

INFORMATION TO USERS

This manuscript has been reproduced from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps.

Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6" x 9" black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.

Bell & Howell Information and Learning
300 North Zeeb Road, Ann Arbor, MI 48106-1346 USA
800-521-0600

UMI[®]

**Market-Based Natural Resource Management:
An Institutional Analysis of Individual Tradable Quotas
in New Zealand's Commercial Fisheries**

Tracy Yandle

Submitted to the faculty of the University Graduate School
in partial fulfillment of the requirements
for the degree
Doctor of Philosophy
in the Department of Political Science
and the School of Public and Environmental Affairs
Indiana University

April 2001

UMI Number: 3005496

Copyright 2001 by
Yandle, Tracy Jane

All rights reserved.

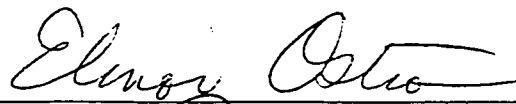
UMI[®]

UMI Microform 3005496

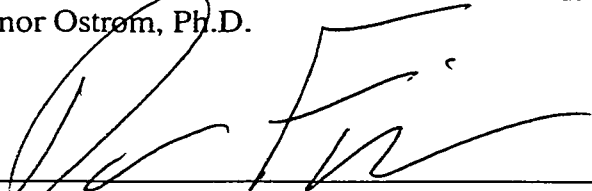
Copyright 2001 by Bell & Howell Information and Learning Company.
All rights reserved. This microform edition is protected against
unauthorized copying under Title 17, United States Code.

Bell & Howell Information and Learning Company
300 North Zeeb Road
P.O. Box 1346
Ann Arbor, MI 48106-1346

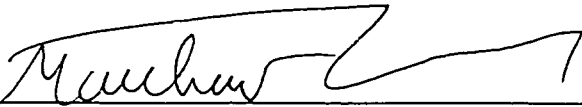
Accepted by the Graduate Faculty, Indiana University, in partial fulfillment of the requirements for the degree of Doctor of Philosophy.



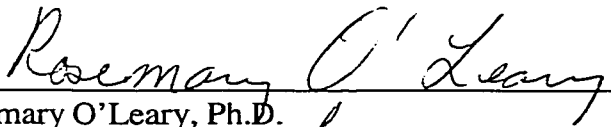
Elinor Ostrom, Ph.D.



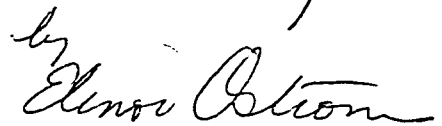
Norman Furniss, Ph.D.



Matthew Auer, Ph.D.



Rosemary O'Leary, Ph.D.

by


March 6, 2001

Copyright 2001

Tracy Yandle

ALL RIGHTS RESERVED

Acknowledgments

Writing this acknowledgements page has given me an opportunity to take some time to remember and appreciate the help and support I was fortunate enough to receive while working on my degree and completing this dissertation. There are many people and organizations that I owe a great deal of thanks.

First, my dissertation committee, who guided this research through all its twists and turns, read drafts, and offered impeccable advice.

- ◆ Elinor Ostrom, who as my dissertation chair advised me and pushed me to better scholarship than I thought myself capable. I have learned so much from!
- ◆ Rosemary O'Leary, who mentored me through my early years in this program, and continues to do so now.
- ◆ Norm Furniss, who somehow explained the mysteries of Comparative Politics, and supported me from the beginning.
- ◆ Matt Auer, who I could always rely on for a cool head, and critical (yet always diplomatic) analysis when it was needed most.

In addition, this dissertation also would not have been possible without the assistance of the National Science Foundation's Dissertation Improvement Grant (# SES-9905271), which provided the funding necessary to conduct extensive fieldwork in New Zealand.

While in New Zealand, the School of Environmental and Marine Sciences (SEMS) at the University of Auckland was generous enough to host me, providing access to research facilities, faculty, as well as good friends from the graduate student offices! The New Zealand Seafood Industry Council (SeaFIC) was also kind enough to grant me extensive access to their library. I found most of the original documentation (and many of the secondary sources) used in this dissertation there. For fisheries researchers and policy analysts, the SeaFIC library is a world-class resource. During my fieldwork, I was consistently blessed by the willingness of people to talk with me frankly and in-depth.

These people ranged from individual fishers to people at the Ministry of Fisheries, the National Institute of Water & Atmospheric (NIWA), SeaFIC, fishing companies, and environmental groups. As a result, I gained valuable insights into this topic. More individually, I would like to thank Bunny and David Potter for giving me a “home away from home” while I was in Auckland. Also, Murray Walker whose excellent genealogical research skills and freely given time helped document the historic survey response rates (and track down a few more interviewees).

Finally, there are thanks on a personal level. My parents, Lorna and Chris Yandle, who always believe in me, even when I don't believe in myself. My friends who have seen me through the ups and downs of the last six years. And my husband, Erik Droutman, who holds me close when I need the support, and nudges me out of the nest when I need to spread my wings. It's like the Buddy Holly song – “True Love Ways.”

Market-Based Natural Resource Management: An Institutional Analysis of Individual Tradable Quotas in New Zealand's Commercial Fisheries

Tracy Yandle

Abstract

This dissertation examines the institutional choices made in how the New Zealand government manages its fishery resources and the consequences of these choices in New Zealand's fisheries. Special attention is paid to how the changing perceptions of property rights led to changes in institutional arrangements. Specifically, the adoption of a market-based ITQ-based management regime in the late 1980s; and the later development of a co-management regime based on stakeholder groups are examined. I explore four broad questions:

- ◆ How and why was New Zealand's Quota Management System (QMS) adopted?
- ◆ What effect did the Quota Management System have on the structure and characteristics of the fishing industry in New Zealand?
- ◆ What types of property rights do Individual Tradable Quotas (ITQs) represent? Has this changed over time, and what are the effects of such changes?
- ◆ What are the characteristics and origins of New Zealand's co-management approach? How likely is this approach to succeed?

These questions are examined using data from a combination of sources including: a panel survey of ITQ owners in the Auckland Region dating to the start of QMS, national surveys of large companies and stakeholder groups, quota ownership records, expert interviews, and extensive archival and published documents.

The data and information presented in this dissertation will show that ITQs are a powerful management tool, the use of which has wide-ranging institutional implications. As the property rights change, it fundamentally changes the nature of the fishery -- changing how people view the resource and how they interact with it. These changes go beyond those envisioned in the economic modeling of quota systems to change the social and institutional fabric of the fishery, and the resource management responsibilities that the fishing industry and community are willing to take on. The findings also have implications for our theoretical conception of approaches to natural resource management, showing that the simple vision of three competing approaches may be incomplete, and that a layering of approaches into various forms of co-management is possible and in many cases desirable.

