn about important factor’s Wilk and Miller (1997) suggest are overlooked in many census methodologies.

The typical household structure at the caye consists of a resource-pooling unit comprised of members who are related by kinship. The large majority was comprised of nuclear family units; however, several variations included multi-generational extended families, single older men and women, siblings, non-kin
groups (friends or co-workers) who share rent, among others. I did not count some households because although I was aware of their presence in the village they had moved away from the village before I reached their residence. Likewise, there are household units and individuals within households who moved to the caye after I began the census, and these were counted because I had not reached that part of the village yet. If I noticed a previously unoccupied household in an area I had already visited, I returned to interview someone living there. For the households that I was not able to interview, I talked to neighbors to learn the composition of the household and the nature of their primary work and livelihoods.

I was pleasantly surprised at the overwhelming support and participation on the part of community members. I think many community members were also surprised to learn of the high rate of participation. At least once a week someone I interviewed or someone I spoke with outside the census in casual conversation would ask how others were responding and participating in the project. When I conveyed nearly everyone agreed to speak with me, the response was usually surprise. I believe that the high response rate is largely attributed to the length of time I was able to spend at it. I was able to return to households who were not available on initial calls and I was around the village so people were aware of my presence and could learn of my intent. In addition, I had established good rapport with several villagers and Village Council members from past visits and by actively participating in clean-up efforts after Hurricane Mitch, which also added to my credibility and trustworthiness to some.

Interviews were short, mostly lasting no more than 15 minutes. Several, however, took much longer because of there being more people to describe livelihoods for and some people asked questions about me and were interested to learn more about the fishing and cooperative aspects of the project. Others simply appreciated the opportunity to talk with someone who was interested in their life and their family. These longer interviews were helpful in learning more about the relationships between households and families around the caye.
Appendix C

Identifying the Population of Fishermen from Caye Caulker:
Issues of Sampling and Representation

This Appendix elaborates on the issues of representation and bias from using a non-random sample for interviews with fishermen from the caye. I was aware of some of the biases as I was conducting the project and tried to control for it when I could by choosing different “types” of fishermen to interview based on my knowledge of the community from the census. Therefore, the sample was opportunistic, but was not taken by a snowball method. I used a semi-structured interview and survey format and initiated the project with two fishermen I knew well in order to work out any problems with the questions. After these initial interviews, I began asking fishermen to participate. Four fishermen I approached for interviews declined to participate, and in the end, I had interviewed 45 fishermen. The interviews lasted nearly an hour; some lasted more than 90 minutes. Two interviews were conducted in two parts because of this long duration.

The biases introduced by this approach resulted in a sample that included more trappers than divers, more fishermen who are relatively wealthy, more local households, and older fishermen. In other respects, the sample is a fairly well distributed mix of fishermen from the caye, considering involvement in tourism, household size, and whether the household rents or owns their primary residence. The following tables show how the fishermen I interviewed are representative of the population of fishermen from the caye. Chi-square statistics are provided when possible.
Table C.1, Fishing Households: Size

<table>
<thead>
<tr>
<th>Number of People in Household</th>
<th>In Sample of Fishing Households</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Yes</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>10</td>
<td>6</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>3</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>16</td>
<td>7</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>20</td>
<td>11</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>15</td>
<td>8</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>6+</td>
<td>11</td>
<td>9</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>44</td>
<td>124</td>
<td></td>
</tr>
</tbody>
</table>

Table C.2, Fishing Households: Origin, Local or Non-Local

<table>
<thead>
<tr>
<th>Household Origin</th>
<th>In Sample of Fishing Households</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Yes</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Local</td>
<td>47</td>
<td>36</td>
<td>83</td>
<td></td>
</tr>
<tr>
<td>Non-Local</td>
<td>33</td>
<td>8</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>44</td>
<td>124</td>
<td></td>
</tr>
</tbody>
</table>

$X^2 = 6.825, \, df = 1, \, p = .009, \, n = 124$

Table C.3, Fishing Households: Ownership or Renting of Primary Residence

<table>
<thead>
<tr>
<th>Household Tenure</th>
<th>In Sample of Fishing Households</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Yes</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Owner</td>
<td>55</td>
<td>35</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td>Renter</td>
<td>25</td>
<td>9</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>44</td>
<td>124</td>
<td></td>
</tr>
</tbody>
</table>

$X^2 = 1.662, \, df = 1, \, p = .197, \, n = 124$
### Table C.4, Fishing Households: Ownership of Other Property

<table>
<thead>
<tr>
<th>Owns other Property</th>
<th>In Sample of Fishing Households</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
</tr>
<tr>
<td>At Caye Caulker</td>
<td>15</td>
</tr>
<tr>
<td>Outside Caye Caulker</td>
<td>9</td>
</tr>
<tr>
<td>At and Outside Caye Caulker</td>
<td>2</td>
</tr>
<tr>
<td>No Other Property</td>
<td>54</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>80</strong></td>
</tr>
</tbody>
</table>

