

**Understanding the Development of  
Co-Management in a Modern Fishery:  
Rock Lobster Management in New Zealand**

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Tracy Yandle  
Assistant Professor  
Department of Environmental Studies  
Emory University  
tyandle@emory.edu

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## I. Introduction<sup>1</sup>

Key issues in self-governance are why co-management organizations develop, and how the characteristics of the organization influence their success. Traditionally, it is argued that co-management regimes grow from long-lived community based regimes. Closely linked are the concepts of social capital and civic engagement which Putnam (1993) identifies as key to the development of democratic self-governing societies. However, it is also argued that the co-management can develop out of strong property rights regimes that provide incentives to take on co-management or self-management responsibilities (e.g., Scott 1993; Scott 1999; Yandle 2003). By examining a recent case where co-management has developed from a regime that included elements of bureaucracy-based regulation and of market-based regulation (ITQs), it is possible to tease out which of these variables drives the development of co-management in a setting similar to those that many industrialized fisheries face.

Management of New Zealand rock lobster (*Jasus edwardsii* and *Jasus verreauxi*) provides a key case for understanding these issues. This is due to New Zealand's legislative and property rights characteristics, as well as the cultural and physical history of the rock lobster industry. Because of the rock lobster's history as a series of localized fisheries, an extensive history of local and national cooperation existed prior to the introduction of Individual Tradable Quotas (ITQs) into rock lobster management in the 1980s. However, ITQs and their associated property rights created an incentive structure which encouraged the development of strong regional and national organizations which works with the New Zealand government to co-

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<sup>1</sup> A considerable amount of acronyms and specialized terms are used throughout this paper. People not familiar with New Zealand fisheries management may want to read this paper with Appendix 1: Alphabet Soup.

manage the lobster fisheries. Thus, this case shows a combination of industry involvement (at the local and national level) and strengthening property rights as key to the development of co-management in the New Zealand rock lobster industry.

## **II. Thinking About the Development of Co-Management**

Within the co-management literature, there are multiple explanations of how and why co-management regimes develop. In addition, the broader governance literature discusses other variables (such as social capital) are described as key to the successful long-term self-governance. A brief review of these literatures provides a context for this analysis.

### *Insights from the Co-management Literature*

Within the co-management literature, two routes to the development of co-management regimes are described: evolutionary, and crisis-driven. Evolutionary development occurs when long-lived institutions based in local communities (e.g., traditional or indigenous management regimes) become interwoven with the existing central or regional government (e.g., Acheson & Taylor 2001; Honneland & Nilssen 2000; Lim et al. 1995; Jentoft 1989). For example, traditionally followed gear or catching rules may be incorporated into laws as often happens in the Maine lobster fishery (Acheson, 2003). In many cases, the origins of the underlying institutions are lost in the mists of time, but it is maintained in a modern co-management form. Examples of these institutions include: common pastures in Torbel, Switzerland, and zanjeras (irrigation societies) in the Philippines (Ostrom, 1990).

For more recently developed co-management regimes, the co-management literature suggests that co-management approaches are most likely to be adopted when there is a period of extreme stress within the fishery management system. For example, Pinkerton notes “co-management is most likely to develop out of a real or imagined crisis in stock depletion or a

problem of comparable magnitude.”<sup>2</sup> (Pinkerton, 1989: 27) Other conditions identified by Pinkerton are: fishers’ willingness to contribute to regime financing and management; and the development occurring as a negotiated or experimental process. More recently, Pomeroy and Berkes have argued that a broader set of crisis-oriented conditions can lead to co-management development. These include: resource deterioration, conflict between stakeholders, conflict between management agencies and the local fishers, and governance problems in general.” (Pomeroy & Berkes, 1997: 476) Thus, in recently developed co-management regimes, the conditions most likely to lead to a sustained co-management approach are where there is a perceived crisis – most often within the fishery itself, but it may also be management-oriented issues such as conflict among stakeholders and management agencies.

### *The influence of property rights*

Another important stream of thinking regarding co-management is property rights, which can be defined as:

... enforceable authority to undertake particular actions related to a specific domain. For each right an individual holds, rules exist that authorize or require particular actions in exercising that property right (Ostrom and Schlager, 1996: 130).

Thus, with property rights come explicit or implicit responsibilities. While typologies of property rights vary (e.g., Ostrom & Schlager, 1995; Hanna et al, 1996; Berkes & Favara, 1989), a key insight is that when individuals or groups of resource users have a strong set of property rights to a common pool resource, the security provided by the property rights creates the incentive for them to manage the resource sustainably over a long period of time. (Ostrom & Schlager, 1996: 137) Thus, there is evidence of a clear link between property rights and the success of management regimes – including those for common pool resources such as fisheries.

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<sup>2</sup> Pinkerton goes on to comment “Nothing upsets government more than believing the resource is being eliminated, while nothing upsets fishermen more than seeing a fishery closed when they believe there are plenty of fish.”

This linking of property rights and governance has important implications for developing co-management regimes. Anthony Scott (1993, 1999) makes a similar argument concerning Individual Tradable Quotas (ITQs). He notes that a primary reason for some fishers failing to organize into self-governing organizations is a combination of information costs and conflict over distribution of the resource. However, he argues, “the distributional obstacles in the way of self-control of individual fishing pressures cannot be solved endogenously. ITQs provide a ready made exogenous distribution basis” (Scott 1993). Scott goes on to note that once Individual Tradable Quota (ITQ) regimes are set up, self-governing fisher organizations are likely to succeed, as they are better able to work together without fear that their share of the resource will be diminished.<sup>3</sup> There is evidence in the case of New Zealand that at the national level, the process theorized by Scott have indeed taken place. (Yandle, 2003) However, whether or how this dynamic works within an individual fishery has not yet been investigated.