Contents

Chapter 1: Why New Zealand’s Fishing Management Approach is Important to Policy Analysis	1
Introduction.....	1
Importance of the World’s Fisheries	3
Individual Tradable Quotas and Fisheries Management	5
ITQ Management in New Zealand	7
Research Themes	10
Dissertation Overview	11
Chapter 2: Linking Policy Proposals and Theoretical Concepts	13
Introduction and Overview	13
Tragedy of the Commons	15
Fisheries Management	19
The Bureaucracy-Based Approach	22
The Market-Based Approach.....	26
Community-Based Approach.....	32
Co-Management.....	35
Transaction Costs Associated with Policy Approaches.....	41
Information Costs.....	43
Coordination Costs.....	49
Strategic Costs	51
Property Rights	53
What are property rights?.....	54
Typologies of Property Rights	55
The Complexity of Property Rights.....	57
Analysis and Conclusion	59
Chapter 3: Case Background and Research Design.....	62
Introduction.....	62
Existing Research on New Zealand’s Quota Management System.....	63
Data Sources	68
Historic Auckland Region Surveys.....	68
Nation-Wide Corporate Survey	73
Stakeholder Survey	75
Historic Quota Ownership Data.....	76
Qualitative Data Sources.....	76
Research Questions and Design.....	79
Research Question #1: How and why was New Zealand’s Quota Management System Adopted?	80
Research Question #2: What effect did the Quota Management System have on the structure and characteristics of the fishing industry in New Zealand?	81
Research Question #3: How and why have perceptions of the property rights ITQs represent changed? What are the effects of these changing Perceptions?	83

Research Question #4: What are the characteristics and origins of New Zealand's co-management approach? How likely is this approach to succeed?	85
A Note on Methods.....	88
Appendix 3-1: 1999 Auckland Region Fishers Survey	89
Appendix 3-2: 1999 New Zealand ITQ Company Survey Protocol.....	93
Appendix 3-3: 1999 New Zealand Stakeholder Group Survey	97
Chapter 4: Development and Change in the New Zealand Fishing Industry	101
Introduction.....	101
History of New Zealand Fishing: The Maori to 1945	102
History of New Zealand Fishing: 1945 to QMS.....	104
Inshore Developments	107
Deepwater Developments	109
Introduction of QMS.....	112
Dominant Explanations.....	112
An Alternative Explanation	113
Intellectual Origins of QMS.....	116
Adopting and Implementing QMS	118
Introducing QMS to the Fishing Industry	119
Initial Implementation and Buy-Back.....	122
Changes in QMS Management: 1986 to 1999.....	124
The Quota Management System Today.....	132
Conclusion	134
Appendix 4-1: Map of New Zealand's Quota Management System (Adapted from: Clement, 1997).....	135
Chapter 5: Effects of QMS Management.....	138
Introduction.....	138
Sustainable Fishing.....	139
Stock Assessment Process	140
Sustainability.....	144
Perception of Efficiency	155
Industry Consolidation, Aggregation, and the Loss of Small Fishers	160
Compliance	181
Conclusion	191
Appendix 5-1: TACC Setting Process (Annala, 1999).....	194
Appendix 5-2: Summary of Aggregation Limit Exemptions Approved between the start of QMS and June 1999.....	195
Chapter 6: Evolution in the Perceptions of ITQs as a Property Right.....	202
Introduction.....	202
Property Rights	202
In the Beginning: ITQs in 1986	205
Security of ITQs as Collateral for Loans	208
Switch from Tonnage Allocation to Proportional Allocation.....	210
Treaty of Waitangi Settlement.....	215
Shift from Resource Rentals to Cost Recovery	219
1996 Fisheries Amendment Act	224

1999 Fisheries Amendment Act	225
2000 Moratorium	229
Conclusion	231
Chapter 7: Evolution of a Stakeholder Group Managed Fishery.....	234
Introduction.....	234
Research Questions.....	236
Characteristics of Stakeholder Group Management Approach	237
Reactions to the Stakeholder Group Approach.....	241
Development of Stakeholder Group Approach	244
Political and Public Management Context.....	245
Academic Contexts	246
Industry Context.....	248
Current Characteristics of Stakeholder Groups	262
Congruence between Stakeholder Group Approach and Literature	269
Historical Context.....	270
Geographic Diversity	271
Membership Diversity	272
Congruence between Stakeholder Group and Fishery Interests	273
Implications of Differences between Literature and Stakeholder Groups	276
Predictions for Success of Stakeholder Group Approach.....	277
Clearly Defined Boundaries.....	280
Congruence	285
Collective Choice Arrangements	286
Monitoring	288
Graduated Sanctions	291
Conflict Resolution Mechanisms.....	292
Recognition of Right to Organize	293
Nested Enterprises	294
Analysis of Design Principles.....	297
Conclusion	301
Chapter 8: Conclusions.....	303
Introduction.....	303
Summary of Findings.....	305
Policy Implications	312
Theoretical Implications	314
Gazing into the Crystal Ball.....	315
Future Research	317
Works Cited	319

Figures

Figure 2-1: Approaches to Fisheries Management	20
Figure 2-2: Pomeroy and Berkes' Hierarchy of Co-Management Arrangements	36
Figure 2-3: Presentation of Co-Management in the Literature	41
Figure 2-4: Ostrom and Schlager's Typology of Property Rights	57
Figure 2-5: Integrative Presentation of CPR Management Approaches.....	60
Figure 4-1: Snapper Catch and Effort 1963 to 1986.....	109
Figure 5-1: Research Spending Relative to Export Earnings	153
Figure 5-2: Marginal Measures of Change in the Number of Deepwater and Inshore Quota Owners	165
Figure 7-1: 1996 Ministry of Fisheries Definition of Fishery Stakeholder	253
Figure 7-2: Organization of New Zealand Rock Lobster Industry Council (Sykes, 1999)	295
Figure 8-1: Approaches to Natural Resource Management.....	304

Tables

Table 2-1: Characteristics of each approach to fisheries management.....	21
Table 2-2: Perceived outcomes of each fisheries management approach.....	22
Table 2-3: Summary of Transaction Costs Associated with Management Regimes.....	42
Table 3-1: Summary of Historic Auckland Region Survey.....	69
Table 3-2: Detailed Breakdown of 1999 Auckland Region Survey Response Rate	71
Table 3-3: Reasons for Non-Participation in 1999 Auckland Region Survey	72
Table 3-4: Summary of Nation-Wide Corporate Survey	73
Table 3-5: Summary of Stakeholder Survey.....	76
Table 3-6: Research Questions and Data Analysis	87
Table 4-1: Timeline of Major Fishing Laws and Regulations 1945 to 1986.....	105
Table 4-2: Summary of Fishing Industry Board (FIB) Discussion Of ITQ-Based Management as Presented in FIB Annual Reports	114
Table 4-3: 1987 Auckland Region Survey on Adoption of QMS	121
Table 4-4: Major Changes to the Quota Management System 1986 – 2000	124
Table 5-1: Auckland Region Survey Response on Conservation over Time	148
Table 5-2: 1999 Comparison of Auckland Small-Scale and Nationwide Companies Response on Conservation	149
Table 5-3: MoRST Analysis of 1996 Stock Assessment (MoRST, 1996: 26)	151
Table 5-4: Royal Forest and Bird Analysis of 1999 Orange Roughy Stock Assessment (Weeber, 2000: 2).....	152
Table 5-5: 1999 Comparison of Auckland Small-Scale Fishers and Nationwide Companies Response on Efficiency.....	157
Table 5-6: Descriptive Measures of Inshore and Deepwater Quota Ownership 1987 to 1998	164
Table 5-7: Two Way ANOVA Analysis of Changes in Number of Quota Owners over time Between Inshore and Deepwater Fisheries.....	164
Table 5-8: Quota Ownership 1986 vs. 1996 (Clement, 1996: 15).....	166
Table 5-9: Auckland Region Survey Responses on Small Fisher Issues Over Time	169
Table 5-10: Comparison of Outlook of Auckland Small-Scale Fishers and Nationwide Companies.....	170
Table 5-11: Changes in Ports since QMS -- As described by Peter Stevens.....	175
Table 5-12: Change in Auckland Region Opinions about Cheating Over Time	184
Table 5-13: 1999 Comparison of Auckland Small-Scale Fishers and Nationwide Companies Response on Changes in Cheating.....	186
Table 5-14: 1999 Comparison of Auckland Small-Scale Fishers and Nationwide Companies Mentioning Cheating or Enforcement as Negative Effects of QMS.....	186
Table 5-15: Estimates of Commercial Fishers Level of Compliance (MFish 1998: 12)	188
Table 6-1: Bundles of Rights Associated with Positions (Ostrom and Schlager, 1996: 137)	203
Table 6-2: Timeline of Events Influencing ITQs as Property Rights: 1986 – 2000	232
Table 7-1: Summary of Documents Concerning Stakeholder Group Management.....	250

Table 7-2: Summary of Core and Non-Core Ministry of Fisheries Functions	255
Table 7-3: Clarke and Clough's "Comparative advantages of organizational options" (Clarke and Clough p.20)	257
Table 7-4: Summary of Group Responsibilities (in percent)	265
Table 7-5: Comparison of Auckland Small-Scale and Nationwide Company Survey Responses	268
Table 7-6: Summary of Interactions of Stakeholder Group and Fishery Interests	275
Table 7-7: Ministry and Stakeholder Group Performance Related to Design Principles.....	278
Table 7-8: Responsibilities Broken Down by Group.....	297
Table 8-1: Summary of Research Questions and Findings.....	305

Chapter 1: Why New Zealand's Fishing Management Approach is Important to Policy Analysis

There are no guarantees, in fishing, of the rewards due on any given day, month, or year. Fish are migratory; they can't be contained by fences.

