

The Spaces of Social Capital: Livelihood Geographies and Marine Conservation in the Cayos Cochinos Marine Protected Area, Honduras

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Abstract

This article explores the relation between a household's social capital and its use of marine resources in the Cayos Cochinos Marine Reserve. Recent writings on social capital's role in facilitating community conservation efforts have highlighted the ways in which strong levels of this asset can produce positive conservation outcomes. In contrast, this paper argues that social capital formation and use at the household level can produce a geography of resource use that runs counter to the zoning-based resource restrictions that often typify co-managed conservation areas. Drawing on ethnographic and survey work from the Cayos Cochinos Marine Protected Area, this paper shows how marine resources help Garifuna fishing families build networks of trust and reciprocity, which in turn allows them to access marine resources and mobilize them across space in ways that are at odds with the geography of the reserve's stated management plan. Keywords: *social capital, conservation co-management, liveliboods, Honduras*

Resumen

En este artículo se estudia la relación existente entre el capital social del hogar y la utilización de los recursos marinos en la Área Marina Protegida de Cayos Cochinos. En recientes trabajos sobre la función del capital social para facilitar los esfuerzos comunitarios de conservación se han destacado las distintas maneras en que un nivel sólido de este activo puede dar lugar a resultados conservacionistas positivos. En contraste, en este escrito se sostiene que la formación del capital social y su utilización en el nivel del hogar pueden dar lugar a una geografía de utilización de recursos que discrepa con las restricciones zonales de recursos que suelen tipificar las áreas de cogestión de la conservación. A partir de estudios etnográficos y de encuestas sobre la Reserva Marina de Cayos Cochinos, en este trabajo se muestra cómo los recursos marinos contribuyen a que las familias de pescadores de la comunidad Garifuna consoliden relaciones de confianza y reciprocidad que a su vez les permiten acceder a los recursos marinos y a movilizarlos espacialmente de manera discrepante con la geografía del plan expuesto para la gestión de la Reserva. Palabras clave: *capital social, cogestión de la conservación, medios de vida, Honduras*

Introduction

In the middle of the day, a young Garifuna fisherman named Hugo¹ was returning from a morning of fishing in Honduras' Cayos Cochinos Marine Protected Area. Before he reached his home on the tiny island of Chachahuate, however, he landed his small dugout canoe on a deserted stretch of beach on Isla Mayor, the largest island in the area. After getting out of his canoe, he soon came across a nest of sea turtle eggs. Upon finding this nest Hugo promptly began loading the eggs into his boat, only to be caught by reserve guards patrolling the area. If the guards and reserve officials had followed the letter of the law, Hugo would have lost his boat and spent six months in jail. Instead, reserve officials took the eggs he collected to an incubator, with the hope that some will still hatch, banned the fisherman from this particular island, and sent him home. This seemingly prudent decision, sensitive to both the needs of sea turtles and Hugo's wife and children, was met with incredulity by Hugo. When asked what he thought about the guard's actions, he complained that by not allowing him to keep the eggs, the guards hurt not just him, but his friends and family with whom he was going to share the eggs.

Hugo is not alone in his negative feelings toward conservation rules that, on the surface, seem sensible. An opinion survey taken by the author in 2004 found that 77% of surveyed- residents on Chachahuate (which is located within the Cayos Cochinos Marine Protected Area) (Figure 1) believed that they lived better before the creation of the reserve (n = 31; see Table 1). This is a striking finding in light of the fact that 87% of those surveyed support some sort of formal protection for the area. Interviews with residents revealed a common sentiment that industrial fishing boats have severely depleted the fish stocks of the Cayos Cochinos, and it is only through legal protection that they can be kept out. While over half (55%) of Chachahuate's residents said that there are the same amount or more fish and lobster today than before the creation of the reserve, 90% agreed that it was easier to obtain resources before the park's creation. In other words, residents support a protected area in theory, and many even recognize the benefits of a protected area for improving fish stocks, however, the deleterious livelihood impact of specific conservation rules has resulted in negative views toward the reserve.

These contrasting opinions about the Cayos Cochinos Marine Protected Area (hereafter CCMPA) reflect a paradox in conservation management: there is often support for the general idea of natural resource protection, but not necessarily for the specific restrictions that accompany conservation policy. This paradox extends beyond the case of the Cayos Cochinos. The inability to translate a general desire for resource protection into active support for specific restrictions and regulations has long bedeviled conservation efforts worldwide (Elliot *et al.* 2001; Campbell and Vainio-Mattila 2004). In response to these problems, the last 25 years have seen the rise of a variety of conservation co-

	%	%	% No
Question	Yes	No	response
Did you live better before the creation of the			
protected area?	77	10	13
Was it easier to obtain the resources you need			
to live before the park?	90	3	7
Has the park has created problems in your life?	61	39	0
Has the lobster ban hurt your income?	65	35	0
Are there today, ten years later, more fish and lobster?	55	45	0
Do you believe that it is worthwhile to continue protecting the Cayos Cochinos?	87	10	3
The park employees help the community?	13	87	0
The park benefits the community in some way?	19	77	3

Table 1: Opinion survey of Chachahuate residents (n = 31)



Figure 1: Location of the Cayos Cochinos and study sites of Nueva Armenia and Chachahuate. Other villages with a presence in the reserve include Sambo Creek and Río Esteban.

management plans, often accompanied by spatially-based policies, such as buffer zones, in order to integrate the goals ecosystem management and the needs of local resource users (Stevens 1997; Western and Wright 1994). These efforts have had mixed success at best, often alienating a number of groups whose livelihoods depend on accessing these territories (Few 2001; Neumann 1997).