### *Social Capital*

Social capital is another key concept in understanding why institutions arise and succeed. Most recently popularized by Putnam (1993, 2000), social capital can be defined as “features of social organization, such as trust, norms and networks that can improve the efficiency of society by facilitating coordinated action.” (Putnam, 1993:167) Ostrom notes the importance of social capital in the management of CPRs, how in situations where people have repeated communication and interaction over a localized resource,

“they can learn whom to trust, and what effects their actions have on each other and the CPR, and how to organize themselves to gain benefit and avoid harm. When individuals ... have developed shared norms and patterns of reciprocity,

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<sup>3</sup> McCay et al (1998) express caution about this, suggesting that the development of co-management also be due to the community created by ITQs. More importantly, they raise equity and management concerns as quota owners have the power and the incentive to choose the narrower interests of quota owners over the broader issues of the fishing community.

they possess social capital with which they can build institutional arrangements for resolving CPR dilemmas.” (Ostrom, 1990: 183-4)

But how does social capital build institutions? Ostrom argues that early success with smaller, localized institutions builds the social capital for future, larger developments. Over time, an iterative process allows incrementally larger organizations to develop. (Ostrom, 1990: 190) How does this happen in a modernized, nationally regulated fishery? Does a similar process occur, does it take a different form? Alternatively, do other variables (such as property rights in the form of ITQs) reduce the importance of social capital in this situation? This case study provides a forum for examining these questions.

As a modern, nationally regulated fishery grounded in both ITQ management, and a recently developed co-management regime, the New Zealand Rock Lobster fishery provides an opportunity to examine the questions raised in this review. Specifically, how co-management develops in a modern setting; the role of property rights; and the role of social capital are examined in this case study.

### **III. Overview of the New Zealand Rock Lobster Fishery**

#### *Description of Fishery*

Current fishing methods continue to follow primarily tradition practices, with lobster potting the main catching method and one or two person boats that sell to large processors and exporters dominating the fishery. However, since the introduction of Individual Tradable Quota (ITQ) management in 1990, there is evidence in some fisheries of a shift from owner-operators to a more vertically integrated structure. Today, rock lobster is essentially an export species, primarily shipped live to the Asian markets (although some is also sold frozen to the US). It is the third largest export species, accounting for NZ\$129 million in 2000 (SeaFIC 2001: 7). Total allowable commercial catch (TACC) for the 2000/2001 season was set at 2,849 metric tonnes, a

sustainable catch level set by annual stock assessment (SeaFIC 2003a:2). Today, the fishery stock assessments broadly describe fisheries that are stable or recovering from previous over-fishing, although they caution that large degrees of uncertainty remain due to incomplete information on recreational catches and the degree of illegal fishing activities (NRLMG, 2002; NRLMG, 2001a).

Rock lobster is managed as part of New Zealand's fisheries Quota Management System (QMS), which is based on an ITQ model in which the rights to catch a certain proportion of the TACC are held. These and may be bought and sold among fishers and other interested parties. (See Yandle, 2003 for detailed description.) ITQs are the primary means of regulation, although they are supplemented by input and catching methods restrictions. Within the rock lobster fishery there is one national set of regulations and TACC for packhorse lobster (*Jasus verreauxi*), but the dominant rock lobster species (*Jasus edwardsii*) is divided into eight regions (See Figure 1 in Appendix 2). These regions correspond with the regional rock lobster industry organizations (referred to as "CRAMACs") that are key to rock lobster co-management in New Zealand.

In addition to Quota Management System (QMS), in 1999, New Zealand passed legislation allowing an additional institutional arrangement in which some fisheries management responsibilities can be delegated from the Ministry of Fisheries to various Commercial Stakeholder Organizations (CSOs). The New Zealand Rock Lobster Industry Council (RLIC), which is a national umbrella organization for the associated CRAMACs, is one of many active CSOs.<sup>4</sup> Today, the RLIC has a variety of responsibilities including: advocacy, providing (or coordinating) stock assessment research, assistance developing management plans and other

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<sup>4</sup> Indeed, Russell Mincher's paper for this conference profiles another New Zealand CSO with a quite different history and operational structure.

duties. Sections below describe the history and institutional development of the rock lobster industry and co-management. This is followed by an analysis and discussion of this management approach.

### **III. History of Rock Lobster Management**

#### *Overview*

Rock lobster catching is integral to the history of New Zealand. Indeed, the Maori who first arrived in New Zealand in the 10<sup>th</sup> to 14<sup>th</sup> centuries (Reed, 1970: 23) consider rock lobster an historically and culturally important catch. After European arrival, rock lobster continued to be culturally and economically important fishery. Nationally, rock lobster was an important export species as early as the 1940s and 1950s (Annala, 1983: 101). However, development varied regionally. For example, in the Chatham Islands, rock lobster were known and fished on a small scale as early as 1907, (Kensler, 1969: 506) but the Chatham Islands lobster boom did not start until 1965 when one boat landed two tonnes of rock lobster (Annala, 1983a: 102), heralding the short-lived “Crayfish Bonanza” (Arbuckle, 1971:21). Similar but less dramatic booms and busts occurred in other localized fisheries.

This classic pattern of boom and bust characterized much of time for which data are available (1945-2002). This is illustrated in Figure 1 (in Appendix 2), where after an initial run-up in catching during the late 1940’s and early 1950’s, several peaks and valleys are evident in both the catch and catch per unit of effort (CPUE) for the national fishery.<sup>5</sup> Since the introduction of regulation to the rock lobster fishery in 1937, managerial efforts have focused on maintaining the biological and economic viability of the fishery. A variety of managerial

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<sup>5</sup> Data presented in this figure includes only the North and South Islands (i.e., it does not include the Chatham Islands) because of both the Chatham Islands’ distinctive history, and the fact that Chatham Islands rock lobster is treated as a separate stock.



approaches including: licensing, catching method restrictions, limited entry, ITQs, and co-management have all been used during the last 64 years.