Kirk Hargreaves, *On The Next Tide*

Introduction

Natural resource policy is an important and complex issue for policy analysts and political scientist. Much of political science is concerned with the governance and distribution of power, goods, and services. But ultimately, all goods come from natural resources. Competition for natural resources, efforts to govern competition, and efforts to control the results of natural resource use have long existed.¹ Today, the need for politically, economically, and scientifically sound natural resource management policy is more important than ever.

Many natural resources take the form of common pool resources (CPRs) – goods that are characterized by both being subtractable (one person's use prevents another person's use) and by being difficult to exclude resource users (Ostrom et al, 1994: 6-7). This dissertation focuses on the management of common pool resources (CPRs); and the evolution of the institutions that people create to help them in this difficult task. I explore these issues using the case of New Zealand's fisheries and the use of a market-based Quota Management System (QMS) to manage the fisheries.

This case presents an excellent opportunity to study these issues for several reasons. The first is that fisheries, which are characterized by both high subtractability and extreme exclusion difficulties, are a classic example of a CPR. Furthermore, (as is

¹ Indeed, as early as the thirteenth century primitive pollution control laws were passed in Great Britain. Since these early efforts population and technology pressures on natural resources have increased considerably.

discussed below) fisheries are a resource of global importance that are coming under increasing pressures from both increased catching pressures and environmental degradation. Turning to New Zealand, it is an important case because it has one of the longest-lived market-based approaches to fisheries management in the world. Finally, in 1999, New Zealand passed legislation enabling what is now a rapidly developing co-management regime. This combination of challenges and institutional regimes offers an important opportunity to investigate issues of institutions and CPR management.

The market-based approach used in New Zealand is sometimes referred to in the literature as "ITQ management". This term derives from the concept of "Individual Tradable Quotas" (or ITQs). These are the units in which catching rights are bought and sold. New Zealand's ITQ management system is referred to in this dissertation and in New Zealand as the "Quota Management System" (or QMS) – the specific name given to the system by New Zealand legislation.

This dissertation examines the institutional choices made in how the New Zealand government manages its fishery resources and the consequences of these choices in New Zealand's fisheries. I explore four broad questions:

- ◆ How and why was New Zealand's Quota Management System Adopted?
- ◆ What effect did the Quota Management System have on the structure and characteristics of the fishing industry in New Zealand?
- ◆ What types of property rights do Individual Tradable Quotas (ITQs) represent? Has this changed over time, and what are the effects of such changes?
- ◆ What are the characteristics and origins of New Zealand's co-management approach? How likely is this approach to succeed?

These questions are examined using data from a combination of sources including: a panel survey of ITQ owners in the Auckland Region dating to the start of QMS, national

surveys of large companies and stakeholder groups, quota ownership records, expert interviews, and extensive archival and published documents.

The data and information presented in this dissertation will show that ITQs are a powerful management tool, the use of which has wide-ranging institutional implications. As the property rights change, it fundamentally changes the nature of the fishery -- changing how people view the resource and how they interact with it. These changes go beyond those envisioned in the economic modeling of quota systems to change the social and institutional fabric of the fishery, and the resource management responsibilities that the fishing industry and community are willing to take on. The findings also have implications for our theoretical conception of approaches to natural resource management, showing that the simple vision of three competing approaches may be incomplete, and that a layering of approaches into various forms of co-management is possible and in many cases desirable.

Importance of the World's Fisheries

As we begin the twenty-first century, we are witnessing an increased interest in fishing and concern over the world's fisheries. From recent best-selling books and movies (such as *A Perfect Storm* and *The Hungry Ocean*) to movements such as the 1998 "Give Swordfish a Break" boycott (Boldt, 1998), commercial fishing and fishing issues are entering public consciousness. Indeed, a 1997 US poll found that while 70 % of respondents said oceans were a critical source of food protein, only 1% believed the oceans were in excellent condition, and half agreed that "too much" is taken from the sea "in fishing, oil drilling and other activities." This may be interpreted as representing a greater concern over the state of the oceans and fisheries than global warming, where (in

a separate survey) only 24% of respondents said they worried “a great deal” about global warming (Morin, 1997).

There is rapidly growing evidence that the public is correct both in the importance they place on fishing and their concern over the fishing industry. Fishing is a very large business. The FAO estimates that the world catch is worth \$80 billion (Carr, 1998). Furthermore, Garcia and Newton (1997) estimate that 200 million people worldwide receive their income from fishing. The scale of fishing also has increased dramatically. “From 1952 – 1992 marine fishery catches increased 300% from 18.5 to 82.5 million metric tons” (Garcia and Newton, 1997:4).

As the size and importance of the industry increased, so have concerns over the state of the fisheries. At the global level, “of the top 200 of the world’s marine fisheries ... 60% were fully exploited or overexploited” (Mace, 1999). Similarly, “70% of the fish resources for which data are available are either heavily or fully fished, overexploited, overfished, depleted, or recovering from depletion” (Garcia and Newton, 1997: 23). Moving to a more local level, examples of overfishing and its consequences abound. For example:

- ◆ “Once known as a giant protein factory, the Chesapeake has seen its catch of hickory shad decline 96%, alewife and blueblack herring 92%, striped bass 70%, American shad 66% and oysters 96% from their historic peaks” (Weber, 1994:296).
- ◆ “The stock of Canadian northern cod has been so run down that the fishery had had to be closed: a moratorium has been declared to prevent fishing for cod on the east coast of Canada. The pacific halibut fishery has been reduced to a one-day half-yearly event: fishing is so intense that the fish available can be taken by the fleet in two 24-hour periods; in 1975, by contrast, the season lasted 120 days” (Schmidt, 1993: 9).
- ◆ “In the past 20 years ... the total catch of true Atlantic salmon (excluding fish escaped from fish farms) has fallen by 80% from more than 4 million to 800,000” (Economist, 1998).
- ◆ “This year’s (1997) salmon catch was 119 million fish (278,000 tons), the lowest since 1988 ... In Bristol Bay, where the salmon run was just half of the pre-season forecasts, the average catch of fishermen in some river systems was worth less than

\$10,000, prompting Alaska Governor Tony Knowles to declare the region an economic disaster area” (Redmayne, 1997: 59).

The combination of these localized depletions and the evidence of fisheries under pressure at the global level, recently led the United Nations’ Food and Agriculture Organization (FAO) to conclude “there are substantial grounds for expressing deep concerns about the state of the world capture fishery resources” (Greboval and Munro, 1999: 1).

Individual Tradable Quotas and Fisheries Management²

The 1980s and 1990s were a time of growing concerns over fish stocks and increasing frustration with what was seen as the failure of bureaucratic management regimes. In response to these concerns, market-based regulation of fisheries through Individual Tradable Quotas (ITQs) began to attract considerable attention as a potential solution to fishery crises. This debate is visible in many different arenas, but one of the most prominent is the recent Nation Research Council’s *Sharing the Fish* report, which was written in response to requirements placed in the 1996 Magnuson-Stevens Act (NRC, 1999). ITQs can be defined as follows:

ITQs divide the total allowable catch quota into smaller individual portions. ITQs are generally transferable, which means fishing vessel owners can sell their ITQ certificates or buy others’ certificates (Buck, 1995).