Perhaps recognizing the politically untenable nature of this type of policy, others in the conservation community have stressed the importance in harnessing local community support for co-managed areas. It is within this context that social capital has increasingly been highlighted as a way to facilitate the production of successfully managed conservation spaces, in which local actors not only abide by conservation rules, but actively participate in their creation and enforcement (Ostrom 1990; Pretty and Smith 2004; Jentoft *et al.* 2007). The concept of social capital has, by now, become well known. While its definition can be a point of debate and confusion (Harriss and de Renzio 1997), it is commonly understood as a term that tries to capture the often nebulous social relations that translate into collective and individual benefits. Relations of trust, networks of reciprocity and exchange, collectively understood norms, and the recognition of common rules are all aspects of social capital that have been highlighted by researchers that are important to long-term conservation success (cf. McCay and Jentoft 1996; Pretty and Ward 2001; Uphoff and Wijayaratna 1999). A number of scholars have argued that strong levels of social capital frequently translates into the presence of a robust civil society, through which meaningful connections between the state or an environmental NGO can be made in order to establish a co-management framework (Krishna and Uphoff 1999; Rudd *et al.* 2003; Adger 2003).

These writings often emphasize the workings of social capital at the institutional or community scale, with comparatively less attention paid to how this asset is formed and mobilized at the household level. In light of the continued conflicts between local resource users and conservation planners, and the increasing attention paid to the role of social capital in community-based conservation, I aim to re-focus the concept of social capital as it is presently employed in the conservation literature, from the community scale to that of the household. Following writings concerning with the "network" approach to social capital (cf. Woolcock and Narayan 2000), which focuses on the social networks that build upon social relations within and between groups, I conceptualize household social capital as the utilization of social networks of trust, reciprocity, and exchange by individuals within and between households in order to mobilize resources for the purposes of building and sustaining a household's livelihood. This view of social capital is in contrast to what Woolcock and Narayan (2000) have described as the communitarian or institutional view of social capital (what I refer to here as community social capital), where relations of trust and reciprocity between people translate into collective benefits such as strong civil society institutions, or responsive modes of local governance. While many of the building blocks of each type of social capital may be similar (e.g. relations of trust, reciprocity, common norms), I suggest the key distinction between the two is that the function and outcomes of this asset are different depending on the scale in which they employed, where social capital formed and mobilized at the scale of the household can potentially produce forms of resource use that are not necessarily congruent with practices of resource management that are formulated at the scale of institutions. I make this conceptual distinction not to argue that one form is somehow superior to the other, but rather, to draw attention to the scalar differences in how this asset is formed and used. Doing so, I hope to facilitate a dialogue between conservation policy makers and cultural and political ecologists, who have long demonstrated the importance of household-level informal networks toward shaping patterns of resource use, and take a small step toward recognizing that robust local institutions are necessary, but not sufficient, for the long-term viability of a conservation area. Drawing on empirical work from the Cayos Cochinos, I hope to demonstrate that a household's social capital produces spatial patterns of resource use that are often at odds with the zoning plans and buffer zones that are often proposed as a more geographic way of making conservation co-management "work".

In the following section, I offer a brief review of the ways in which social capital has been analytically conceptualized as a community based asset in the conservation literature. I then draw on work from cultural ecology, the "sustainable livelihoods" literature, and migration studies to reconceptualize social capital as a household-level asset. In the second section, I describe the study site and my research methods for understanding householdbased social capital. In section three I present ethnographic and household survey evidence which demonstrates the ways in which the livelihood spaces are shaped by a household's social capital. In the final section I discuss ways in which these spaces are incongruent with the current spatially-based restrictions of the co-management plan for the Cayos Cochinos.

Social Capital, Conservation Co-management, and the Spaces of Rural Livelihoods

The last twenty-five years has seen both the proliferation of conservation areas (Zimmerer et al. 2004), as well as explicit attempts to incorporate the needs of local resource users within these territories (Campbell and Vainio-Mattila 2004; Zimmerer 2000). While, in theory, co-management and integrated conservation and development projects (ICDPs) are supposed to be win-win situations, where local communities enjoy the benefits of long-term, sustainably managed natural resources, the political process of creating these territories has been criticized on a variety of fronts, including: poorly defined notions of what constitutes participation (Few 2001; Wells and Brandon 1993); economic and participatory components that fail to substantially improve economic conditions or local participation (Brenner and Job 2006; Campbell and Vainio-Mattila 2004; Mehta and Kellert 1998); an overly broad understanding of what constitutes a community (Agrawal and Gibson 1999); and the dominance of views of ecologists over that of local stakeholders (Campbell 2002). The territorial outcomes of these projects, and their impacts on local communities, have also been extensively critiqued (e.g. Peluso 1993; Neumann 1998; Turner 1999; Robbins et al. 2006). Efforts at co-managed conservation spaces have resulted in conservation efforts that attempt to accommodate community needs, but instead often fail to fully engage with the complex social and political dynamics of these communities in a way that assures broad-based support (e.g. St. Martin 2001; Daniels and Bassett 2002).

An increasing number of writers within the conservation literature have begun to point to social capital as a way to overcome many of these difficulties. Drawing on the "classic" characteristics of social capital, as developed by Coleman (1988) and Putnam et al. (1993), a number of writers have argued that social bonds of norms, trust, and reciprocity minimizes self-interested behavior that results in over-use of natural resources (e.g. Ostrom 1990; Pretty and Ward 2001). The existence of high levels of connectedness between individuals and groups, along with high levels of trust and reciprocity lays the groundwork through which common rules, norms and sanctions within a community can emerge (McCay and Jentoft 1998). This view of social capital's role in commons management has resulted in an influx of empirical work dedicated to examining the link between a community's social capital and conservation successes (e.g. Anderson et al. 2002; Pretty and Smith 2004). Such studies have covered a diversity of conservation efforts such as: wildlife protection (Wagner et al. 2007), rangelands management (Arnold and Fernández-Giménez 2007), sustainable forestry (Mukherjee 2002), fisheries management (Rudd et al. 2003), lake protection (Kramer 2007), sustainable agriculture (Uphoff and Wijayaratna 1999), and wetland protection (La Peyre et al. 2001).