### Table C.5, Fishing Households: Boat Ownership

<table>
<thead>
<tr>
<th>Owns other Property</th>
<th>In Sample of Fishing Households</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
</tr>
<tr>
<td>No Boats</td>
<td>35</td>
</tr>
<tr>
<td>One Boat</td>
<td>37</td>
</tr>
<tr>
<td>Two or More Boats</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>80</strong></td>
</tr>
</tbody>
</table>

\[ X^2 = 15.737, \text{df} = 2, p = .000, n = 124 \]

### Table C.6, Fishing Households: Reliance on Tourism

<table>
<thead>
<tr>
<th>Household Relies on Tourism</th>
<th>In Sample of Fishing Households</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
</tr>
<tr>
<td>No</td>
<td>25</td>
</tr>
<tr>
<td>Yes</td>
<td>55</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>80</strong></td>
</tr>
</tbody>
</table>

\[ X^2 = 1.169, \text{df} = 1, p = .280, n = 124 \]
### Table C.7, Fishing Households: Nature of Tourism Participation

<table>
<thead>
<tr>
<th>How Household is Involved with Tourism</th>
<th>In Sample of Fishing Households</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Not in Tourism</td>
<td>25</td>
</tr>
<tr>
<td>Wage Work in Tourism</td>
<td>32</td>
</tr>
<tr>
<td>Runs a Business</td>
<td>23</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
</tr>
</tbody>
</table>

$X^2 = 1.637$, df = 2, $p = .001$, $n = 124$

### Table C.8, Fishing Households: Involvement in Lobster Fishing

<table>
<thead>
<tr>
<th>Involvement in Lobster Fishing</th>
<th>In Sample of Fishing Households</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Traps</td>
<td>40</td>
</tr>
<tr>
<td>Diver</td>
<td>17</td>
</tr>
<tr>
<td>Laborer on Boat</td>
<td>23</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
</tr>
</tbody>
</table>

$X^2 = 17.813$, df = 2, $p = .000$, $n = 124$

### Table C.9, Individual Fishermen: Involvement in Lobster Traps and Not Traps

<table>
<thead>
<tr>
<th>Involvement in Lobster Fishing</th>
<th>In Sample of Fishing Households</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Traps</td>
<td>56</td>
</tr>
<tr>
<td>Diver/Laborer</td>
<td>54</td>
</tr>
<tr>
<td>Total</td>
<td>110</td>
</tr>
</tbody>
</table>

$X^2 = 19.540$, df = 1, $p = .000$, $n = 155$
Table C.10, Individual Fishermen: Involvement in Lobster, Method Details

<table>
<thead>
<tr>
<th>Involvement in Lobster Fishing</th>
<th>No</th>
<th>Yes</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traps Only</td>
<td>46</td>
<td>23</td>
<td>69</td>
</tr>
<tr>
<td>Traps and Shades</td>
<td>11</td>
<td>17</td>
<td>28</td>
</tr>
<tr>
<td>Dives Shades</td>
<td>5</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Dives Reef</td>
<td>14</td>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td>Laborer on Boat</td>
<td>34</td>
<td>1</td>
<td>35</td>
</tr>
<tr>
<td>Total</td>
<td>110</td>
<td>45</td>
<td>155</td>
</tr>
</tbody>
</table>

Table C.11, Individual Fishermen: Production with Cooperative

<table>
<thead>
<tr>
<th>Cooperative Production</th>
<th>No</th>
<th>Yes</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large Producer</td>
<td>2</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Medium Producer</td>
<td>24</td>
<td>21</td>
<td>45</td>
</tr>
<tr>
<td>Small Producer</td>
<td>40</td>
<td>16</td>
<td>56</td>
</tr>
<tr>
<td>Non-Producer</td>
<td>13</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>Not in Cooperative</td>
<td>31</td>
<td>1</td>
<td>32</td>
</tr>
<tr>
<td>Total</td>
<td>110</td>
<td>45</td>
<td>155</td>
</tr>
</tbody>
</table>

Table C.12, Individual Fishermen: Involvement with Tourism

<table>
<thead>
<tr>
<th>Does Fisherman Work in Tourism</th>
<th>No</th>
<th>Yes</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>45</td>
<td>20</td>
<td>65</td>
</tr>
<tr>
<td>Yes</td>
<td>65</td>
<td>25</td>
<td>90</td>
</tr>
<tr>
<td>Total</td>
<td>110</td>
<td>45</td>
<td>155</td>
</tr>
</tbody>
</table>

$$X^2 = .164, \text{ df } = 1, \ p = .686, \ n = 155$$
Table C.13, Individual Fishermen: Nature of Involvement with Tourism

<table>
<thead>
<tr>
<th>How Fisherman Participates in Tourism</th>
<th>In Sample of Fishing Households</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Not in Workforce or is Student</td>
<td>5</td>
</tr>
<tr>
<td>Not in Tourism</td>
<td>47</td>
</tr>
<tr>
<td>Laborer</td>
<td>39</td>
</tr>
<tr>
<td>Business</td>
<td>19</td>
</tr>
<tr>
<td>Total</td>
<td>110</td>
</tr>
</tbody>
</table>