By privatizing a common pool resource, it is argued, ITQs can remove Hardin’s “Tragedy of the Commons”³ as owners take an interest in managing rather than exploiting the fishery. Supporters argue that ITQ systems “can be successful in

² The debate over ITQ management is addressed in greater detail in Chapter 2.

³ See Hardin, 1968 and Ostrom, 1990 (as well as Chapter 2 of this dissertation) for a more extensive discussion of the “Tragedy of the Commons.”

conserving and sustainably managing fisheries as well as in improving the economic performance and contribution of the fishing industries” (Clark, 1993). Or “quotas encourage fishermen to think about investing in conserving the stock instead of trying to catch the fish before someone else grabs them ... They complain that the joy has gone out of the life – but they are making money” (Carr, 1998: 17).

But ITQ management also receives considerable criticism, most of which can be described as critiques of the applicability of theory to practice, or as Palsson and Helgason write, “the current scholarly fascination with privatization is sometimes challenged on practical grounds” (Palsson and Helgason, 1997:143). Many of these critiques focus on the socioeconomic effects that ITQ systems appear to have on fishing communities. Creed et al. are representative: “... ITQ systems may bring a conservation benefit, but these benefits have significant social costs to a fishing community. ... The ITQs increase distance and power between those who own the fishing rights and those who don’t” (Creed et al 1994: 6). They also focus on technical concerns such as scientific uncertainty (Mace, 1993) and enforcement issues (e.g., Copes, 1995), as well as more theoretical or long-term issues such as changes in property rights. These concerns focus on changes in access (to both the fishery and decision-making) and incentive structures (e.g., McCay, 1995), as well as influence on existing self-governing institutions (e.g., Schlager, 1990; McCay et al., 1998).

Moving beyond a debate over the positives and negatives of ITQ management, there is also discussion in the literature of the long-term influence of ITQs in encouraging the creation of new governing institutions and management structures. While the theory behinds ITQs relies on individual fishers and fishing firms acting as economically

rational individuals, theory quickly developed suggesting that ITQs could act as an intermediate step to co-management or self management. Scott predicted that by resolving disagreements over the distribution of resources and defining individual rights, ITQs would encourage the formation of groups capable of self-governance. Essentially, ITQs would become “a membership card in a self-governing fishery group” (Scott, 1993: 197).

Movements toward such management are documented at a small scale in Nova Scotia (e.g., McCay et al. 1998) and steps towards such an approach on a national level are documented in the Dutch Biesheuvel system (e.g., Sysmes, 1997 and Davidse, 1997). However, there are also important concerns over this form of self management, mainly focusing on exactly whom these groups represent and the degree to which those not represented in management will view the rules as legitimate. McCay et al’s concerns are representative: “Each management regime creates its own sociocultural community, largely defined by the interests created through the allocation process ... Care should be taken to address the problem of representation when designing ITQ and other individual rights-based systems” (McCay et al. 1998: 23)

ITQ Management in New Zealand⁴

As the debate over ITQ management continues, New Zealand’s Quota Management System (QMS), as one of the oldest ITQ management systems in the world, provides an important case for systematically examining important policy debates surrounding ITQ management. It also provides an opportunity to examine the possibility of ITQ management providing the foundation for the development of other forms of

⁴ New Zealand and its selection as a case are discussed in greater detail in Chapter 4.

management. Until the declaration of New Zealand's Economic Exclusion Zone (EEZ) in 1978, New Zealand's fishing industry was small, and primarily confined to a domestic inshore industry. There was little or no New Zealand deepwater fishing. Instead, these waters were fished by other nations' trawlers – primarily trawlers from Korea, Japan, and the former Soviet Union. This minimalist approach began to change in 1978 when New Zealand claimed its EEZ. Then in 1986, with clear warnings of an imminent collapse of the inshore fisheries at hand, the Fisheries Act of 1986 was passed – introducing property rights in the form of ITQs, and incorporating biological preservation and economic development into fisheries management (Clark et al. 1988). Since implementation, the QMS has expanded and changed in many details. These include a shift from tonnage quota to proportional quota, and the introduction of cost recovery fees. But many of the fundamental principles of the system -- as a fisheries management system based on transferable harvest rights -- have remained constant (Clement & Associates 1997).

Today, New Zealand fisheries management system has an EEZ that covers an area of 1.2 million square nautical miles or approximately 15 times New Zealand's land mass. There are approximately 1000 species in the EEZ, of which 100 are considered commercially significant (Statistics New Zealand, 1999). In the 1996/7 fishing season, 33 species were under quota management as 185 separate fish stocks. These stocks totaled approximately 531,000 tons of quota-managed species, and 79,000 tons of species not under quota management (Clement & Associates, 1998). In 1997, the marine fishing sector accounted for 4,180 full-time equivalent jobs, and there were 2,170 domestic vessels, 59 foreign charter vessels, and 16 foreign licensed vessels. In 1995, seafood exports accounted for NZ\$1.2 billion, with the top species being squid, orange roughy.

hoki, and rock lobster (Statistics New Zealand, 1999). With the exception of lobster, these are all mid to deep-water species requiring large-scale fishing operations.

In addition to providing a long-term example of an ITQ management system, New Zealand also provides a rapidly developing case to examine the influence of this approach on the development of management regimes. In 1999, New Zealand adopted new legislation authorizing stakeholder groups comprised of quota owners to take over a wide range of management responsibilities (under certain conditions). Thus, it is possible to take advantage of this event to observe and gather data on the development of this co-management approach and the characteristics of the rapidly forming stakeholder groups.

Finally, New Zealand offers several important and timely opportunities to study ITQ management.⁵ As discussed above, it is a long-lived ITQ management system. It also offers the opportunity to explore the influence of ITQ management on the development of other forms of natural resource management. But New Zealand also provides opportunities for unique data sources. For example, in 1987 and 1995, Christopher M. Dewees had surveyed fishers about their experiences under ITQ management. By conducting a third wave of this survey, a set of panel data covering the lifetime of QMS is created. Furthermore, the fishing industry in New Zealand is a manageable size, so it is possible to interview a cross-section of fishing companies across the country, as well as key government officials and industry participants. Finally, the Seafood Industry Council (SeaFIC – the seafood industry’s umbrella group) maintains an extensive library of historical and current documents, reports, book, magazines and journals. Together, these opportunities and resources create a unique opportunity to

⁵ Research methods and data sources are discussed in greater detail in Chapter 3.

conduct a wide-ranging and in-depth analysis of market-based regulation in the context of New Zealand's fisheries.

Research Themes⁶

So far, this chapter has presented a brief overview of the discussion surrounding ITQ management including: the possible positive and negative effects, as well as potential long-term institutional and management implications. Out of this discussion, a series of research questions arise. These can be divided into four broad themes that will be addressed in this dissertation. These themes are: policy innovation, effects of ITQ management, property rights, and the development of co-management.

One important question for policy analysts is how innovative policies (such as ITQ management) are adopted – why these policies are adopted in some countries or states but not others. A broad literature exists exploring this topic. But (in recent years) it has been dominated by quantitative analyses of state-level policy adoption. The adoption of ITQ management – a radically different policy from the input control system that preceded it – proved an opportunity to continue this stream of work, to test how well the New Zealand experience fits with the variables identified in this literature stream.

Another theme arises out of the debate over the positive and negative effects of ITQ management. Thus, the question of “What effect did ITQ management have on the structure and characteristics of the fishing industry in New Zealand” provides a useful starting point for exploring the degree to which ITQ management (in this case) fulfills the positive and negative effects attributed to it.

⁶ Research questions are discussed in greater detail in Chapters 2 and 3.