The importance of social capital has also appeared frequently in writings on fisheries and marine protected areas (e.g. Adger 2003; Sekhar 2007; Rudd *et al.* 2003). Recent scholarship on the establishment of marine protected areas has recognized the importance of embedding rules and regulations within the community (Jentoft *et al.* 2007; McCay and Jentoft 1998). A common theme through these writings is that without the support of community norms and rules, there is little likelihood of the long term governance success of a marine protected area. Adger (2003), for example, argues that social capital provides the adaptive capacity necessary for the sustainable harvest of marine resources, with social capital playing multiple roles, depending on the relative strength of the state and local institutions. In a context with strong institutions and strong state involvement, the interconnectedness between groups that is often a hallmark of social capital can serve as the "glue" that allows these groups to work effectively together. In a context where either the state or formal institutions are weak, informal social networks can serve as important avenues for decision making in fisheries management (see also Bennett *et al.* 2000; Cooke *et al.* 2000).

Collectively these works suggest that a community's social capital can lead to conservation success, however, these studies tend posit social capital as one of many causal variables, resulting in what Agrawal (2001) laments as "thin" case studies of natural resource management, with little attention paid to the complex social relations that produce community norms and networks of reciprocity that have been identified as so important. In addition, there is rarely engagement with the ways in which social capital might lead to conservation failure. In light of the extensive critiques centering on the difficulties that co-managed conservation spaces have encountered over the years, it is instructive to think through the ways in which social capital might undermine, rather than facilitate, the management of conservation areas. For this, I argue that it is useful to think about how social capital is formed and used at the scale of the household.

Household Social Capital

The idea that social capital can be an individual asset is not new. The original formulation of the idea of social capital by Bourdieu (1985) conceives of the relations that people build with each other as something that is intentionally done in order for that individual to benefit later. Similarly, Coleman (1988) argued for the importance of social capital in terms of the benefits they bring to individuals. Beginning with Robert Putnam's work on civic traditions in Italy, however, the idea of social capital has a community asset has taken root where, as Alejandro Portes (2000) puts it: "A subtle transition took place...where social capital became an attribute of the community itself. In its new garb, its benefits accrued not so much to individuals as to the collectivity as a whole..." (p. 3). This is not to say that the individual cultivation of and benefits from social capital is no longer recognized by writers on the subject. Instead, social capital has come to be commonly described as a community-held asset, with effects felt at the level of the community.

What are the implications for conservation spaces when the focus of one's analysis is "scaled down" and social capital is viewed as an asset that is held and cultivated by households? There are writings across a number of disciplines that point to a connection between a household's social capital, the geography of its use of natural resources and its livelihood activities. While rarely addressing social capital explicitly, a substantial body of work by cultural ecologists points to the significance of household level bonds of trust and labor exchanges for agrarian households (e.g. Netting 1993; Wilk 1997). These labor exchanges often help produce the emerging spatial patterns of land use in a community. Richard Wilk (1997), for example, shows how the coupling of community work groups with community norms of usufruct land tenure produces the complex patchwork of land use among Kekchi Mayan communities in southern Belize. Other writers have shown how a household's social support networks are actively cultivated through activities such as gift giving (Berry 1993; Godoy et al. 2007). Social networks have been shown to facilitate other activities, such as rain forest extraction, as well as expand the geographic scope in which these products can be traded (Coomes and Barham 1997; McSweeney 2004a). McSweeney's work in the Honduran Mosquitia shows how a household's social networks facilitates access to certain rain forest resources (McSweeney 2004b), and how a household's embeddedness in wider social relations allows for these products to be traded more widely across space (McSweeney 2004a).

A number of writers, utilizing the "sustainable livelihoods" framework, have more explicitly identified social capital as an important asset for households, where social capital is one of a suite of capitals (financial, physical, natural etc.) that households possess and use in building a livelihood (e.g. Ellis 2000; Bebbington 1999; Bury 2004; Turner 2007). Bebbington (1999), for example, highlights the ways in which a household's social capital can help it access resources through its linkages with both institutions and other individuals (see also Bebbington and Perreault 1999). Finally, a number of studies on migration offer probably the most explicit account of how a household's social capital and the spatiality of household livelihoods intersect. Studies have demonstrated the importance of an individual's social networks in facilitating migration (Portes and Sensenbrenner 1993; Portes 1997; Silvey and Elmhirst 2003), and how migration transforms households and communities through remittances (Bilsborrow and Okoth-Ogendo 1992; Massey 1990; Massey and Basem 1992), often resulting in new patterns of land use and resource extraction in home communities (Gould 1994). In addition, arriving migrants can disrupt community-held social capital, transforming the use and management of natural resources (Curran 2002: Lutz and Scherbov 2000). Curran (2002), for example, argues how individually held social capital can help facilitate migration to coastal areas, giving these new arrivals access to marine resources while potentially disrupting longestablished community norms of commonly held resources.

Collectively, these diverse works point to linkages between a household's social capital, its access to resource use, and livelihoods that are sectorally and spatially diverse, where one's social capital helps facilitate the geographic reach of one's access to resource es, and allow for a diversity of income-earning activities, with some occurring in other communities. This often means that a household's embeddedness in wider social networks is a critical means by which one is able create a geographically diverse livelihood, helping to mitigate the damage that future unforeseen events may have. If a household loses its agricultural crops due to flooding, for example, it can still survive to plant again if that same household is receiving remittances from another community. In this way, social capital can be understood as, what Frank Ellis (2000) has termed called, a "spatially diverse means of support" for households.