Table C.14, Individual Fishermen: Age

<table>
<thead>
<tr>
<th>Age</th>
<th>In Sample of Fishing Households</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
</tr>
<tr>
<td>&lt; 15</td>
<td>3</td>
</tr>
<tr>
<td>15 - 24</td>
<td>19</td>
</tr>
<tr>
<td>25 - 34</td>
<td>34</td>
</tr>
<tr>
<td>35 - 44</td>
<td>23</td>
</tr>
<tr>
<td>45 - 54</td>
<td>9</td>
</tr>
<tr>
<td>55 - 64</td>
<td>7</td>
</tr>
<tr>
<td>65 +</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>99</td>
</tr>
</tbody>
</table>
# Appendix D

**Table D.1: Average Market Price NFCS Members Received for Lobster**

<table>
<thead>
<tr>
<th>Year</th>
<th>Average Market Price (BZES)</th>
<th>Average Market Price (BZES adjusted for inflation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1963</td>
<td>$0.80</td>
<td>$1.76</td>
</tr>
<tr>
<td>1964</td>
<td>$0.87</td>
<td>$1.90</td>
</tr>
<tr>
<td>1965</td>
<td>$1.25</td>
<td>$2.71</td>
</tr>
<tr>
<td>1966</td>
<td>$1.75</td>
<td>$3.76</td>
</tr>
<tr>
<td>1967</td>
<td>$2.00</td>
<td>$4.26</td>
</tr>
<tr>
<td>1968</td>
<td>$2.64</td>
<td>$5.54</td>
</tr>
<tr>
<td>1969</td>
<td>$4.58</td>
<td>$9.39</td>
</tr>
<tr>
<td>1970</td>
<td>$3.49</td>
<td>$6.98</td>
</tr>
<tr>
<td>1971</td>
<td>$3.93</td>
<td>$7.62</td>
</tr>
<tr>
<td>1972</td>
<td>$5.46</td>
<td>$10.37</td>
</tr>
<tr>
<td>1973</td>
<td>$5.23</td>
<td>$9.78</td>
</tr>
<tr>
<td>1974</td>
<td>$7.22</td>
<td>$13.00</td>
</tr>
<tr>
<td>1975</td>
<td>$7.20</td>
<td>$12.17</td>
</tr>
<tr>
<td>1977</td>
<td>$11.52</td>
<td>$17.74</td>
</tr>
<tr>
<td>1978</td>
<td>$10.67</td>
<td>$15.79</td>
</tr>
<tr>
<td>1979</td>
<td>$14.05</td>
<td>$19.67</td>
</tr>
<tr>
<td>1980</td>
<td>$14.16</td>
<td>$18.27</td>
</tr>
<tr>
<td>1981</td>
<td>$15.04</td>
<td>$17.45</td>
</tr>
<tr>
<td>1982</td>
<td>$18.13</td>
<td>$19.04</td>
</tr>
<tr>
<td>1983</td>
<td>$16.49</td>
<td>$16.49</td>
</tr>
<tr>
<td>1984</td>
<td>$17.72</td>
<td>$17.01</td>
</tr>
<tr>
<td>1985</td>
<td>$17.52</td>
<td>$16.12</td>
</tr>
<tr>
<td>1986</td>
<td>$16.92</td>
<td>$15.40</td>
</tr>
<tr>
<td>1987</td>
<td>$20.76</td>
<td>$18.06</td>
</tr>
<tr>
<td>1988</td>
<td>$25.87</td>
<td>$21.47</td>
</tr>
<tr>
<td>1989</td>
<td>$19.89</td>
<td>$15.51</td>
</tr>
<tr>
<td>1990</td>
<td>$19.80</td>
<td>$14.45</td>
</tr>
<tr>
<td>1991</td>
<td>$23.58</td>
<td>$16.03</td>
</tr>
<tr>
<td>1992</td>
<td>$24.62</td>
<td>$16.00</td>
</tr>
<tr>
<td>1993</td>
<td>$25.60</td>
<td>$15.87</td>
</tr>
<tr>
<td>1994</td>
<td>$23.48</td>
<td>$14.09</td>
</tr>
<tr>
<td>1995</td>
<td>$30.22</td>
<td>$17.23</td>
</tr>
<tr>
<td>1996</td>
<td>$26.91</td>
<td>$14.53</td>
</tr>
<tr>
<td>1997</td>
<td>$24.12</td>
<td>$12.54</td>
</tr>
<tr>
<td>1998</td>
<td>$30.05</td>
<td>$15.03</td>
</tr>
<tr>
<td>1999</td>
<td>$27.29</td>
<td>$13.10</td>
</tr>
</tbody>
</table>

Sources: NFCS Annual Reports (1968-1999); Price-Daly (1984:73); CPI and inflation data from [http://minneapolisfed.org/research/data/us/calc/hist1913.cfm](http://minneapolisfed.org/research/data/us/calc/hist1913.cfm), chained 1982-84 = 100
Appendix E

A Natural Experiment with Vented Lobster Traps in Belize, Central America

This Appendix describes an experiment designed to test the differences in catch between two types of lobster traps in Belize. It is modeled after one conducted by a lobsterman in New Hampshire (see Greenwood, et al. 1982). The NH fisherman used wider lath spacing as a venting, or escapement, mechanism allowing small sized lobsters to exit the trap as he hauls it to the boat. The NH experiment found that the vented lobster traps caught fewer “shorts” (sub-legal sized lobster) and more “counts” (legal sized lobster) than the regular traps used as a control set. I will present data and findings from Belize and conclude with implications for lobster management policy and a plan of future research.