Property rights offer another useful lens for examining ITQ management. Researchers argue that as individuals and groups gain higher levels of rights, their responsibilities increase because it becomes in their long-term interest to manage the resource sustainably. Within New Zealand, it appears that the perception over exactly what kind of property rights ITQs represent has changed over time. Perceptions also change depending on who is discussing the issue. So, it is useful to explore the theme of “How the perceptions of what property right ITQs represent changes”. By exploring how and why these perceptions change in the New Zealand case, it may be possible to document and understand the evolution of property right in a broader context.

Finally, there has been considerable discussion of the influence of ITQ management in encouraging self-management behavior. Yet, at the same time, this approach is seen as market-based regulation, which is perceived by some schools of thought as an antithesis of community management or co-management. New Zealand, with its recent moves towards co-management while keeping the core of its ITQ management system provides an opportunity to examine this dynamic. By exploring how and why this approach developed, as well as its characteristics and potential to succeed, it may be possible to better understand these dynamics and their implications for fisheries and natural resource management in the future.

Dissertation Overview

This chapter introduces the topic of ITQ management as a policy tool for managing fisheries. It also introduces New Zealand as an important and useful case for examining the introduction, effects, and future development of ITQ management. By introducing these topics and posing broad questions about them, I have provided a

preliminary overview of the issues that this dissertation will address. Chapter Two provides an overview of the theoretical issues that drive the policy questions addressed in this dissertation. It also specifies the research questions that this dissertation will examine. Chapter Three describes the data sources and research methods employed in this dissertation. Chapter Four provides an extended discussion of the case explored in this dissertation: fisheries management in New Zealand. As part of this exploration, the chapter examines the reasons behind the adoption of ITQ management. Chapter Five examines the effects of ITQ management on New Zealand's fisheries and fishing industry. This examination focuses on the outcomes of ITQ management, and the degree to which ITQ management succeeds using institutional criteria. Chapter Six explores ITQ management from the perspective of property rights and how the perceptions of ITQs as a property right have changed over time and among groups. Chapter Seven examines the growth of the movement to "devolve" fisheries management to stakeholder groups composed of ITQ owners. This examination how and why this movement developed, as well as the prospects that these "stakeholder groups" have for success and resource management institutions. Finally, Chapter Eight draws together the themes of this dissertation. It also presents a discussion of discusses their broader implications for fisheries and natural resource management.

Chapter 2: Linking Policy Proposals and Theoretical Concepts

Policy analysis needs to be based on theory that is supported by empirical evidence

-- Ostrom et al. *Rules, Games, and Common Pool Resources*

Introduction and Overview

The previous chapter introduced and described the importance of fisheries and fisheries management as a national and international environmental policy issue. In that chapter I argued that fisheries management and New Zealand's Quota Management System (QMS) presents a timely and wickedly complex set of policy problems. I also argued that this topic engages questions that are theoretically rich and important. This chapter more fully explores these theoretic issues and their application to this dissertation.

I begin by reviewing the debate surrounding the "Tragedy of the Commons." provides the context of discussion of environmental and natural resource management in general, as well as the more specific fisheries management. I follow up on this by exploring and analyzing the main debate within the fisheries management policy literature: the competition between the bureaucratic, market-based, and community-based management approaches. I also explore co-management, another approach rapidly gaining prominence within this body of literature. Next, I discuss the implications of the property rights literature that examines how changes in the rights and responsibilities individuals and groups influence their behavior.

My review of these bodies of literature highlights a few key insights that drive the research design presented in Chapter 3. The main streams of the fisheries management literature are seen as competing and exclusive ways to manage the resource. Three of

these approaches (bureaucracy-based, market-based, and community based) are broadly perceived as representing three points of a triangle (Figure 2-1), while the fourth approach (co-management) is seen as representing a blend of the market-based and community-based approach. Figure 2-3 illustrates this dynamic.⁷ As these management approaches had different criteria to measure success and desired outcomes (see Tables 2-1 and 2-2) these research streams end up talking past each other or critiquing other approaches rather than focusing on when each approach would be most appropriate, or what might be called “best fit” research. However, transaction costs (as is discussed in the IAD framework) can be used to bridge this gap by focusing on a uniform set of criteria across the four approaches. This analysis shows that each approach offers a different set of transaction costs (see Table 2-3 for summary).

Finally, the property rights literature emphasizes that as property rights change, they also change people’s incentives and how they interact with a resource. Because of these changes in property rights and incentives, researchers (such as Anthony Scott) have theorized that co-management regimes can also develop out of a convergence of the market-based and bureaucracy based regime. I argue that this means co-management can develop from the convergence of all three approaches – not just out of the community and bureaucracy-based approaches. (See Figure 2-5) Examining whether and how this occurs, as well as the theoretical and policy implications of this finding are important themes explored throughout this dissertation.

⁷ Although I do not document it here, the broader CPR or natural resource literature also follows this pattern.

Tragedy of the Commons⁸

A good place to begin our discussion of theory is the Tragedy of the Commons⁹. This term was introduced by Garrett Hardin's well-known 1968 article but the issue was discussed widely before. Indeed, Hardin himself credits William Forster Lloyd (1833) and A.N. Whitehead (1948). In this article, Hardin's vivid description of the dilemma faced by herders on an open common that focused academic attention on the problem we now know as Common Pool Resources.

Hardin rejects the possibility that Adam Smith's invisible hand will aggregate individual benefits into a social good, and argues that there are cases when Smith's assumptions are invalid, and the interests of the individual will aggregate into a social negative. To illustrate this, he describes the problem of the open pasture where all can keep however many cattle they want. Under his scenario, until recently, social ills (war, poaching, disease) kept both the number of people and the number of animals below the carrying capacity of the land. However, after social ills were reduced, the number of animals rose higher than the land's carrying capacity. Since each person solely takes the gains of each extra animal, while sharing the negative aspects of overgrazing with his/her neighbor, it is in each individual's interest to add additional animals to the common pasture. Describing this paradox as the tragedy of the commons, he wrote: "Each man is

⁸ Although the "Tragedy of the Commons" is more commonly associated with a metaphorical pasture, it is applicable to fisheries management. For example, Hardin uses marine fishing as an example of the Tragedy of the Commons. "Likewise, the oceans of the world continue to suffer from the survival of the philosophy of the commons. Maritime nations still respond automatically to the shibboleth of the "freedom of the seas." Professing to believe in the "inexhaustible resources of the oceans" they bring species after species of fish and whales closer to extinction (Hardin 1968: 1245)"

⁹ Since it was written in 1968, Hardin's article has served as a catalyst for much of the research into common pool resource issues. The importance of this article as a touchstone work is confirmed by the review articles written on anniversaries of its publication and major works using its metaphor such as: Feeny et al, 1996; Feeny et al, 1990; Ostrom et al, 1999. Furthermore the scale of the influence of this work is shown by the fact that a recent (2/31/2001) search of the Social Science Citation Index found that Hardin's original 1968 article was cited 2,079 times between 1987 and early 2001.

locked into a system that compels him to increase his herd without limit -- in a world that is limited. Ruin is the destination towards which all men rush, each pursuing his own best interests" (Hardin 1968, p. 1244).

Hardin identifies two solutions – privatizing and mutual coercion (removal of freedom), but advocates removal of the individual freedom of the commons, replaced by social limitations or regulations. "Individuals locked into the logic of the commons are free only to bring on universal ruin: once they see the necessity of mutual coercion, they become free to pursue other goals" (Hardin, 1968: 1248). Essentially, he argued that people's economic self-interests are too strong and must be overcome by an externally imposed rule of law.¹⁰ In a follow-up article 30 years later, Hardin refined his argument:

A managed commons describes either socialism or the privatization of free enterprise. Either one may work, either one may fail: the devil is in the details. But with an unmanaged commons, you can forget about the devil: An overuse of resources reduces carrying capacity, ruin is inevitable" (Hardin, 1998:683).

Clearly, Hardin maintains his original thesis that the inevitable destruction of the unmanaged commons but modifies it to advocate equally the opposing solutions of privatization or strict government control.