Table 1 provides a summary of this history and related events, which are described in greater detail below. In reviewing this history, a pattern of expanding industry participation in management is noted.

**Table 1: Key Events in Development of Rock Lobster Co-Management**

Years	Event
1937-1980	Permitted Fishing & Input Controls – fishing permits required but freely distributed. Considerable input and method controls.
1977 - 1979	Moratorium on of new permits
1980 – 1990	Controlled Fishery -- Fishery Licensing Authority issued limited number of fishing licences to approved commercial fishers
1986	QMS introduced into finfish & paua (abalone)
1991	Introduction of rock lobster into QMS – TACCs less than catch histories
1991-1993	TACC Cuts in some areas
1991	National Rock Lobster Steering Group – 10 year plan
1992	Start of National Rock Lobster Management Group (NRLMG)
1993	CRA3 initiative to cut TACC in exchange for other management changes.
1996	Formation of CRAMACs and RLIC, formation of SeaFIC
1997	RLIC becomes research provider to ministry. Continues to today.
1999	Legislation passes allowing fishery management plans/co-management

*Permitted Fishing & Catch Restrictions: 1937-1980*

Annala (1983b: 6) marks regulation as beginning in 1937 with the introduction of permitted fishing (in which for the first time commercial rock lobster fishing licences were required to participate in the rock lobster fishery. Also during this time, a variety of input controls and method restrictions were introduced<sup>6</sup>. While the fundamentals of the permitted fishing approach remained a constant, the frequency of changes to method restrictions was dizzying. Indeed, Annala (1983b:30-31) documents approximately 60 changes to commercial and recreations catching regulations during this time period.

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<sup>6</sup> These included: size limits (often varying by regions); bans on taking of egg-laden females; bans on taking of soft-shelled lobster; seasonal limits; bans on SCUBA equipment; escape gap requirements; and area closures.

Concerns about the permitted fishing approach arose in the 1970s, when after a long-term run-up in catch; a rapid decline became evident (see Figure 1 in Appendix 2) leading to concerns about over-fishing and a possible stock collapse. With broad agreement from the Federation of Commercial Fishermen, the Fishing Industry Board, and the Ministry of Agriculture and Fisheries, it was decided to institute a limited entry fishery in which the number of permits issued for rock lobster fishing would be much more strictly controlled than in the past.

In 1977 the Fisheries Amendment Act 1977, or the “Controlled Fisheries Act,” was passed, resulting in an immediate moratorium on the issuing of new fishing permits. Meanwhile, the Ministry of Agriculture and Fisheries (MAF) worked in consultation with industry through the Fishing Industry Board (FIB)<sup>7</sup>, and held a series of 40 public meetings in the major rock lobster ports to decide how the newly controlled fishery would be administered.

#### *Rock Lobster as a Controlled Fishery: 1980-1990*

The moratorium remained in place until 1980 when the controlled fishery policy was introduced. As a “Controlled Fishery,” rock lobster fishing permits were distributed by the Fishing Licensing Authority (FLA). Two types of permits could be issued: “continuous licences” were issued for multi-year periods for full-time fishers;<sup>8</sup> and “seasonal licences” were issued for more limited periods, and had to be re-applied for annually. As a result, the number of commercial rock lobster fishing permits issued nationally dropped from 1,574 vessels to 970 vessels – a drop of approximately 38% (Annala, 1983a: 107). Furthermore, new licences could only be issued if an existing licence was surrendered and the FLA decided to re-issue rather than retire the permit. Thus, through natural attrition, the FLA further reduced effort in the fishery.

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<sup>7</sup> The Fishing Industry Board (FIB) was an industry board which acted in an advisory and advocacy role for the industry. It was empowered by the government to levy the industry to pay for its activities. In 1997, the FIB was replaced by the New Zealand Seafood Industry Council (SeaFIC) which retains its levying authority, but has a substantively different organizational structure.

<sup>8</sup> those who fished throughout the year and earned at least 80% of their income through fishing

The controlled fishery also divided New Zealand into separate geographically distinct fisheries, with permits usually restricted to one region. For each region, the Fishing Industry Board organized a liaison committee consisting of fishers and processors who provided industry input into regional fishery management. A national liaison committee composed of representatives from each region also was created. As is discussed later, the formation of these regional and national liaison committees was a key step towards the development co-management in the rock lobster fishery.

#### *Introduction of Rock Lobster into the Quota Management System*

While rock lobster continued under controlled fishery management until 1990, the 1980s marked a key period of change in the broader New Zealand fishing industry. In 1986, New Zealand became one of the first countries to adopt market-based regulation when it instituted its Quota Management System (QMS), with its emphasis on the use of ITQs, the removal of subsidies, and the promotion of exports is viewed as a seminal and long-standing example of the market-based approach to fishery management.<sup>9</sup>

Rock lobster was not included in the initial roll-out of QMS. According to Sykes (2003), in the early 1980s, the Ministry of Agriculture and Fisheries originally approached the New Zealand Federation of Commercial Fishermen seeking to use paua (abalone) and rock lobster as pilot species for introducing ITQ management. However, the Federation rejected this proposal because the fishery appeared healthy at that time, and the Federation was wary of a system entailing a total allowable catch (i.e., a catch limit). Thus, QMS was initially introduced in the broader fin-fisheries first, then in the mid 1980s, as pressure on stock continued to grow, the issue of bringing rock lobster into QMS was re-examined.