I introduced a local fisherman to the idea of an experiment with vented lobster traps. He thought it sounded interesting and suggested that we try it. We discussed how to build the vented traps, how many to use, and how to collect the data while not interrupting his work too much. Since earning a living is Jim’s first priority, he did not want the space in the vented traps too wide to let out any legal sized lobsters, so we agreed to start with a space of 1.5 inches. We widened the space to 1.75 inches after the first haul, observing that the space was not wide enough. These hauls were not used in the data presented here. We used 20 vented traps and 20 control traps set in two different areas. On days that this fisherman hauled traps that were not in the experiment, I accompanied him fishing to help locate traps. As his helper removed lobsters and scrubbed the trap, I worked in the front of the boat spotting traps in the water as the fisherman navigated to the next trap. All the traps Jim works are in areas of mixed sand and seagrass in 11 to 12 feet of water, one behind Caye Caulker and one behind Caye Chapel.

I recorded information from 178 hauls on 14 days of fishing between July and November 1999. I collected the lobsters kept from vented and control traps, measured their carapace, and noted if it was less than or greater than 3 inches. I also recorded the number of lobsters thrown back, if there were any dead lobsters in the trap, other kinds of marine life in the trap, called by-catch, and the number of days the trap was set. I separated lobsters from control and vented traps and these lobsters from the rest of the lobsters.
kept from the day’s catch. After cleaning the lobsters, we brought them to the cooperative receiving station to be weighed. I recorded the number and weights of tails for vented and control traps, as well as the number of “rejects,” the lobster tails that the cooperative does not accept because they weigh less than four ounces.

Table E.1 compares the catches from vented and control (traditional) traps, noting whether the traps captured shorts. As you can see, there is no difference between these traps in terms of the number of shorts they capture. Traditional trap hauls caught no shorts even slightly more often than the vented traps; however, this difference is not statistically significant, as the Chi-square test shows. Figure E.1 reports the relative frequency of the number of shorts captured, in percent of hauls, by whether the trap’s venting status.

<table>
<thead>
<tr>
<th>Presence of small lobsters in trap</th>
<th>Trap type</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>control trap</td>
<td>vented trap</td>
</tr>
<tr>
<td>0 shorts</td>
<td>20</td>
<td>18</td>
</tr>
<tr>
<td>1 or more shorts</td>
<td>34</td>
<td>36</td>
</tr>
<tr>
<td>Total</td>
<td>54</td>
<td>54</td>
</tr>
</tbody>
</table>

\[X^2 = .162, \text{df} = 1, p = .687, n = 108\]
While the Chi Square test and the line graph show that the vented traps do not reduce small lobster handling, observations while fishing proved that the vented traps do allow small lobsters to swim free as the trap is being hauled to the boat. Small lobsters swam out of the vented traps as the traps were pulled to the boat; others fell out of the trap and into the water as the trap sat on the edge of the boat. These observations made us think the traps were working. However, the results presented above do not support our perceptions, and it could be that vented traps increased the handling of small lobsters.

Knowing something about the spiny lobster, its habitat, and the fishing technology helps us understand what may be going on and how to interpret these results. Fishermen in Belize do not bait their traps because they do not have to. Spiny lobsters are nocturnal scavengers and seek out shelter as the day breaks. Their natural shelter habitats include the Barrier Reef and other small patch reefs, caves, and rocks. Lobster traps act as an artificial habitat, as they provide a place for lobsters to hide and escape predators and the daylight.
Observations and interviews with fishermen who work in the area behind Caye Caulker suggest that this area harbors more small lobsters than other areas. Tables E.2 and E.3 show the differences in catch of shorts by fishing area, and support my observations and fishermen’s reports. In both areas, there are no differences in catch between vented and traditional traps. However, Caye Caulker traps are rarely without a small lobster. My theory is that, especially in areas like Caye Caulker where there are more small lobsters, the vented traps functioned like a type of artificial habitat for smaller lobsters because they can move freely in and out of the traps through the venting space.

**Table E.2: Cross Tabulations of Trap Type by Fishing Area: Caye Chapel**

<table>
<thead>
<tr>
<th>Presence of small lobsters in trap</th>
<th>Trap type</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>control trap</td>
<td>vented trap</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 shorts</td>
<td>17</td>
<td>16</td>
<td></td>
<td>33</td>
</tr>
<tr>
<td>1 or more shorts</td>
<td>16</td>
<td>17</td>
<td></td>
<td>33</td>
</tr>
<tr>
<td>Total</td>
<td>33</td>
<td>33</td>
<td></td>
<td>66</td>
</tr>
</tbody>
</table>

$X^2 = .061, \text{ df } = 1, p = .806, n = 66$

**Table E.3: Cross Tabulations of Trap Type by Fishing Area: Caye Caulker**

<table>
<thead>
<tr>
<th>Presence of small lobsters in trap</th>
<th>Trap type</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>control trap</td>
<td>vented trap</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 shorts</td>
<td>3</td>
<td>2</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>1 or more shorts</td>
<td>18</td>
<td>19</td>
<td></td>
<td>37</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>21</td>
<td></td>
<td>42</td>
</tr>
</tbody>
</table>
Why do these small lobsters not fall out as the trap is pulled? I think that the spacing between the bottom lathe and the base of the trap is still too small or is not placed appropriately on the trap. Increasing the space to 2 inches and experimenting with vents on the rear of the trap would be two promising variations to test these ideas. Besides the benefits to the reproductive health of the lobster population in reducing the handling of small lobsters, fishermen may realize direct economic benefits from appropriately designed and inexpensively produced vented traps.