The idea of a spatially diverse livelihood mirrors one of the key assumption in the livelihoods literature, which is that household are actively utilizing their various assets to engage in diverse activities in ways that allow for them to be flexible enough to withstand future shocks or disruptions (cf. Bebbington 1999; Ellis 2000; Scoones 1998). While this literature is mostly concerned with sectoral diversification, here one can see how a geographic diversity can be useful as well. Here I suggest that an individual's social networks of reciprocity and exchange, and the relations of trust and common norms that hold them together, constitute a form of social capital that is a critical asset in helping marginalized households secure a livelihood that is composed of diverse income earning activities. This diversity is achieved, in part, through mobilizing resources across space, and taking advantages of differences between places in earning a living, resulting in a particular "livelihood geography" for households.

Understanding how a household's social capital can facilitate access to resources while producing geographically diverse livelihoods can further inform critiques of spatially-based conservation plans by providing a window on the dynamic mechanisms by which the livelihoods of local resource users unfold in a way that conflict with the static conservation geographies of buffer zones and no-take areas. There have already been a number of scholars who have shown how the day-to-day management of resources by local users results in a geography of resource use that is complex, dynamic and flexible (e.g. Berkes 1999; Rocheleau and Ross 1995; Walker and Peters 2001), which is often obscured by the abstract spaces of conservation (e.g. Rocheleau 1997; Daniels and Bassett 2002). Here, I wish to show how these livelihood spaces are both produced by, and enable, a household's social capital. I argue that by conceptualizing social capital as a household asset, and showing the livelihood spaces it produces, one can turn much of the recent writings on conservation and social capital on its head, where relations of trust and reciprocity are not a means by which local communities come to gain acceptance of a zoning plan, but instead, show how the often hidden geographies of resource use can produce conflict with a conservation area. This can allow for a fine-grained understanding of why there is so-often a disconnect between proposed conservation restrictions and the support of local resource users. Doing so can help provide a means to engage scholars and policy makers who stress the importance of social capital in conservation co-management, but often overlook the sources of some of the negative consequences of these policies.

In order to understand the link between a household's social capital and its livelihood geography I will draw on empirical work in the Cayos Cochinos in order to answer the following questions. First, in what ways does a household's social capital help facilitate a geographically diverse livelihood? Second, what ways does a household's social capital allow for access to marine resources? Third, what is the relation between a household's use of marine resources, and the maintenance of its social capital?

Study Site and Methods

The Cayos Cochinos Marine Protected Area (CCMPA) is located along the North coast of Honduras and includes two small islands and thirteen coral cays. The Cayos Cochinos are used as fishing grounds by Garifuna communities located along the mainland. Two communities (Nueva Armenia and Río Esteban) have their own permanent settlements within the reserve, while another community (Sambo Creek) has a temporary fishing camp on one of the small cays. There is a primary school located in Río Esteban's settlement on Cayo Mayor, which is attended by children from Chachahuate as well. Chachahuate, the focus of this paper, is a small cay approximately 150 meters long and 50 meters across, lacking in potable drinking water and electricity. It was originally a temporary fishing camp for residents of Nueva Armenia, but has over time, morphed into a permanently occupied cay with approximately 100 full-time residents, a number of small stores, and 35 permanent structures of mostly thatch roof houses (field survey 2004),² making it the largest Garifuna settlement in the Cayos Cochinos. Nueva Armenia has a population of 1,500 inhabitants (INE 2001) and sits on a low-lying, swampy area near the mouth of the Río Papaloteca. Approximately ten kilometers of ocean separate Nueva Armenia from Chachahuate.

The Garifuna are an ethnic group located primarily along the Caribbean coasts of Honduras and Belize with a few villages on the Caribbean coasts of Guatemala and Nicaragua. There are also significant numbers of Garifuna located in the United States (Gonzalez 1988; Palacio 2002). The wide dispersal of Garifuna populations is indicative of this group's long history of adaptation and migration. Since being forcibly displaced from St. Vincent to the island of Roataan in the 18th century, both fishing and migration have been a central feature of Garifuna life. After arriving on the Honduran mainland, Garifuna men were almost immediately employed as soldiers in the Spanish army, an occupation that allowed time for fishing (Gonzalez 1997). The year 1832 marked the arrival of the first large-scale migration of Garifuna to Belize, after the defeat of the conservative Spanish forces that many Garifuna had supported (Gonzalez 1988). Since this time, there has been continuing contact and movement between Garifuna populations in



Figure 2: Schematic map of the zoning plan implemented by the Honduran Coral Reef Fund. [Map based on the zoning plan presented in the Cayos Cochinos management plan (HCRF 2004)].

Honduras, Belize, and Guatemala, driven by the ongoing search for wage-earning and trading opportunities (Palacio 2002), a pattern that has continued today with Garifuna migration extending to the United States (Gonzales 1988; Palacio 2002).

The CCMPA has its beginnings in 1993, when the Cayos Cochinos Biological Reserve was established by a presidential decree, which initially placed a moratorium on the extraction of all marine life in an area of five miles in every direction from the central cay (Brondo and Woods 2007). Soon thereafter, navy patrols began enforcing these rules. After an outcry by local and national Garifuna organizations, the government modified the ban to allow for "subsistence fishing" so long it does not include nets or diving for lobster. In addition, Garifuna were prohibited from using any trees in the area for building or repairing their homes. In 2004, the size and shape of the CCMPA changed, when it was expanded to its present size of 485.3 km² (HCRF 2004; see Figure 1). This expansion was accompanied by a new management plan, which included spatially-based zoning restrictions (Figure 2). These restrictions include a middle zone that encompasses the islands and is a permanent "no-take" area, while the outer zones are designated as

rotating "no-take" areas where fishing is either banned or temporarily allowed, depending on the time of year. This plan also includes an area where lobster diving is allowed for part of each month. This management plan was formulated by members of the Honduran Coral Reef Fund (hereafter HCRF) with extensive technical input from the World Wildlife Fund. According to the management plan, the no-take area is designed to provide a spawning ground for juvenile fish while the seasonally rotating no-fishing zones are designed to provide further protection for critical coral habitat in the area. Other restrictions from the previous management plan also apply: no lobster diving with tanks, no fishing with nets, no hunting of sea turtles or harvesting their eggs. Human concerns are generally reflected through two mechanisms. First, the rotating exceptions to the fishing bans in the outer-zones are meant to accommodate "subsistence fishing." Second, three areas within the no-take zone are designated as places that local fishermen can use in times of bad weather (as identified by the HCRF). This second accommodation was added after the zoning plan was presented by the HCRF to representatives of local communities, who pointed out the difficulty that many fishermen would have making it to the approved outer fishing areas in times of choppy seas.