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<sup>9</sup> See Yandle, 2001 for discussion of introduction of QMS, and Annala, 1996; Batstone & Sharp, 1999; Boyd & Dewees, 1992 for discussion of implementation and effects of QMS.

Discussion about bringing rock lobster into QMS next took place at the national leadership level through the National Rock Lobster Liaison Committee, then moved to the regional and grassroots level where the discussion centered on four policy options including: the existing system, transferable licences, transferable pot entitlements, and ITQ management. After a series of public meetings with the rock lobster industry, on October 3, 1986 the Federation of Commercial Fishermen held a vote on the four policy options. The results of this ballot showed no single policy option receiving majority support, and ITQ management receiving only 21% support (Branson, 1986).

In the wake of this vote, a new round of consultation was held starting in November 1986. Again, a vote was released. However, this time options open for discussion were limited to a revised ITQ management system under QMS or the existing controlled fishery.<sup>10</sup> Thus, with the two most popular options removed, it is perhaps not surprising that the second vote held on 16 April 1987 resulted in acceptance of ITQ management. Sykes later described the sentiment of the day by recalling “we came into QMS reluctantly ... as we got closer to 1990, there was grudging acceptance that it was going to happen and we needed to get on board to get the most concessions possible.” (Sykes, 2003). However, it should also be noted consultation with national and regional interests, as well as two votes had taken place prior to the decision. By 1990 Rock Lobster was an ITQ-managed species.<sup>11</sup>

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<sup>10</sup> In a forward to the discussion booklet – the “Rock Lobster Fisheries: Proposed Management Policy” (MAF 1986b), the Minister of Fisheries justified this decision by noting “Transferable licences and pot limits are considered to have major shortcomings. I believe ... that implantation of either of these options would not be in the long term interests of the industry or the nation” (MAF 1986b:4)<sup>10</sup> The Minister then went on to make something of an ultimatum, stating: “[The Government] does not intend, however, to impose a management system to which a substantial proportion of the industry is adamantly opposed. If after a second round of consultation with the industry, it is clear that substantial opposition to ITQs still exists, then I believe there will be no alternative but to maintain the present controlled fishery regime and to set a TAC for each controlled fishery. (MAF 1986b:4)”

<sup>11</sup> The Ministry initially planned to bring rock lobster into QMS in 1988, but Treaty of Waitangi fishery claims (i.e., rights claims by the Maori) put a temporary hold on the introduction of new species into QMS (see Moon, 1999), and rock lobster was finally brought into ITQ management as part of the 1989 Maori Fisheries Act for

### *Rock Lobster under the Quota Management System (QMS)*

Although the introduction of rock lobster into QMS represented a period of legislative stability, a consider amount of turbulence continued within the industry and regulatory system. This turbulence focused around the setting of total allowable commercial catch (TACC) which was subject to organized discussion and contestation by national fisheries organizations;<sup>12</sup> as well as a series of national and regional rock lobster industry initiatives on methods and approaches to maintain and improve the fishery. These events, briefly summarized below, are important for their role in developing grassroots input and thus a co-management tradition or ethic within the industry and government.

#### *Management Advice and Initiatives*

In addition to discussion of TACC setting, industry was also involved in rock lobster management at the national level through two different initiatives started by Douglas Kidd, who was Minister of Fisheries during the early and mid 1990s. The first of these initiatives was the Rock Lobster Steering Committee which was convened in 1991 to: “address conservation issues in a manner that provides user groups with some predictability of the management process [and] to formulate a 10 year management plan for the rock lobster fishery. (RLSC, 1991: 2)” The committee formation composition (commercial fishing, recreational interests, Maori interests, conservation groups, and the Ministry of Agriculture and Fisheries) was itself important, as noted by the chairman who commented “The formation of this committee perhaps represents as shift towards a new management approach based on the direct involvement of user interests in the formulation of a forward looking fishery plan” (RLSC, 1991: i).

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implementation in the 1990 fishing year. This one year delay in implementation resulted in a year of “last hurrah” intensive fishing that can be noted in Figure 1 (Appendix 2) just before the ITQ introduction.

<sup>12</sup> Evidence of the degree of discussion and interaction is well-documented in letters and lobbying papers between industry organizations and the Ministry (see Ellison, 1993 and Dobson, 1991) as well as meeting minutes from internal ministry meetings where TACC reviews were conducted (MAF, 1990b).

After intensive meeting for a year, as well as an extensive period of public comment -- which included a series of regional meetings organized by the Fishing Industry Board (FIB 1991) and comment by regional fishing groups (e.g., Foggo, 1991) – the final plan was released. It recommended that rather than focusing on a nationwide management with TACC reductions, strategy should be regionally focused, and use a variety of management tools (including crackdowns on illegal fishing, handling protocols, changes in size requirements, etc) as well as TACC limits to rebuild the rock lobster fishery. Finally, the committee recommended that all management approaches be looked at as evolutionary, and that a National Rock Lobster Management Group (NRLMG) with a similar composition as the Steering Committee be created to advise the Minister on rock lobster fishery management (RLSC 1991) for the duration of the ten year plan. In an historical perspective, this recommendation was important because it institutionalized the industry's (and other groups') participation in management decision-making.