When there are fewer small lobsters in the trap to sort through and throw back to the sea, time and fuel can be conserved while at sea. If wider lathe spacing or an alternative vent could be found to reduce the catch of shorts, I believe that fishermen may consider such a design. As several fishermen have adopted shades, I think they would be willing to try vented traps of the simple design we used because it modifies the traditional trap only slightly, uses the same materials, and may even reduce the costs of building traps—as the lathes on the sides could be reduced from five or six to four or five. The problem of small lobster harvesting is growing in Belize. Increasing numbers of fishermen are supplying increasing numbers of restaurants that feed the increasing number of tourists visiting Belize. This trap design may be a useful way for fishermen to balance the detrimental behaviors of the few by reducing their own impact on small lobster mortality.
Appendix F

NFCS Production by Members’ Place of Residence 1996-1999

Table F.1, Pounds of Lobster Tails by Member Residence 1996-1999

<table>
<thead>
<tr>
<th>Place of Residence</th>
<th>1996</th>
<th>1997</th>
<th>1998</th>
<th>1999</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caye Caulker</td>
<td>48265.5</td>
<td>28158</td>
<td>98949.5</td>
<td>70821</td>
</tr>
<tr>
<td>All, not Caye Caulker</td>
<td>224641.5</td>
<td>185551</td>
<td>225643.5</td>
<td>188148</td>
</tr>
<tr>
<td>Belize City</td>
<td>97141</td>
<td>69649.5</td>
<td>93130.5</td>
<td>61859</td>
</tr>
<tr>
<td>Sarteneja</td>
<td>72589.5</td>
<td>77036.5</td>
<td>78574.5</td>
<td>69922</td>
</tr>
<tr>
<td>Dangriga</td>
<td>21990.5</td>
<td>27782</td>
<td>23931.5</td>
<td>12934</td>
</tr>
<tr>
<td>San Pedro</td>
<td>5725</td>
<td>4496</td>
<td>8706</td>
<td>5567</td>
</tr>
<tr>
<td>Punta Gorda</td>
<td>7620</td>
<td>6009</td>
<td>4938</td>
<td>6514.5</td>
</tr>
<tr>
<td>Residence Unknown</td>
<td>19575.5</td>
<td>578</td>
<td>16363</td>
<td>31351.5</td>
</tr>
<tr>
<td>Total Cooperative Membership</td>
<td>272907</td>
<td>213709</td>
<td>324593</td>
<td>258969</td>
</tr>
</tbody>
</table>

Table F.2, Percent of Lobster Tails by Member Residence 1996-1999

<table>
<thead>
<tr>
<th>Place of Residence</th>
<th>1996</th>
<th>1997</th>
<th>1998</th>
<th>1999</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caye Caulker</td>
<td>17.69%</td>
<td>13.18%</td>
<td>30.48%</td>
<td>27.35%</td>
</tr>
<tr>
<td>All, not Caye Caulker</td>
<td>82.31%</td>
<td>86.82%</td>
<td>69.52%</td>
<td>72.65%</td>
</tr>
<tr>
<td>Belize City</td>
<td>35.59%</td>
<td>32.59%</td>
<td>28.69%</td>
<td>23.89%</td>
</tr>
<tr>
<td>Sarteneja</td>
<td>26.60%</td>
<td>36.05%</td>
<td>24.21%</td>
<td>27.00%</td>
</tr>
<tr>
<td>Dangriga</td>
<td>8.06%</td>
<td>13.00%</td>
<td>7.37%</td>
<td>4.99%</td>
</tr>
<tr>
<td>San Pedro</td>
<td>2.10%</td>
<td>2.10%</td>
<td>2.68%</td>
<td>2.15%</td>
</tr>
<tr>
<td>Punta Gorda</td>
<td>2.79%</td>
<td>2.81%</td>
<td>1.52%</td>
<td>2.52%</td>
</tr>
<tr>
<td>Residence Unknown</td>
<td>7.17%</td>
<td>0.27%</td>
<td>5.04%</td>
<td>12.11%</td>
</tr>
<tr>
<td>Total Cooperative Membership</td>
<td>100.00%</td>
<td>100.00%</td>
<td>100.00%</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