During my interviews with the management of the HCRF, the managers indicated a great deal of pride in the pains that they have made in incorporating local communities into the design and implementation of the management plan. They stressed that the management plan was formulated in consultation with "community leaders", along with extensive outreach efforts and development projects that have been undertaken with local communities. Such projects have included building a latrine on the island of Chachahuate (which has since fallen into disuse), a pig-raising project in Nueva Armenia, environmental education activities among all communities affected by the reserve, and scholarships for local students.

As indicated in the introduction, the management plan is very unpopular among residents of Chachahuate and Nueva Armenia. The process for formulating the management plan was commonly derided by local residents. One common complaint was that the "community representatives" were not locally elected leaders, but rather hand-picked by HCRF, and were people that did not represent the community's interests. Community meetings about the new management plan were held, but only after the plan was formulated. In addition to problems associated with creating this plan, there are a number of points of concern about the plan itself. One principal concern is that the geography of fishing in the reserve is often determined by the weather, especially among the majority of fishermen who use small dugout canoes, and a plan that imposes such large territorial restrictions over the best fishing grounds, is unrealistic for most fishermen. Other restrictions, such as the bans on conch and turtle, long-time staples in the Garifuna diet, were likewise seen as too heavy-handed.

An examination of the management plan shows that ecosystem priorities clearly took precedence in forming the geography of the zoning plan (cf. HCRF 2004). Each restrictive zone is described in terms of their ecosystem function. The core no-take area, for example, has extensive information on its importance as a habitat for juvenile fish, while the outer zones are all characterized in terms of the coral habitat that they encompass. The characteristics of fishermen in the reserve are discussed, but in a separate section, and only in terms of the commercially profitable fish that they harvest, and the ways in which their activities might be depleting the fish stocks in the Cayos Cochinos. While reserve officials recognize that there is a complex and dynamic relationship between fishing families on the cays and their villages on the mainland, this is not reflected in the management plan. There is no mention of how, for example, the resource restrictions of the CCMR might affect the livelihoods of mainland families.

In order to understand the ways in which household social capital and resource use intersect, I draw on ethnographic and survey work carried out in July and August 2004. I conducted a household survey on Chachahuate (n = 28) among all households living on Chachahuate during this time. I interviewed the household head and asked about income sources, household assets, family structure, and social ties. In addition, I conducted indepth semi-structured interviews among residents of both Chachahuate (n = 15), Nueva Armenia (n=15), and managers at the HCRF (n=3). Finally, I accompanied a number of fishermen on lobstering and fishing trips. In the following sections, I present results that are a mix of statistical evidence from the household survey as well as ethnographic supporting detail. This mix of qualitative and quantitative evidence is intended to be complementary, and overcome one of the key barriers in research on social capital, which is that its central qualities - such as networks of reciprocity and norms of trust - are difficult to assess for the researcher. Past research on social capital tends to be measurement by proxy, with a resulting body of work that empirically evaluates social capital in terms of institutions which serve largely as indirect indicators of this asset (Bebbington 1999). My use of survey data is intended to provide a broad picture of the ways in which households organize their income earning activities, while supporting ethnographic detail digs into the specific mechanism by which a household's social capital helps facilitate these activities.

Social capital's livelihood spaces

Home to an island store, the island's two-way radio, and the general gathering place for most residents on the island, it didn't take me long to see that Myrna's house is the social hub of Chachahuate. After a few more days on the island, it was easy to see that Myrna was heavily invested in trading goods between Chachahuate and the mainland. Despite the lack of electricity, her store is always well stocked with ice cold sodas and beers. In addition, she frequently purchases fish and lobster on the island and ships them to the mainland for resale as often as two or three times a week. She also took care of people's houses while they were away by renting them out to visiting tourists, and sells them meals using the fish that her husband catches. The diversity of activities that Myrna engages in is not unusual for this island. Table 2 shows the different income activities that households engage in, along with households' primary income source. While the most common activities are fishing (86%) and catching lobster (68%), there are a number of other activities that are indirectly related to marine extraction in which a substantial number of households participate. Selling prepared food on the island, for example, is an activity that 43% of households do. Myrna is also an example of a household that is able to engage in a number of activities without owning a boat. Myrna only owns a small, run-down dugout canoe, which she rarely uses. Instead, Myrna has been able to sustain a livelihood on this island that is based primarily on shipping goods across space by relying on her extensive network of friends on the island who carry these items for her.

As would be expected for life on a tiny cay lacking in fresh water, firewood, and electricity, boats play a key role in the maintenance of livelihoods and the mobilization of resources on Chachahuate. Boats are a necessity for not only access to the island but also for shipping necessary goods and supplies between the island and the mainland. There are two main types of boats on Chachahuate. *Cayucos* (Figure 3) are small, two-person dugout canoes that are powered by either a small sail or paddle. A trip from Chachahuate to Nueva Armenia in a cayuco takes from four to six hours and their small size makes it difficult to carry more than small quantities of fish and supplies. *Canoas* (Figure 4) are larger dugout canoes that can hold up to ten people or more and are powered by a

	Mean		
Age household head	35		
# in household age 15-65	2.1		
# in household age <15	1.8		
times/months visits mainland	2.4		
% that own property on mainland	64		
Presence of income generating activity ^b	Mean %	Primary income source	Mean %
Fishes	86	Fishes	36
Traps lobster	68	Traps lobster	18
Dives for lobster	50	Fish Mongering	18
Fish mongering	39	Tourism employment	14
Sells food supplies	18	Very Diversified	14
Sells prepared food	43		
Tourism employment	11		
Rents out house	14		

Table 2: Household demographic and activity information (n = 28)

small diesel motor. A canoa trip between Chachahuate and the mainland takes about one hour. In general, when one wants to carry lobster traps and ferry goods and supplies between the mainland and the island, canoas are usually used (field observation).