In 1992 the National Rock Lobster Management Group was created, and its existence continues through to today. While official composition includes all groups that participated in the Rock Lobster Steering Committee, it should be noted that participation of the environmental representative is not consistent, and that in 2001 concerns were raised about the lack of direct customary Maori<sup>13</sup> representation (NRLMG 2002: 7; NRLMG 2001b: 10-11). As is illustrated in Table 4, over the last decade the NRLMG has changed its role from providing management advice to the Minister to that of a user forum that encourages cooperation. As the group still retains its position as primary management adviser to the Minister, this change in vision has important implications for the strength and role of regional and national organizations in

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<sup>13</sup> Customary Maori is the right to catch limited amount of certain traditional species (such as rock lobster) for traditional celebrations.

developing management approaches. It also reflects a series of initiatives that have taken place during the 1990s.

**Table 4: Change Definition of NRLMG Role: 1992 versus 2002**

1992 Statement of Purpose	2002 Background Statement
“The group first met on 31 July 1992 and agreed their purpose was to provide you [the Minister] with ongoing advice relating to the management of the rock lobster fishery from a group that is representative of all interests in the fishery.” (NRLMG 1993:3)	“The NRLMG has not only played an important role in developing a significant level of consensus among user groups, which aids in the decision-making process, but also has encouraged the development of management initiatives throughout the country.” (NRLMG 2002:6)

Since the early 1990s, the rock lobster industry – either at a national level or a regional level, and either independently or a part of larger fishing organizations (e.g., the Federation of Commercial Fishermen, or the Fishing Industry Board) – has engaged in a series of management efforts with the objectives of stabilizing or increasing the rock lobster stock, and enhancing long-term revenue from the fishery. While these efforts have met with mixed success, they show a consistent pattern of industry involvement in, and often initiation of, innovative management practices. Some of these initiatives are summarized below.

- **Supplemental Enforcement Initiative:** In 1993, the Fishing Industry Board (with cooperation of the Federation of Commercial Fishermen) entered into a contract with the Ministry of Fisheries under which the Ministry of Fisheries would provide additional enforcement of commercial and non-commercial fishing law paid for by a levy on rock lobster catches (Sykes, 1993). While initial reviews in 1994 were positive (FIB, 1994), the agreement rapidly fell apart in late 1994/early 1995 after the Ministry received legal opinion that the contract was inappropriate for a government agency; and industry groups expressed frustration with the government’s lack of progress in fulfilling the terms of the contract (FIB, 1996).
- **CRA 3 Harvest Strategy:** In the early 1990s, Area 3 (Gisborne/East Coast) was facing with declining stock, and need to make serious catch reductions if the fishery was not to be depleted. Rock lobster quota holders worked together with recreational and customary Maori interests to form the CRA 3 Users Group which developed a harvest strategy that they believed would result in the best management of the fishery,<sup>14</sup> and submitted it to the NRLMG and Ministry with full support from all parties (e.g., Area 3 User Groups, 1992;

<sup>14</sup> The four elements of this proposal were: shelving 50% of TACC for 3 years, closure of the CRA3 fishery for 3 months to all fishers; increased enforcement targeted towards poaching; and decreasing of the minimum catch size for male lobster from 54 to 51 mm (Branson, 1992).

Hough, 1993) Although additional negotiations and modification were required for Ministry acceptance,<sup>15</sup> the harvest strategy was accepted by 1993 and elements remain in place today.

- Data Gathering Programs: A key issue in rock lobster management is the scientific information used in stock assessment and TAC/TACC setting. However, high-quality data are expensive and difficult to obtain. In response, several of the regional rock lobster fishing organizations, as well as more national-level interests began developing data gathering efforts including voluntary logbook programs, tag and release programs, and efforts to hire field technicians. For example, both Area 2 (Bay of Plenty) and Area 8 (Southland) commercial fishers were early starters or adopters of logbook programs; and Area 5 (Canterbury/Marlborough) has a research committee that initiated commercial logbook programs, and tag and release programs, and worked with the charter sector to develop a charter logbook programs. Other regions (e.g., Area 1 (Auckland/ Northland), Area 4 (Wellington/Wairarapa/ Hawkes Bay) are cooperative when approached to participate in data gathering, but do not initiate their own programs (Sykes, 2003)
- No Tag/No Sale: An ongoing problem within the rock lobster fishery is the amount of lobster taken through illegal catch, then often sold on illegally to the retail or restaurant market. The New South Wales rock lobster fishery had used a tagging program to identify legally caught lobster. In conjunction with the Fishing Industry Board, leadership in the rock lobster industry decided to try a similar program. Once the Rock Lobster Industry Council was formed the program was trialled in the New Zealand market. While the tags were a technical success, the program met with unexpected failure due to resistance among retailers, consumers, and restaurants. In the absence of a government requirement to use the tags, the program failed and quickly closed after its 1999 trial. (Sykes, 2003)

Together, these examples illustrate a pattern of activity during the 1990s where at the national and regional levels commercial rock lobster fishers and the leadership of the rock lobster fishing industry began to take on some management responsibilities within their fisheries. As this movement progressed during the mid and late 1990s, it led to: (i) the development of the New Zealand Rock Lobster Industry Council (RLIC) and the regional CRAMACS; (ii) legislation passed in 1999 allowing the government to delegate certain fisheries management responsibilities to Commercial Stakeholder Organizations (CSOs).