This article stimulated a wide-ranging and long-lasting debate over the management of common-pool resources (CPRs) and what was the best solution to this dilemma – if there were any solution available. One stream of this debate (which can be

¹⁰ An irony associated with this article is that it is known almost universally for its pastoral scenes. But it was written to advocate punitive measures to control population growth, with other forms of commons as illustrations. A more accurate description of Hardin's theory is the following quote: "No technical solution can rescue us from the misery of overpopulation. Freedom to breed will bring ruin to us all. ... The only way we can preserve and nurture other and more precious freedoms is by relinquishing the freedom to breed, and that very soon" (Hardin, 1968: 1248). It is ironic that (outside of China) the primary emphasis of Hardin's most famous work is an area that it has not been applied to. It is also interesting to speculate about both why this original emphasis has been lost over the past 30 years, and to what extent the impact of this piece would have been diminished if his actual policy recommendations were more widely known.

described as market-oriented) argued that Hardin's initial analysis of the unregulated commons was right, but that his original emphasis on mutual coercion rather than privatization was misguided. Instead, this stream argues, market-based solutions such as privatizing the resource or taxes on resource use were the solution.¹¹ Among those who popularized this approach were Kneese and Schultze (1975) and Beckerman (1975). Advocates of this approach emphasized that by privatizing CPRs or by imposing taxes on their uses, the tendencies of the economically rational person can be harnessed to preserve rather than destroy the CPR. It is argued that by adopting this approach, CPR management can be more efficient, more flexible, and best meet the needs of both the resource and its users. Research into this approach, and how it can best be applied to CPR management is extensive. Examples of this approach to CPR management include: Morgan, 1995; Hahn et al, 1998; Pearce and Turner 1993, Norman & Keenan, 1995; Bernstein et al, 1994; Becker et al 1996.

At the same time, the other stream of the debate – the bureaucratic approach -- continued to receive considerable support. In this context, the emphasis was on the ability of a government to restrain self-interested behavior, and to take account of all citizens' interests when making resource management decisions. The argument for adopting this approach can be taken back to classical political theory and the basic argument for government as laid out in Hobbes' case for the adoption of the commonwealth as a means to escape the state of nature. In many ways, the basic theoretical argument for this approach, that an external authority is necessary to prevent the tragedy of the commons, was assumed by many in the environmental policy

¹¹ The inclusion of taxes as a "privatization" measure is problematic under Hardin's framework, since he argues that taxation a tool of "mutual coercion" or government regulation (Hardin, 1968: 1247).

community¹², and Hardin's argument remained a primary citation in support of the bureaucratic approach. Thus, those interested in the bureaucratic approach instead focused on weaknesses of the market-based approach,¹³ or ways to increase the effectiveness of bureaucratic management.

For a considerable period of time, the debate over CPR management seemed to stay within the debate prescribed by Hardin's original article: whether a market-based approach or a bureaucratic government-based approach was best for managing CPRs. A long tradition of a "third way" to manage CPRs exists as well. (See Feeny et al. 1990 for a review of pre-1990 literature and Ostrom 1999 for an analysis including more recent literature.) Like the market-based approach, this community-based approach had developed for a considerable period of time. It first began to attract wider academic attention with publication of works such as the NRC's 1986 *Conference on Common Property Resource Management* and McCay and Acheson's 1987 *Question of the Common*, both of which brought together examples and analyses of community-based management efforts in a variety of CPRs worldwide. The approach then attained broader policy and academic attention in 1990 when Feeny et al published an important article in *Human Ecology* and Ostrom published *Governing the Commons*.

Under this third way, communities can work together to create institutions capable of managing the CPRs vital to their interests and survival. As described by Ostrom, "communities of individuals have relied on institutions resembling neither the state nor the market to govern some resource systems with reasonable degrees of success

¹² For example, in five graduate-level environmental policy books (Scheberle, 1997; Rosenbaum, 1998; Vig and Kraft, 2000; Fiorino, 1995; and Lee, 1993), the justification for this form of management is simply assumed.

¹³ See p.8 of this chapter for a discussion of this critique as it pertains to fisheries management.

over long periods of time” (Ostrom, 1990: 1). An essential difference between this approach and the privatization approach is that it sees man not only as economically rational (to varying degrees) but also embedded in communities or institutions which also influence individual decision-making. As part of exploring how communities can manage CPRs, this approach also encompasses changes in property rights, and how these changes influence individuals’ and communities relationships with CPRs.¹⁴

These three approaches: traditional bureaucracy-based management, market-based regulation and community-based regulation form the basis of a debate over the Tragedy of the Commons and its possible solutions. This debate is applied to a wide variety of natural resources, and even man-made resources. For example, research on CPRs include: forestry (e.g., Krahl and Henderson, 1998; Gibson et al, 2000; Agrawal and Yadama, 1997); fisheries (see below); irrigation and water supply (Carter et al, 1999; Tang, 1992; Lam, 1996); the internet (Brin, 1995); and even traffic congestion (Toh et al 1994) such, the debate over the management of common pool resources can be seen as one of the great policy and political science puzzles. The debate in fisheries management echoes the same themes of this debate, but in greater detail and specificity. It can be seen as a microcosm or a laboratory for the broader issues raised by the debate over the Tragedy of the Commons.

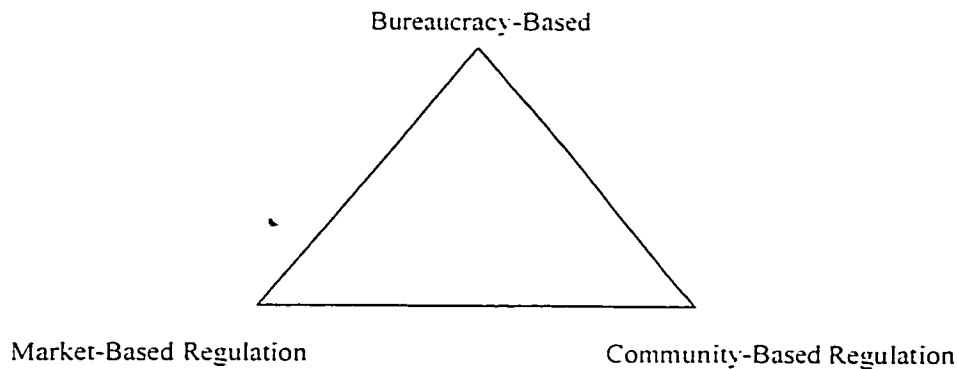
Fisheries Management

As described by Charles (1992), there are three distinct schools of thought dominating fisheries literature: Conservation, Rationalization, and Social/Community.

¹⁴ Examples of this approach include: Hanna et al, 1996; McCay & Jentoft 1998; Berkes and Folke, 1998. See Feeny et al, 1996 for a good summary and analysis of this literature stream

Adapting his model to the wider policy literature, these can be identified as: bureaucracy-based, market-based, and community-based regulation. (See Figure 2-1.)

**Figure 2-1: Approaches to Fisheries Management
(Charles, 1992)**



Charles describes each approach as occupying one point of the triangle. (Tables 2-1 summarizes the general characteristics of each approach, while Table 2-2 summarizes their potential outcomes.) To a certain extent, this literature review focuses on the extremes represented by these points – an approach that some fisheries analysts may object to.¹⁵ A fourth major approach, co-management, can be added to this list of major fisheries management approaches. Each approach has different objectives and criteria for success and failure, and different potential positive and negative outcomes, leading a lack of comparison using a common set of criteria.

¹⁵ For example Jentoft and McCay (1995) considers individual tradable quotas (ITQs) a form of co-management because the fishers decide the actual distribution of the catch. But Charles sees it as fundamentally market-based.