While boats are indispensable for life on this island as a whole, examples like Myrna's show that, for individual households, supporting an island-based livelihood that involves moving resources across space is not necessarily dependent upon the type of boat that one owns. Table 3 lists differences in household livelihood activities by boat type. Despite the differences between these two boats, there are relatively few differences in livelihood activities between cayuco and canoa owning households. The only significant difference is with lobster trapping, where canoa owning households are significantly more engaged. Other activities that would seem to require a larger boat, such as fish mongering (buying fish on the island, and reselling on the mainland) show no significant differences in participation between cayuco or canoa owning households.

Here we can see the role that a household's networks of social support play in supporting a livelihood that encompasses moving resources across space. Fish mongering is an activity in which moving marine resources across space is absolutely essential, yet ownership of the physical asset that facilitates this the most (a canoa) does not play a significant role in the ability of someone to carry out this activity. This trend is further confirmed by a logistic regression on the probability that a household engages in fish mongering (Table 4). The household's type of boat ownership was not a significant predictor for fish mongering and, surprisingly, the number of times a month a household member visits the mainland was a negative predictor for this activity (p = .015). In other words, the more often a household on Chachahuate has physical contact with the mainland, the less likely it is to engage in an activity that, by definition, requires contact with the mainland.



Figure 3: Cayuco with sail (photo by author).

This counterintuitive finding becomes clearer when one situates this activity with respect to the role a household's social capital plays in facilitating this livelihood strategy. A closer look at Myrna's example shows how she is able to use both her ties on the mainland and on the island in order to sustain a livelihood that extends across space via fish-mongering, despite a relative lack of physical assets.³ Myrna's sister, Rosa, who lives on the mainland, handles the resale of fish on the mainland, and buys and sends supplies back to Myrna for her store. Fish and goods are shipped several times a week (fieldnotes, 2004). All of this is done without using any of their own small cayucos, but rather, through shipping fish on other people's boats and in other people's coolers. Despite maintaining livelihoods that are, in large part, depending on shipping goods across space, neither of these women own the necessary boats to do so.

Here Myrna is able to draw on a network of boat-owners, who carry her fish and supplies between the two places. Myrna is also able to use these boats without any form of direct compensation. Myrna explained to me that she only uses the same three or four people to ship her fish and supplies. When I asked her why this is so, she responded: "My fish go with people I trust, so I know they will arrive." While the relationship between Myrna and her canoa-owning friends is one certainly based on trust, the other key feature of social capital, reciprocity, is not as obvious. Talking with the boat owners that move Myrna's supplies, it was clear that they are not paid for their services. "I'm going that way anyway", was a common response to the question of why the carry her fish and supplies. After spending some time on the island, however, it became apparent that other, more hidden forms of reciprocity were at play.

As mentioned before, Myrna's house served as something of a social hub on the island. It was the only place to get a cold beer, and was the center of the all-important two-way radio. In addition, Myrna acted as something of a rental agent for people who had houses on the island, but weren't currently living in them. She would maintain these houses and rent them out to tourists. While at first glance, it might seem that Myrna was able to act as a store owner and fish monger thanks to the goodwill of a few canoa owners.



Figure 4: Canoa getting ready for a trip to the Cayos Cochinos (photo by author).

A closer look reveals that Myrna occupies an important place on the island: the center of communication with the mainland, the source of a cold drink, and someone who will look after your house if you leave for a few months. In many ways, Myrna's activities allow for a slightly easier life on the island, and by doing so, one could argue that it is the boat owners that are in debt to Myrna for making their time on the island a little more comfortable. One fisherman expressed just such a sentiment to me (with a cold

beer in his hand): "Why do I carry Myrna's things? Because if I didn't we wouldn't have anything cold to drink." There are no doubt small favors and gifts that occur between Myrna and the boat owners, actions that are all but impossible for an outside researcher to see or track. What can be seen, however, is that Myrna's livelihood is clearly facilitated by her social ties, which in turn, helps her to form a livelihood that allows her to occupy an economic role on the island that further strengthens these same connections.

Social capital and access

Boat Borrowing

The example of Myrna and Rosa demonstrates how a livelihood based on mobilizing resources across space is facilitated through strong social networks. The example of young men on the island who engage in lobster trapping are an example of social capital mobilizing a household's labor supply across space. Every lobster season attracts single men to Chachahuate who do not own their own boats, but are still able to trap and dive for lobster by entering into a relationship with a *patrón*. A typical patrón relationship is one in which the patrón will provide a canoa and lobster traps to two men, who are then obligated to sell all of their lobster back to the patrón at a set, below market, price. This is not an uncommon arrangement: 40% of all households have patrón borrower living with them. Of all canoa using individuals, 55% are in a patrón relationship.

While this is a more formalized economic relationship that allows men, who have few physical assets of their own to earn money for their households on the mainland, the familiar traits of trust and reciprocity are important for facilitating this activity. Interviews with patróns on the island reveal the importance of trust between the patrón and his client. The client is entrusted with the care of all of the equipment he is loaned, and to be honest about how much lobster his traps generate. Patróns have indicated that the primary consideration in who they will hire is how well they know that person, whether it is through a previous relationship or a family connection. In addition, as seasonal residents on the island, clients must find a place to live on the island. This is no simple task. The island is small, and with most houses already occupied, clients generally need to enter into an arrangement with an already-established household on the island. It is not surprising then that the majority of lobster clients on Chachahuate stay with distantlyrelated family members (e.g. cousins, aunts) who are permanent residents on the island. This is a reciprocal relationship for both parties. The client gets a place to stay, while the family that hosts the lobster fisherman now has access to the benefits of a canoa.