#### *Development of the New Zealand Rock Lobster Industry Council*

The 1990s were a period of intense activity within the rock lobster industry. Not only did the industry enter into QMS, it also took on an active role in participating in fisheries

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<sup>15</sup> Most notably the modification of tail length requirements being increased to 52mm



management.<sup>16</sup> As regional groups took on more responsibility, they began to need more structure and thus formed or revitalized formal organizations.<sup>17</sup> At the same time, the need for national coordination and support of regional activities was rapidly growing beyond that which could be provided by the Fishing Industry Board (Sykes, 2003). As a result, a series of discussion papers were developed and meetings took place during 1996 in which the concept of the New Zealand Rock Lobster Industry Council (RLIC) and its relationship with its associated regional groups (or CRAMACs as they were called) was hammered out (e.g., Sykes, 1996a; 1996b). The result of this work was the document Pathways to Progress (unauthored, 1996) which was something between a manifesto and discussion document for a meeting held on 6 June, 1996. During this meeting, the RLIC was formed, with the understanding that CRAMACs would form and associate with the national organization. On 15 June, 1996, the RLIC announced its formation and established working relationships with organizations such as the Ministry of Fisheries (Sykes 1996c). Thus, the RLIC became one of the first examples of what are now referred to in New Zealand fisheries management as Commercial Stakeholder Organizations (CSOs).

A final key development for rock lobster co-management took place in 1997 when stock assessment research contracts became contestable (i.e., made open for bids, rather than conducted through single party contracts). The RLIC approached the newly formed New Zealand Seafood Industry Council (SeaFIC) fisheries scientists (see section below) as well as the traditional service provider National Institute of Water and Atmospheric (NIWA) about creating

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<sup>16</sup> This was largely encouraged by the vision outlined by the Rock Lobster Steering Committee reported in the 1991 document Towards 2001 (RLSC, 1991), and encouraged by the NRLMG. With this background, during the mid 1990s, efforts began to formalize and institutionalize this industry role in management.

<sup>17</sup> For example, the Southern Rock Lobster Research & Development Committee (Foggo, 1993) which was formed to support research activities; or the Otago Rock Lobster Liaison Committee (ORLLC, 1994?) which expanded its responsibilities from its former role when it was originally developed under the Fishing Industry Board with strong ties to the Federation of Commercial Fishermen's old port associations.

a joint venture for providing rock lobster stock assessment research. The consortium won a one year contract based on the concept of industry and government (NIWA) scientists working together with coordination and extended voluntary access to fishing boats provided by the RLIC. The consortium now regularly receives multi-year contracts, and uses CRAMACs and individual harvesters as subcontractors. (Sykes, 2003)

### *Development of the Seafood Industry Council and Legal Recognition of CSOs*

While the developments taking place in the rock lobster industry were remarkable, they were not occurring in a vacuum. Indeed, they took place within the larger context of the fishing industry as a whole with the similar movements towards co-management taking place in other fisheries. Organizations such as Challenger Scallop, the Orange Roughy Management Company, and similar organizations were forming and seeking to take on management responsibilities. As this occurred, the needs for a national organization also changed. The old 1950s/1960s model of the monolithic Fishing Industry Board was no longer appropriate. Instead, the New Zealand Seafood Industry Council (SeaFIC) was formed in 1997 based upon a model of Commercial Stakeholder Organizations (or CSOs) as the building blocks, all represented on a Board of Directors which governs overall activity. Today, SeaFIC describes its role as “to promote the healthy development of the New Zealand seafood industry. This occurs through advocacy, policy development, and the provision of scientific and educational services to the commercial seafood industry” (SeaFIC 2003b)

In September 1999, legislation was passed supporting this movement towards CSOs and co-management when the 1999 Fisheries Amendment Act was passed. It delegated certain management responsibilities to “approved service delivery organizations,” or CSOs.<sup>18</sup>

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<sup>18</sup> The explanatory notes accompanying the legislation described the extent of power sharing: “Another major reform will allow the Minister to transfer responsibility for certain fisheries services to quota owner-based

Essentially, CSOs are authorized to carry out routine management activities, including research, while the Ministry maintains the role of setting management standards, enforcement, and auditing CSO activities. A change of government leadership (from the National party to a series of Labour coalition governments) and other factors has since considerably slowed the efforts of many CSOs to take on full management responsibilities, but the 1999 legislation (which remains in place today) provides the legal framework for considerable co-management or self-management efforts within the fishing and rock lobster industries.

## **V Why the Rock Lobster Industry Council and CRAMACs emerged**

The material above describes how the RLIC and CRAMACs arose. It shows a gradual emergence of co-management that was not crisis driven, but rather was evolutionary – with industry’s role in management slowly growing over a more than 20 year period. This suggests that in addition to the crisis-driven model suggested by the literature, modern co-management may develop gradually, as traditional community-based co-management regimes do.

However, a key question is why the RLIC and the CRAMACs emerged when they did and in the form they did. An examination suggests two linked answers: a strong tradition in the rock lobster industry of involvement in the fishery; and a growth in the perceived property rights (primarily represented by ITQs) in the broader New Zealand fishing industry. Both of these explanations are explored below.

### *Social Capital*

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organizations (known as approved service delivery organizations) that meet certain criteria specified in the Bill. In devolving responsibility, the chief executive of the Ministry will no longer be responsible for delivery of those fishery services but will take on a role of monitoring and auditing the performance of approved service delivery organizations in accordance with the standards and specifications set by the Minister.” (Fisheries Act 1996 Amendment Bill 1999: ii) Furthermore, the enabling legislation notes that the Ministry must be satisfied that: “The proposed approved service delivery organization is representative of quota owners who have an interest in those functions, duties and powers” (Fisheries Act 1996 Amendment Bill 1999: §296(B)3a).

Within the rock lobster industry, there is a tradition of involvement and participation in the fishery beyond that of just catching the fish. Instead rock lobster fishers had a tradition and expectation of participating (or at least having input into) fishery management through institutions such as the port associations, lobster syndicates, and liaison committees. Similarly, the industry expected involvement in national-level decision making. This pattern can be seen as social capital. However, the pattern of development appears subtly different than Ostrom predicts. While development institutions managing CPR is usually described as localized then expanding geographic scope, here the pattern shows involvement starting at the national level then slowly growing in industry's involvement in management.