Table 2-1: Characteristics of each approach to fisheries management¹⁶

	Bureaucracy-Based Approach	Market-Based Approach	Community-Based Approach	Co-Management Approach
Primary Emphasis	Stock protection and maintaining fisheries at sustainable levels	Wealth generation for the fishing industry	Community control over the fishery	Shared management between government and user groups
Competing Objectives	<ul style="list-style-type: none"> - Conservation - Resource maintenance - Administrative efficiency - Accountability 	<ul style="list-style-type: none"> - Market efficiency - Productivity - Resource maintenance - Accountability 	<ul style="list-style-type: none"> - Fisher control - Community welfare - Distributional equity - Other social/cultural benefits - Resource conservation 	<ul style="list-style-type: none"> - Shared decision making - Greater fisher control - Better info. gathering - Resource maintenance - Reduced govt. costs
Resource Ownership	Government: Property rights held by state	Fishers: Property rights allocated through ITQs to boat owners/fishers	Community: Property rights held by community or group of individuals within community	Varies by arrangement, usually held by government with specific rights delegated to groups
Vision of Fishers	Components of predatory fleet	Individual fishing firms acting in economically rational manner	Members of cohesive community	Members of user group with shared interests. Not always members of geo-graphic community.
Policy Tools	Focus is on regulating inputs: <ul style="list-style-type: none"> - Licenses - Gear restrictions - Seasonal restrictions - Closures 	Focus is on regulating the outputs using primarily ITQs <ul style="list-style-type: none"> - % of TAC - Tonnage 	Mixed inputs and output controls <ul style="list-style-type: none"> - Gear limits - Season restrictions - Place restrictions - Rotating pressure - Ownership of fishing grounds 	Mixed set of tools <ul style="list-style-type: none"> - Government delegates some responsibilities to user groups - Tools may be any of those used in other approaches.
Cheating Behavior	<ul style="list-style-type: none"> - Illegal gear - Fishing during closures or in closed areas - Violating catch limitations - Reporting false catch information 	<ul style="list-style-type: none"> - Quota busting (high grading and discarding) - Off loading - Leakage from monitoring system (e.g., reporting false catch information) 	<ul style="list-style-type: none"> - Violating communal rules (e.g., gear limits, etc.) - Outsiders violating the fishing rules 	<ul style="list-style-type: none"> - Same as other three approaches, depending upon rules.
Enforcement Focus	Fines or license revocation for violating rules of gear, closure, etc.	<ul style="list-style-type: none"> - Fines or forfeiture of quota for reporting violations or quota-busting activities 	<ul style="list-style-type: none"> - Social sanctions and agreed upon penalties. 	<ul style="list-style-type: none"> - Government penalties - Group sanctions - Social sanctions

¹⁶ Tables 1 and 2 are adapted from Imperial and Yandle, 1997.

Table 2-2: Perceived outcomes of each fisheries management approach

	Bureaucracy-Based Approach	Market-Based Approach	Community-Based Approach	Co-Management Approach
Definition of Success	Rules limit total catch so that MSY is not exceeded	Quota is set so that MSY is not exceeded and market is able to operate efficiently	A community is able to maintain the fishery at a socially & biologically viable level.	Government and user groups maintain fishery at viable level at lower costs to govt. and fishers
Potential Positive Outcomes	<ul style="list-style-type: none"> - Centralized government control over resource allocation - Resource protection - Stability of the rules governing the fishery - Low administrative costs - Accountability - Equitable - Preserve small fishers 	<ul style="list-style-type: none"> - Economic efficiency & higher fisher incomes - Eliminates capital stuffing and derbies - Stock conservation by quota allocation - Accountability via quota - Fleet/industry modernization - Stability for fishers & producers 	<ul style="list-style-type: none"> - Locally managed - Fisher control over resource - Preserves community culture and values - Preserves small-scale fishers/producers - Often minimal environmental impacts - Better congruence between rules and local ecosystem conditions - Reduced cheating 	<ul style="list-style-type: none"> - Fisher involvement in management - Better time/place information - Lower scientific information costs - Reduced role for central government - Better congruence b/w conditions and rules - Reduced mgmt costs - Reduced cheating
Potential Negative Outcomes	<ul style="list-style-type: none"> - Rent-seeking w/ respect to regulations - Agency capture by fishers, conservation groups or industry - Inefficient - Capital stuffing and derbies - Low adaptability - Admin. costs of monitoring and enforcement - Scientific uncertainty w/ respect to regulations preventing over-harvesting 	<ul style="list-style-type: none"> - Rent-seeking w/ respect to quotas - Agency capture by industry - Equity issues - Loss of small fishers/producers - Industry consolidation - Admin. costs of tracking quota allocations and setting new quotas - Loss of community - Scientific uncertainty if quota is set correctly 	<ul style="list-style-type: none"> - Subject to capture by community leaders - No external accountability - Economically inefficient - Unsafe fishing practices - Does not cope well with dramatic changes in technology, practices, stock, or culture - Difficulty addressing outside threats to fishery 	<ul style="list-style-type: none"> - Industry capture of management - Unwillingness to reduce catch when necessary - Difficult for non-commercial interests to participate - Insufficient government oversight - Lack of voice for small fishers - Insufficient capacity to perform management responsibilities - Lack of enforcement

The Bureaucracy-Based Approach

One long-held assumption of natural resource management is that an external authority is necessary to prevent the tragedy of the commons. This assumption “leads to

the recommendations that central governments control most natural resource systems” (Ostrom, 1990: 9). Applied to fisheries, this approach is “based on the premise that the primary duty of fishery management is to take care of the fish. Fishers are viewed, by and large, as components of a predatory fleet ... To save the fish stock, fisheries management must directly control ‘the fleet,’ restricting fishing time, fishing location, total effort, and or harvest” (Charles, 1992: 384). Within advanced industrialized nations, this approach typically represents the default position. Policy analysts do not write about the need for centralized or regionalized government control over fisheries in the United States because a multi-level bureaucratic regulatory regime already exists (Wise, 1991). Rather, analysts tend to examine the development and implementation of various plans and changes in regulations (e.g., Branson, 1987; Cox, 1988; Tucker, et al., 1997). Thus, the literature has an implementation or policy studies flair to it, and finds support in public administration, planning, and traditional natural resource management. Some fisheries biologists (e.g., Mace, 1993) also support this approach, as do some conservation groups¹⁷.

Two examples of the bureaucratic approach are the Northwest Atlantic (the New England and Canadian) groundfish fishery. While property rights in these fisheries are not always well defined (Libecap, 1989), there is an extensive history of efforts to bureaucratically manage the fisheries. This region had a successful fishing industry for 300 to 400 years, until the introduction of more intensive harvesting techniques (such as trawlers) in the 1930s (Murawski et al. 1997) and the post World War II development of international fishing which created an “international commons” situation in what had

¹⁷ While there is little direct evidence in the literature, this may be because fisheries scientists and conservation groups are better able to exert political influence over policy development and implementation in the bureaucratic arena than in other management approaches.

previously been a localized fishery (Finlyson & McCay, 1998). Since these events, government's management efforts have focused on escalating levels of fishing limits including gear limits, season restrictions, and even entire fishery closures (Murawski et al., 1997; Doeringer and Terkla, 1995).

Since the earliest state intervention by the International Commission of the Northwest Atlantic Fisheries (ICNAF) which lasted from 1950-1977, the bureaucratic model has been the dominant policy approach to fisheries management (Halliday and Pinhorn 1997). After the U.S. adopted the Magnuson Fishery Conservation and Management Act in 1976 and the ICNAF was disbanded, Canada and the United States have developed somewhat different approaches to fisheries management. The United States adopted a series of regional fisheries management councils that are charged with developing fisheries management plans and regulations that are designed to meet the federal goals of achieving "optimum yield" (Halliday and Pinhorn, 1997). By 1990, there were 32 active fishery management plans with over 150 amendments covering nearly 350 species of fish (Wise 1991).¹⁸

The Canadian system also followed a centralized bureaucratic model with the initial goal of "best use" and low exploitation (Doeringer and Terkla 1995). Later, the goals were changed to low exploitation and high employment¹⁹. To reach these goals the Canadian government relies on direct management techniques such as limited entry, annual fishing plans, seasonal limits, and gear limits such as minimum net size. These programs can have high enforcement costs, which include shore-based, at-sea, and

¹⁸ For a good review fisheries management in the United States see Wise (1991). For a discussion of the activities of the regional fisheries councils in the United States see: Branson, 1987; Fullerton 1987; and Miller 1987. For a discussion of the problems with state management of inshore fisheries see Cox, 1988.