Table F.3, Percent of Producing Members by Place of Residence 1996-1999

<table>
<thead>
<tr>
<th>Place of Residence</th>
<th>1996</th>
<th>1997</th>
<th>1998</th>
<th>1999</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caye Caulker</td>
<td>30.21%</td>
<td>27.49%</td>
<td>29.05%</td>
<td>28.19%</td>
</tr>
<tr>
<td>All, not Caye Caulker</td>
<td>69.79%</td>
<td>72.51%</td>
<td>70.95%</td>
<td>71.81%</td>
</tr>
<tr>
<td>Belize City</td>
<td>16.84%</td>
<td>18.73%</td>
<td>15.71%</td>
<td>15.18%</td>
</tr>
<tr>
<td>Sarteneja</td>
<td>38.24%</td>
<td>42.58%</td>
<td>37.62%</td>
<td>36.39%</td>
</tr>
<tr>
<td>Dangriga</td>
<td>5.61%</td>
<td>9.00%</td>
<td>8.33%</td>
<td>7.23%</td>
</tr>
<tr>
<td>San Pedro</td>
<td>0.80%</td>
<td>0.73%</td>
<td>0.48%</td>
<td>0.24%</td>
</tr>
<tr>
<td>Punta Gorda</td>
<td>0.27%</td>
<td>0.24%</td>
<td>0.24%</td>
<td>0.24%</td>
</tr>
<tr>
<td>Residence Unknown</td>
<td>8.02%</td>
<td>1.22%</td>
<td>8.57%</td>
<td>12.53%</td>
</tr>
<tr>
<td>Total Cooperative Membership</td>
<td>100.00%</td>
<td>100.00%</td>
<td>100.00%</td>
<td>100.00%</td>
</tr>
</tbody>
</table>
Table F.4, Percent of Members with 100+ Pounds 1996-1999

<table>
<thead>
<tr>
<th>Place of Residence</th>
<th>1996</th>
<th>1997</th>
<th>1998</th>
<th>1999</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caye Caulker</td>
<td>84%</td>
<td>73.50%</td>
<td>87.70%</td>
<td>89.70%</td>
</tr>
<tr>
<td>All, not Caye Caulker</td>
<td>77.40%</td>
<td>74.80%</td>
<td>74.50%</td>
<td>71.50%</td>
</tr>
<tr>
<td>Belize City</td>
<td>71.40%</td>
<td>63.60%</td>
<td>71.20%</td>
<td>76.20%</td>
</tr>
<tr>
<td>Sarteneja</td>
<td>84.60%</td>
<td>80%</td>
<td>77.80%</td>
<td>72.20%</td>
</tr>
<tr>
<td>Dangriga</td>
<td>81%</td>
<td>75.70%</td>
<td>74.30%</td>
<td>73.30%</td>
</tr>
<tr>
<td>San Pedro</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Punta Gorda</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Residence Unknown</td>
<td>50%</td>
<td>40%</td>
<td>63.90%</td>
<td>61.50%</td>
</tr>
<tr>
<td>Total Cooperative Membership</td>
<td>79.40%</td>
<td>74%</td>
<td>88.80%</td>
<td>76.60%</td>
</tr>
</tbody>
</table>

Table F.5, Number of Producing Members by Place of Residence 1996-1999

<table>
<thead>
<tr>
<th>Place of Residence</th>
<th>1996</th>
<th>1997</th>
<th>1998</th>
<th>1999</th>
<th>All Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caye Caulker</td>
<td>113</td>
<td>113</td>
<td>122</td>
<td>117</td>
<td>130</td>
</tr>
<tr>
<td>All, not Caye Caulker</td>
<td>261</td>
<td>298</td>
<td>298</td>
<td>298</td>
<td>404</td>
</tr>
<tr>
<td>Belize City</td>
<td>63</td>
<td>77</td>
<td>66</td>
<td>63</td>
<td>79</td>
</tr>
<tr>
<td>Sarteneja</td>
<td>143</td>
<td>175</td>
<td>158</td>
<td>151</td>
<td>185</td>
</tr>
<tr>
<td>Dangriga</td>
<td>21</td>
<td>37</td>
<td>35</td>
<td>30</td>
<td>39</td>
</tr>
<tr>
<td>San Pedro</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Punta Gorda</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Residence Unknown</td>
<td>30</td>
<td>5</td>
<td>36</td>
<td>52</td>
<td>97</td>
</tr>
<tr>
<td>Total Cooperative Membership</td>
<td>374</td>
<td>411</td>
<td>420</td>
<td>415</td>
<td>534</td>
</tr>
</tbody>
</table>

Sources: NFCS Second Payment Schedules 1996-1999
Appendix G

Notes from NFCS Meeting on May 27th, 1999, Main Office Belize City

This appendix is included to illustrate how an issue is raised, ideas presented, a motion made, but then is lost in the commotion of the meeting. Member’s names are not included.