One of these benefits is increased contact with the mainland. While households engaged in fish mongering are less likely to visit the mainland, the opposite is true with households that have a boat borrower living with them. Table 5 shows that boat-borrowing households visit the mainland more often than non-boat borrowing households. Households with boat-borrowers living with them visit the mainland, on average, roughly three times more per month more than households without boat-borrowers living with them (3.15/month for boat borrowers vs. 1.14/month for non-borrowers). In addition, a higher percentage of boat-borrowing households regularly send fish to Nueva Armenia than households without boat borrowers (88% for boat borrowers vs. 55% for non-boat borrowers). These differences indicate that the presence of a boat-borrower in the household helps to facilitate a livelihood option that allows for mobilizing fish resources across space.

	Cayuco (n = 16) ^a	Canoa (n = 9)	p- value ^b		
Number in household	4.2	3.86	.856		
Average age of boat (years)	5	11.5	.124		
Presence of income activity (percentage) ^c					
traps lobster	56	100	.027*		
dives for lobster	50	56	.789		
fishes	100	89	.361		
buys/sells fish	38	44	1		
sells food supplies	19	11	1		
sells prepared food	44	11	.182		
tourism employment	19	0	.280		
rents house	19	11	1		
Primary source of income (percentage group)					
fishing	63	34	.226		
traps lobster	6	44	.041*		
buys/ sells fish	6	11	1		
tourism employment	19	0	.281		
very diversified	6	11	.527		
Percentage that owns property on Nueva Armenia	69	44	.671		
Armenia	63	33	.226		
Nueva Armenia	1.99	2.75	.561		
Percentage with other related households on Chachahuate	50	44	.789		
a Some canoa households also own a cavuco. Cavuco households only own cavucos.					

Statistics exclude three households that lack any boats.

b Fisher's test for percentage variables; Mann-Whitney test for numeric variables c Defined as: member of household has engaged in this activity in previous month p-value significance * < .05

Table 3: Activity differences between households that own cayucos or canoas.

Dependent variable	Household engages in fish mongering	
N	28	
Chi-square	21.048	
p-value	0.002	
Pseudo-R ²	0.739	
Independent Variables	Coefficient	p-value
Constant	-2.047	.517
Age of household head	0.001	.981
years living on Chachahuate (household head)	0.126	.187
times/months visits mainland	-1.302	.015*
owns cayuco	1.13	.518
owns canoa	2.57	.211

p-value significance *<.05

Table 4: Logistic regression on household's probability in engaging in fish-mongering (buying and reselling fish).

	Households without	Households with	
	boat borrower ($n =$	boat borrower ($n =$	
	20)	8)	p-value ^a
Percentage that own			
property on Nueva			
Armenia	60	75	.669
Percentage that regularly			
send fish to Nueva			
Armenia	55	88	.194
Average number of			
times/month visits			
Nueva Armenia	1.4	3.15	.002**
Percentage with other			
related household on			
Chachahuate	45	63	.678

a Fisher's test for percentage variables; Mann-Whitney test for numeric variable. p-value significance ** < .01

Table 5: Differences in mainland ties between household by presence/ absenceof boat-borrower living with household.

Fish Exchanges

While strong social ties can help people access and mobilize marine resources, the importance of fish exchanges show how these same resources help to build and maintain these ties. While certain commercially valuable species such as lobster or snapper were almost always packed with ice and shipped to the mainland for sale, other less valuable species were often given away (in addition to being consumed). One day I observed a fisherman come back to the island with a fifty pound jewfish (Epinephelus itajara), sell the bulk of the fish (30 pounds) to the research station on Cayo Menor (where scientists and guards live), keep some for himself, and give the rest away to seven other households on the island (fieldnotes, 2004). Such distributions were not uncommon. On another day, I accompanied a fisherman who, while fishing outside of the reserve, found a dead sea turtle caught up in his net, along with several small species of shark. Upon returning to Nueva Armenia, this fisherman immediately sold the lobster he found in his net to a middleman waiting on shore. By the time he made it up river to the village, word had already gotten back that he had a turtle. Our boat was greeted by a phalanx of people lining the riverbank, some giving wild hand gestures that they are ready to take home a piece of meat. The turtle's head was given to a nephew, the sharks were given away to five different people (none of whom were family members), and the rest of the turtle meat was split evenly with his neighbor, who happened to be Myrna's sister, Rosa.

When I asked people why they shared their catch with someone, their answers were usually a terse reply along the lines of "because she's a good person" or "it's my custom'." Interviews, however, show that this sharing is one of a long-line of close economic ties between people. For example, the man who shared most of his turtle meat with Rosa is a former resident of the island, and long-time go-between for Myrna and Rosa's fish mongering activities. He no longer has his own boat (he lost it during hurricane Mitch), and instead relies on borrowing others' boats so he can set his nets.

These forms of reciprocity show how a number of marine resources have "noneconomic" value, one that is rarely recognized by the reserve's management plan. The less commercially valuable species are frequently a form of social currency on both the island and mainland. Nowhere, however, are these practices recognized in the management plan. Instead, the management plan's treatment of marine resources in the context of human use almost always concerns the most commercially valuable species, with the justification for the zoning plan centered around maintaining the viability of these species in the reserve, with the reserve providing "spillover" benefits to the wider regional fishing industry. I point this out here to highlight how the management plan's "blindness" to many of the ways in which marine resources can be valuable resulted in a number of restrictions, such as bans on turtle hunting and the spatial exclusion zones, which have ultimately proven to be some of the principal sources of tension between residents and the reserve managers.