A review of events over the last few decades shows a pattern of consistent but growing rock lobster fisher and fishing industry participation in governance activities. This includes:

- Historical existence of active port associations and the Federation of Commercial Fishermen (in which rock lobster fishers were a significant proportion of members)
- Consultation over decision to introduce controlled fishery
- The ability of the rock lobster industry to reject QMS in the early 1980s
- The extensive national-level debate, meetings, manoeuvrings, and votes surrounding the introduction of QMS in the late 1980s
- The development of the NRLMG and its changing role in promoting fishers' activities
- Movement on the regional and national level towards developing regional management initiatives and scientific monitoring programs during the 1990s
- Development of the RLIC and the CRAMACs in the late 1990s.

This development or accumulation of expertise and experience encouraged the emergence over time of the NZRLIC and CRAMACs as an institution capable of co-managing the rock lobster fishery with the government.

### *Property Rights*

But this development of human and social capital through involvement and participation does not completely explain the puzzle of why this institution arose. While it answers the how and part of the why, it does not fully explain the motivation. Why was it worthwhile for

individuals and groups to invest the considerable time, effort, and money to build this approach? The answer can be found in the large context of property rights in New Zealand's fisheries management.

When QMS was introduced to New Zealand's finfish fisheries in 1986, ITQs represented a simple right to extract a specified tonnage of fish from the national fisheries. However, over time, the property right ITQs represent has changed, growing to represent a more extensive bundle of rights. As QMS changed, so did the nature of the property rights ITQs represent. This series of changes is summarized in Table 6, and a more detailed discussion of this process is available in Yandle, 2001. Among the most important changes were: the switch from tonnage to proportionality in 1990 placed the costs and benefits of stock changes on the quota owners, thus giving them an incentive to better manage the fish stocks, then rock lobster was brought into QMS. Next, the use of ITQs to settle the Treaty of Waitangi Maori right issues in 1992 strengthened the perception (and political reality) of ITQs as a perpetual ownership right. The switch from resource rentals to cost recovery in 1994 ended the symbolic acknowledgment of government ownership of the fisheries, and the incentive structure of paying for management costs encouraged quota owners to become more active in fisheries management and cost control. Finally, the legalization of stakeholder group management in 1999 recognized the management interests and rights of quota owners.

**Table 6: Timeline of Events Influencing ITQs as Property Rights: 1986 – 2000**

<b>Event</b>	<b>Description</b>	<b>Influence on Perception of Property Rights</b>
1980 –1990 Controlled Fishery	Rock Lobster as a controlled fishery	Rock lobster fishers have extremely limited property rights as number of fishers is severely limited. Rights are non-transferable.
1986 Fisheries Amendment Act	Quota Management System (QMS) introduced	ITQs defined as a perpetually held right to harvest a specific amount of fish, while government retains ownership
Ongoing -- Security of ITQs as asset and as loan	ITQs not well accepted as loan collateral by banks. 1996 law provided registry for liens, but	Perception of ITQs as strong property right (or as an ownership right) is undermined by difficulty in obtaining loan financing.

<b>Event</b>	<b>Description</b>	<b>Influence on Perception of Property Rights</b>
collateral	loans still difficult to get.	
1989/90 Switch from Tonnage to Proportional Allocation	Government stops entering market to change TACC. Instead, tonnage ITQ owners have rises or falls with TACC changes.	ITQ owners bear the risks and benefits of changes in TAC. Large companies and industry leaders saw these changes as improving property rights, small fishers saw as weakening rights.
1991 – Rock Lobster Enters QMS	Rock lobster enters QMS	Fishers in rock lobster fishery have same rights and incentives as other New Zealand fishers
1992 -- Treaty of Waitangi Settlement	Maori granted 10% of quota; plus half of Sealord Products (NZ\$150 million); plus 20% of all new fish stocks brought into QMS.	Government’s use of ITQs as partial settlement of Treaty of Waitangi claims increased perceived strength of ITQs as a property right.
1994 -- Switch from resource rentals to cost recovery	Quota owners pay for part of the cost of management, rather than a “rental fee” for the privilege of fishing in New Zealand waters.	End of resource rentals symbolized a reduction of Government property rights and an increase in ITQ owner property rights. Incentive structure of cost recovery encouraged quota owners to become more actively involved in fisheries management.
1996 -- Fisheries Amendment Act	Primarily administrative reforms, more explicitly defined ITQs, encouraged loans on ITQs (see above)	Provided a more explicit definition of ITQs, created ACE, and encouraged loan financing (see above)
1999 -- Fisheries Amendment Act	Legislation allows MFish to delegate some management powers to CSOs.	Explicitly recognizes ITQ owners as having a legitimate fisheries management interest that can be exercised through stakeholder groups.

This strengthening of property rights coincided with events in the development of rock lobster co-management, in a mutually supportive process in which strengthening property rights and engagement in management re-enforced each other over time. The result was the still evolving co-management approach that we see today in the RLIC and the CRAMACs.

## **VI Examining the Effects of Rock Lobster Co-Management**

Perhaps the most documented aspects of fisheries management are the well-known measures of outcome, such as catch or catch per unit effort (CPUE). Both these measures are presented in Figure 1 (in Appendix 2), in conjunction with the key events in the rock lobster fishery. This shows that since QMS and the later development of co-management, catch levels have been brought reduced through TACC reductions; and CPUE has increased – indicating an increased return for effort in the fishery. Similarly, scientific stock assessments (e.g., NRLMG

2002; NRLMG 2001) appear consistent in their assessment that the stocks are safely managed – given the degree of uncertainty surrounding recreational and illegal catch. However, QMS and the development of co-management are so intertwined that it is difficult to tease out of the outcomes the roles of QMS versus co-management.