ES = Executive Secretary
MC = Managing Committee
Q = Question
A = Answer
C = Comment
DFC = Development Finance Corporation of Belize

NFCS Annual Business Meeting, 27 May 1999

The events and tone of the 1999 Annual Business Meeting held prior to the Annual General Membership (AGM) Meeting in May illustrate the convergence of fishermen’s returns on collective marketing and the result of member delinquency on the cooperative’s and members’ bottom line. The meeting was held in Belize City, where most meetings are held with the exception of the AGM Meeting, in the newly remodeled conference room at the cooperative’s main office between Haulover Creek and Front Street, a couple blocks west from the Swing Bridge. The meeting was well attended by local standards with about 65 people filling the room to near capacity by 9:40 AM, and, as normal, the meeting started nearly thirty minutes past is scheduled time of 9:30 as people wandered in, out, and about the new room and through the other office space looking for a sign that the meeting was actually going to begin. At least 122 cooperative member had joined the meeting by 10:00 when the Executive Secretary (ES) entered, the sign for which the wandering members were waiting. While the attendance was only about 20% of the total membership, this number is more than other meetings I attended, which ranged from 35-
50. The larger turn-out was due to this being an Annual Meeting to discuss the contents of the Annual Report, including the past year’s performance, returns from collective marketing, and the upcoming lobster season, not to mention this meeting serves a “free” lunch to attendees.

After agendas and annual reports were passed out [MC Member A], the chairman of the cooperative’s Managing Committee, called the meeting to order and an older member led the group in a prayer. The ES then began the meeting with an explanation that today we would present the details of the annual report so that members could review it for approval at the AGM meeting to be held later at Caye Caulker. The first hour of the meeting was devoted to reading through the figures presented in the report. Several items were elaborated with details about expenses, payments, and how and why these were accounted as they are presented. Some members follow along, take notes in their reports, and ask questions for more information and clarification during this time. The members then have until the AGM to scrutinize the report and request further clarification. A few other items remained on the agenda, including announcements of plans to open a duty free store at the International Airport, new import tax shelter for goods used in fishing by members, and other initiatives for the upcoming year; however, the last 75 minutes of the meeting was mostly devoted to questions and discussion about the cooperative’s financial hurdles, the members’ and leaders’ thoughts as to their causes, and actions to remedy the situation.

This year’s business meeting and corresponding AGM were scheduled later than usual, which was due at least in part to the difficult financial times the society faced in the current period. Here are some of the comments and observations the members and management made:

Interest on current debt is too high, will restructure Debt from Atlantic (current bank) to DFC as 10-12% over 8 years…

Members will no longer get credit in excess of production capacity (wasn’t this in place already?)

The current fiscal problem is felt most through decreased production

Some more detailed and specific questions and comments from membership:
[Member A] Q: What happens to those with outstanding accounts and resign or don’t deliver? (ES/MC Member A) A: For those who “work and hide” we will get an attorney.

[Member B] C: Vote of encouragement to deliver product, support the new ventures in shrimp and crab, and to understand figures in report.

[Member C] Q: Members are buying product from other members? (MC Member A/ES) A: If member doesn’t sell to Northern or to a northern member, we loose production. [Member C] C: But members are getting coop loans to buy other members’ product!!

[Member B] C: Managing Committee should not be encouraging this! All this connected with MC power and fear in buying from other members to “save” the cooperative by increasing production, but this leads to increasing numbers of loans going unpaid.

[Member D] C: Proposes that the first payment be raised to $15 as an incentive to deliver to the cooperative. This gets a lot of support throughout the room. He adds that Placencia Cooperative sells it’s product to National Cooperative for $18 per pound. (MC Member A/ES) A: reply that National also pays its members only 10 on first payment and they have the same problem (with member delinquency) as we, but this idea merits some study, look into working to this increase first payment. (This kind of tabling a motion or idea raised in a meeting is common and is a way to get it off the table when there is popular support but little support in MC.) [Member D] C: we can make a motion and pass it now!

[Member A] C: “I think all coops need same payment.”

[Member E] C: Most of our outstanding debt ($3 million BZE) is from non-producing members and our problems lie in decreasing production coming into the cooperative, not from [Hurricane] Mitch or that fewer lobsters are being caught (in Belizean waters). The problem is that shifting of members who are selling to San Pedro (Tourism Hotels and Restaurants) at $22-23 per pound. (MC Member A) A: we raising stone crab from $8 to $10, then raise the rest to $14?

[Member F] C: Thinks [MC Member A] and others did not get the original question: This is how it is: Loans to members; at end of season he pays back to coop; if not, then the society pays and the member doesn’t because the interest piles up; so, we have to get tough on this.
(Then someone from back of room seconds [Member C’s] motion to raise the first payment to $15), as his motion is in Spanish three competing choruses fill the room: supporting, denying, and pleading for English translation. After the Spanish motion seconding is translated, [MC Member A] translates [Member C’s] original motion (idea) in Spanish, with applause from the Spanish speaking contingent.

[Member G] C: Should plan to use (member’s) share capital and production (amount marketed) to set a ceiling on loans.

[Member H] C: Thinks loans should require signing over collateral, house, boat and when members not paying up then take these items through the contract in loan. Where is the Sarteneja coop? Where are its members? This stirs some rumbling through the room.

[Member C] C: Need to get for people to act as co-signers on loans.

[Member E] C: adds a common sentiment I heard on several occasions regarding Belizeans (particularly those from Caye Caulker and Creoles in the City): The Chinese are always helping each other, Belizeans only taking each other down, implying that the cooperation among the Chinese immigrants is key to their obvious prosperity, whereas us national from across Belize are always looking to better ourselves and will even work to make sure the other fails. This is no good, he continues, we need to work together like the Chinese. This whole sentiment (often related in relation to tourism business at the Caye) I found puzzling, but pretty accurate, coming from the village that organized the first and most successful fishing cooperative.