Social Capital, Livelihoods and Conservation in Context

Households who rely on the resources of the Cayos Cochinos are constantly maintaining a livelihood geography that is considerably different from the co-management spaces of buffer zones and no-take areas that characterize this management plan. Figure 5 shows a schematic representation of the types of resource flows between the mainland and the island and the types of ties that island residents maintain with the mainland. This geography of resource use is dramatically different from the ecosystem-based geography of spatially-based fishing and lobstering zones that is in the management plan (Figure 2). This suggests an incongruence between the livelihoods of local residents and the priorities of the management plan that cannot be overcome simply through stronger engagement between the HCRF and local institutions. Instead, this difference suggests

a need to re-think the ways in which conservation territories are designed and how local communities and conservation organizations interact. While I am certainly not the first to make this point (cf. Daniels and Bassett 2002; Zimmerer 2000), I wish to contribute to this critique by offering three insights as to how understanding a household's social capital can help inform a more inclusive conservation area.

First, some households on the Cayos Cochinos utilize social capital as a way to overcome a lack of physical assets and build a livelihood whose activities extend well past the reserve boundaries. This is illustrated in the case of Myrna's household, whose members rarely fish, but instead, is part of a broader social network in which fish are moved from the island to the mainland through various social networks. The presence of these types of households mean that the effects of conservation restrictions not only reach fishing dependent families of the Cayos Cochinos, but also reverberate back through social support networks that extend to the mainland. This has important implications for the types of people in a community a conservation organization should engage, and the manner in which they should be approached. It is necessary but insufficient, for example, to work with a community fishermen's group. When drafting co-management plans one should also consider households that might, on the surface, appear to lack the means to extract resources from a reserve, but are able to do so due to their household social networks. Taking into account the needs and priorities of such families is a first step toward a more constructive engagement between conservation organizations and local residents.

Second, the effect of social capital is variable and allows households to access different resources in different ways, resulting in restrictions that have highly variable effects within a community. Young men from the mainland who enter into a patrón relationship are essentially members of mainland households who use their social networks on the Cayos Cochinos in order to help their families on the mainland through their lobstering activities. Fish buyers, however, generally live on Chachahuate all year, and use their connections to the mainland to help build their livelihood on the island. These are groups that use their social capital to mobilize resources across space with different goals: one is using the Cayos Cochinos as a supplement to a mainland livelihood, while the other is using the mainland as a supplement for their island-based livelihood. The implication for co-management is that it is not enough to simply expand the geographic scope of community engagement, the HCRF is already engaged with mainland communities, but rather to incorporate a broader recognition of why and how certain households use marine resources in the Cayos Cochinos. For example, lobster diving restrictions might disproportionately affect mainland households who have sons in a patrón relationship. Targeting these families for input on lobstering restrictions, or for possibilities for alternative incomes, could lessen the negative impacts of conservation restrictions.

Third, social capital is an asset that is continually maintained, with some marine resources serving as a key role in building this asset. This has important implications for conservation efforts that are often focused on accommodating the financial needs of fishermen by formulating detailed management plans for species such as lobster, but impose blanket restrictions on socially valuable animals like turtles. In the case of the HCRF there has been a great deal of energy expended on educating local residents on the importance of preserving nesting grounds of turtles, without recognizing the role that turtle eggs and turtle meat often play in building social capital. The poaching of turtle eggs by fishermen like Hugo is not just a matter of residents who don't "get" the conservation message of the HCRF, but also one of conservation scientists and managers failing to understand Hugo's motivation for collecting the eggs in the first place. Recognizing that marine resources are often times valuable in ways that go beyond sub-



Figure 5: Resource flows and ties between mainland and island.

sistence or money is a first step toward bridging the disconnect that one often sees between those of conservation managers and those of local residents.

Conclusion

While this paper deals with only one community in the CCMR, the insights presented here can contribute to understanding why attempts at conservation co-management have failed around the world. The case of the Cayos Cochinos suggests that the very same aspects of social capital that are often celebrated by conservation policy researchers can also become a source of non-compliance and friction when used by households in the pursuit of maintaining a livelihood. By investigating how a household's social capital produces a geographically diverse livelihood, a very different story about the problems of co-management emerge than if I had focused on how social capital strengthens institutions and local civil society. The complex and diverse patterns of marine resource use that emerge show how difficult it is to implement a successful co-management plan that engages with homogenized social entities like "communities" or "fishermen groups." I am not denigrating the importance of a robust civil society in engaging with the political process of commons management. What I am suggesting is that a community with the classic hallmarks of strong social capital, strong community norms and high levels of trust, does not mean that conservation co-management efforts will necessarily succeed. Instead of producing a robust civil society, these elements of social capital, when formed and mobilized by individual households can produce patterns of resource use that are at odds with conventional conservation co-management geographies. A similar analytic approach - where social capital is understood at the scale of the household - can be used in other cases of conservation co-management in order to show that local residents are often hostile to conservation rules, not because they fail understand the benefits of conservation, but because their geographically and socially complex uses of resources fails to find expression in a management plan.

Notes

¹ All personal names in this paper are pseudonyms.

² They are, however, still residents of Nueva Armenia. Since ties to the mainland are necessary for survival on this island, Chachahuate can be thought of as more of an extension of the mainland village, than a separate village. The legal status of this island has been the source of ongoing legal disputes between one non-Garifuna man who claims sole legal title of a the cay (along with a number of other cays in the Reserve), and the community who claims that communal title has been granted to residents of Nueva Armenia. This is one of a number of land disputes between Garifuna communities, none of which held formal land title before 1992, and individuals who have come to own parts of the Cayos Cochinos. (for more details on this, see Brondo and Woods 2007).

³ While one could, in theory, do this with a smaller cayuco, it is in fact rarely done, since the fish are usually packed in ice-filled coolers, which require a larger canoa to transport.

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