More directly observable is the effect that co-management through the RLIC and the CRAMACs has had on the process of management. Here, there is clear evidence of increased participation of the fishing industry and individual fishers in the management process. At the national level, this paper has documented how the RLIC acts as an advocate, research provider, and coordinator of activities for the regional CRAMACs, and the regional CRAMACs themselves either undertake activities independently or participate in nationally coordinated efforts. This improvement in management process in itself has value, as research has indicated that resource user participation in rule-making and management activities increases compliance levels and thus the robustness of self-management regimes (e.g., Ostrom, 1990; Ostrom et al., 1994). It is reasonable to expect that a similar effect would be seen in co-management regimes.

## **VII. Discussion**

Perhaps the most well-documented conclusion in this case study is that the development of co-management in the form of the RLIC and the CRAMACs was a long-term (multi-decade) process that involved both the development of social capital and management experience within the industry, coinciding with a quite remarkable expansion in property rights (in the form of ITQs) within the New Zealand fishing industry as a whole. At the broadest level, these findings confirm our theoretical understanding of the role of property rights and social capital as key variables in the development of co-management or self-management institutions.

However, some subtle differences from the literatures' predictions also emerge. These include: the gradual development of co-management rather than crisis-driven development; and the growth of social capital at the national level rather than solely in local institutions. When combined with the property rights findings, these results show that there are multiple paths for developing institutions capable of co-managing CPRs. Indeed, this case shows that in some situations, even if traditional institutions have been overwhelmed by developments such as ITQs, new forms of co-managing or self-managing institutions may still develop. There appears to be potential in this management approach, but we must be careful that we understand when and how it works, before apply it to a wide range of activities and institutional settings. While this study (and others) emphasizes the role of civil society and property rights in the development and success of these regimes, a more comprehensive understanding of these mechanisms is still needed to fully understand the totality of this approach.



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APPENDIX A - ALPHABET Soup

Term	Acronym	Explanation
Catch Per Unit Effort	CPUE	measure ment of the amount of effort or input it takes to extract a certain amount of product from the fishery (e.g., amount of kg per potlift).
Commercial Stakeholder Organizations	CSOs	Organzations composed of commercial fisheries interests (usually ITQ owners) that can be delegated certain fisheries management responsibilities.
Customary Maori Rights		the right of the Maori to catch limited amount of certain traditional species (such as rock lobster) for traditional celebrations
Fishing Industry Board	FIB	A board that acted in an advisory and advocacy role for the industry. It was empowered to levy the industry to pay for its activities. In 1997, the FIB was replaced by the Seafood Industry Council (SeaFIC)
Fishing Licensing Authority	FLA	A government organization active at the time of controlled fisheries (1980-1990) that determined wo could remain active in the rock lobster fishery
Individual Tradable Quotas	ITQs	The right to catch a defined amount of a certain fish species. ITQs may be bought, sold, traded, etc.
Ministry of Agriculture & Fisheries	MAF	The ministry responsible for fisheries management until the early 1990s. Replaced by Ministry of Fisheries.
Ministry of Fisheries	MFish	The ministry now responsible for fisheries management. Replaced the Ministry of Agriculture and Fisheries
National Institute of Water and Atmospheric	NIWA	An independent government agency that is the primary provider (via a competitive bid process) \for fisheries stock assessment research
National Rock Lobster Management Group	NRLMG	A multi-sector group (commercial, govt, recreational, environmental, science) that provides rock lobster management advice to the Minister of Fisheries.
New Zealand Rock Lobster Industry Council	RLIC	The national-level CSO for the rock lobster fisheries. Provides advice, advocacy, stock assessment and coordination for CRAMACs
New Zealand Seafood Industry Council	SeaFIC	Replaced the Fishing Industry Board (FIB) in 1997 as the primary advisory and advocacy group for the fishing industry as a whole. All CSOs are members (including RLIC) are members
New Zealand Federation of Commercial Fishermen	NZ FCF	National organization that traditionally represents smaller fishers and owner-operators. It was closely tied to the old port associations, and was active in the debates over introduction of QMS. Has lost power since the formation of CSOs and SeaFIC.
Port Associations		Local/regional fisher associations based from home ports with historical roots dating back to turn of the century. These associations were nationally represented through the Federation of Commercial Fishermen. Some rock lobster sections of port associations evolved into CRAMACs.
Quota Management System	QMS	The regulatory system used to implement ITQ management in New Zealand fisheries. Was introduced for finfish & paua in 1986, and for rock lobster in 1990
regional management area	CRA ___	Geographic boundaries for management regions of rock lobster as defined under QMS. These boundaries are also used to define the areas that various CRAMACs co-manage. E.g., CRA 3
regional rock lobster organizations	CRAMACs	Regional CSOs that take on responsibility for co-managing various aspects of the rock lobster fisheries. All CRAMACs are members of the RLIC
Rock Lobster Steering Committee	RLSC	1991-1992 committee that wrote <u>Towards 2001</u> recommending more regional management and formation of NRLMG
Total allowable catch	TAC	The maximum amount of a certain fish stock that can be extracted in a given year (includes customary, recreational, and commercial catch)
Total allowable commercial catch	TACC	The maximum amount of a certain fish stock that can be extracted in a given year by commercial fishers. This is then divided into ITQs.
Treaty of Waitangi		An 1840 keystone document which guaranteed certain property rights to the Maori. Subsequent modern lawsuits and settlements concerning violations of these treaty rights have had tremendous impacts on fisheries management and used ITQs as currency for settling disputes.



Appendix 2  
 Figure 1: Rock Lobster Catch & CPUE 1945 to 2002