Other items brought up at the end:

Coop in process of getting a reverse osmosis plant at Caye Caulker to sell bottled water and insure quality water for receiving station, more to come on this.

Other questions from the crowd concerning the ES and Accountant wand why they have so much time away from the office? A ruckus follows this, members complaining and talking about this among themselves. Comments that they think ES makes too much money and does not spend sufficient time on
the job and in the office, other appointments (paid even) on other boards and committees (Belize Electricity, Ltd.), etc.

[Member C] Q: is the cooperative is paying for members (from Sarteneja) to travel to the city for meetings. [MC Member A] assures that nothing like this has been done, no bus or anything.

[Member B] C: gives one last impassioned speech about getting strict on member delinquency.

Meeting Adjourned at 12:15 with boxed lunches served.

No vote was taken and many members leave unsatisfied. Contrast with Minutes from 1968 AGM included in Chapter Seven (pages xxx).
Appendix H

Figure H.1, Letter Submitted to the Registrar of Cooperatives and NFCS Management, June 1999

Mr. Joseph Bradley  
Registrar of Cooperatives  
Administration Building  
Belize City  
Belize

21 June 1999

Dear Sir:

Through this medium we wish to draw your immediate attention to the urgent concerns of the undersigned, concerns that in the past have not been given the serious consideration they deserve.

It is our understanding that being members of a Co-operative we are rightly entitled to have a say in the affairs and all business transactions of our Co-operative. We believe that the misappropriation of funds by the Management Committee of Northern Fishermen Co-operative Society Ltd. is among the serious matters that merit immediate attention. The reckless spending of the Management Committee is presently endangering the bread and butter of members of our honorable Society.

Sir, the voices of the members from Caye Caulker are not being heard by the Management Committee. Their neglect is the main cause of the many irregularities presently being experienced in this, our most distinguished, Society. To alleviate the problem we respectfully request for an amendment to the Co-operative Act. Consequently, we also suggest the following: (1) that the Management Committee be comprised of 2 members from Caye Caulker, 2 members from Belize City, 2 members from San Pedro, and 1 member from the South; (2) members desirous of sitting on the Management Committee should have delivered over 300 pounds in lobster tails in the previous season; (3) aspirants for the Management Committee should not be indebted to the Society of a sum exceeding $10,000.00, and, furthermore, any member desiring a loan exceeding $10,000.00 should deposit a personal security matching that amount; and (4) that the motion passed at a general membership meeting held last year be observed and enforced; this motion stated that the Society shall not finance (give loans to) any member to purchase lobsters from Society members or from other non-member fishermen.

If our needs are not seriously and urgently addressed within 30 days of the date on this letter, we, the undersigned, are prepared to take drastic measures leading to a final course of action to: (1) form a new Co-operative; (2) use our shares as collateral for the purchasing of the receiving center in Caye Caulker; and (3) to reserve the right to sell our produce to the highest buyer.

We trust that our concerns will be given the serious and immediate attention that they justify merit. Thank you for your time and consideration.
## Table I.1. Membership Homogeneity and Monitoring Indices

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Sources: NFCS Annual Reports 1968-1999; Craig 1966
### Table J.1, Members Removed from Northern Cooperative for Not Producing 1968-1999

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Shoman, Assad  

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Wylie, Jonathan  

Yunnus, Muhammad  

Ziegenhorn, Randy  
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Education
B.A. in Anthropology and History, St. Cloud State University, St. Cloud, Minnesota, 1993.
M.A. in Anthropology, University of Iowa, Iowa City, Iowa, 1996.

Employment and Teaching Experience
1994-1997, Teaching and Research Assistantships, Department of Anthropology, University of Iowa.
1997-1998, Research and Teaching Assistantships, Department of Anthropology, Pennsylvania State University.
1998-2000, Graduate Instructor, Department of Anthropology, Pennsylvania State University.

Participation in Workshops, Institutes, and Conferences
1997, Attended the National Science Foundation Summer Institute for Research Design in Cultural Anthropology at the University of California at Irvine.
2000, Invited to present at the International Rural Sociology Association’s annual meetings in Rio de Janeiro, Brazil; paper: “Two Transnational Industries, One Local Environment: Rural Livelihoods from Lobsters and Tourism at Caye Caulker, Belize.”
2004, International Association for the Study of Common Property annual meeting, Session on Cooperatives and Common Property in Fisheries, paper: “Of Lobsters and Loans: Collective marketing and Common-Pool Credit in a Belizean Fishing Cooperative.”

Awards and Grants
1998, Honorable Mention for the Graduate Student Award for Excellence for paper in Human Organization
1998, National Science Foundation Grant SBR-9806978
1998, Wenner-Gren Foundation for Anthropological Research, Small Grant number: 6448
1998, Penn State’s Anthropology Department’s Hill Fellowship
1998, Penn State’s RGSO Dissertation Improvement Grant

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