¹⁹ A policy objective of dubious quality

airborne surveillance. Enforcement efforts include on-board observers for all foreign vessels, and at times use military support. For domestic vessels, on-board observers provide total coverage for some high-profile fisheries, while others (particularly small coastal vessels) receive scant attention (Halliday and Pinhorn, 1997).

In spite of these differences, all three systems (i.e., ICNAF, U.S. and Canada) share distinct similarities. All focus on conserving and maintaining fisheries resources at sustainable levels. Several basic assumptions underlie this approach. The government holds the property rights to the fish on behalf of the nation. The government maintains strong centralized control over how the resource is allocated and helps to maintain public accountability with respect to resource allocation decisions. The regulatory systems are designed to be administratively efficient with similar rules and regulations governing a number of different species. These rules often apply to all fishers in a similar fashion and tend to rely on a similar set of policy tools that govern the input (i.e., harvesting) component of the production equation.

The typical policy instruments utilized in each system include: fishing licenses; gear restrictions or prohibitions (e.g., trawls, mesh size, etc.); area closures; season closures; total allowable catches (Tacos); and, size limits. The rules are designed to be stable which helps improve accountability and lowers administrative costs as it simplifies enforcement. It also increases the equity in the system since similar rules apply to all fishers. Moreover, the stability of the rules can help to lower industry costs because it often has the effect of freezing or slowing industry change. This can help to preserve a role for small fishers and further enhances equity within the fishing industry. Finally,

limited entry approach also helps preserve opportunities for small fishers and is consistent with the view of fishing as an individualistic enterprise.²⁰

This rule structure can also be a liability. Because the rules increase the level of effort required to harvest, it also decreases the efficiency of the industry as it increases costs. This can lead to overcapitalization (Clark, et al. 1988) and fishing derbies²¹ (Buck, 1995). It also creates incentives to cheat by using illegal gear, violating size limits, violating closures, and mis-reporting catch information (Halliday and Pinhorn, 1997; Clark, et al, 1988). These information problems are especially important because they increase regulatory enforcement costs and difficulty in setting appropriate rules or knowing when rule changes are necessary.²² Rule stability itself can also be a source of potential problems. Because changing fisheries rules and developing new management plans can become a difficult and time-consuming process, the system's ability to adapt to may be reduced.

Finally, bureaucracies themselves suffer from a variety of problems. Bureaucracies and centralized decision-making arrangements can experience increased transaction costs because they can have difficulties collecting, synthesizing and interpreting information effectively. Developing management plans and new regulations is a political process, making agencies subject to capture by fishers, the fishing industry, or conservation groups (McManus, 1994; Wilen, 1995).

²⁰ Evidence for this paragraph may be found in: Murawski et al. 1997; Halliday, et al, 1992; Wise, 1991; Doeringer and Terkla, 1995; Branson, 1987; Miller, 1987.

²¹ A fishing derby is when a large number of boats "race" to catch a limited amount of fish in a restricted time span.

²² Information problems are discussed in greater detail on p. 23.

The Market-Based Approach

Although the market-based approach has existed within the fisheries and natural resource management community for a considerable period of time,²³ it emerged as an important policy tool during the 1980s and 1990s. A few factors may have contributed to the emergence of this approach. One reason is that economic principles and concepts spread to a variety of academic disciplines (including natural resource management). Also, criticisms of the bureaucratic approach (such as those described above) helped create an environment more favorable to the market-based approach. As a result, a growing number of policy analysts began to explore or advocate the use of a market-based approach rather than a bureaucracy-based approach (Clark, 1994; Clark, 1993; Clark et al, 1988; Hatcher, 1997; Squires et al. 1995).

The two countries that have the most experience with the market-based approach are New Zealand and Iceland. Other countries are also experimenting with ITQs, including the regions of the United States (Buck, 1995), Canada (Grafton, 1996; Buck, 1995), the United Kingdom (Hatcher, 1997), and certain fisheries in Australia (Sanders and Beinssen, 1997). Based on the experiences in these countries and the research generated by their experiences, it is possible to make some generalizations about the market-based approach. The primary emphasis is on the economic efficiency and productivity of the fishing industry, while maintaining fish stocks at a sustainable level.

²³ Gordon originally proposed "sole ownership" of fishery resources as method of fisheries management in 1954 (Gordon, 1954). While not explicitly "market-based," Scott was basing his recommendations on using the incentives of private ownership. The idea was then further expanded upon by Scott. He wrote "as long as the user of a fishery is sure that he will have property rights over the fishery for a series of periods in the future, he can plan the use of the fishery in such a way as to maximize the present value ... of his enterprise. From the social point of view it can be said that he will bring about the 'best' use of the fishery and of all other factors invested in it over future periods by this allocating outputs and outlays over time in accordance with the current rate of discount" (Scott, 1955: 122).

The primary policy instrument is a system of tradable permits often referred to as individual tradable (or transferable) quotas (ITQs).

While variations on ITQs exist (e.g., leasing, measuring by tonnage vs. proportion of catch, use of ITQs as loan collateral), in a broader perspective ITQs can be defined as the right to catch a specified proportion of the total allowable catch (TAC) annually, when this right can be traded or sold to others.²⁴ Thus, ITQs are the result of a process in which regulatory authorities determine the TAC, which is usually set at what the authorities determine to be the maximum sustained yield (MSY) for the fishery. The TAC is then allocated, usually in the form of tonnage or a percentage of the TAC. Thus, the property rights to the fish are in effect transferred from the nation and the government to the fishermen. Individuals and groups are then free to trade the permits among themselves in (theoretically) the most efficient manner (Kneese and Schultze 1975).

The theory of ITQ management in fisheries has been supported by modeling²⁵ and theoretical analysis (e.g., Hannesson, 1978; Anderson, 1986; Terrebonne, 1995; Arnason, 1991; Grafton, 1995; Charles, 1992; Charles, 1988 Charles and Yang, 1990). Essentially, the market-based approach views fishers as individual fishing firms that wish to maximize their returns on their investment (Charles, 1992). Thus, while the bureaucracy-based approach focuses on inputs, the market-based approach tends to focus on outputs (the amount of fish removed). This approach has been embraced within the resource

²⁴ A good definition of ITQs is provided in Buck, 1995. That definition is quoted in Chapter I of this dissertation.

²⁵ For example, Terrebonne modeled entrepreneurial fishers with heterogeneous production and employment opportunities outside of the fishery. He found that under the open access model, fishers' income is proportional to the price that they receive for their catches. He also found a reason for fishers to support the use of ITQs, because under his model fishers received more income under the ITQ model than the open access model.

economics community, and is gaining support in corporate fishing industry. Its biggest critics tend to be supporters of the community-based model (Charles, 1992).

Fisheries analysts have advanced a number of arguments in support of the market-based approach. A number of positive outcomes have also been noted. Foremost are the emphasis on economic efficiency and the higher incomes for fishers and the industry as a whole (e.g., Scott 1955; Kneese and Schultze 1975; Clark, 1994; and, Grafton 1996). This can help to modernize the industry (e.g., Clark, et al. 1988; and, Grafton 1996), and lead to the development of a corporatist culture within the fishing industry. It can also help prevent the overcapitalization of the vessels (e.g., Buck 1995; Grafton 1996).²⁶ The ITQs can also help to eliminate fishing derbies and their costly consequences and inefficiencies (e.g., Buck 1995).

Other advantages are attributed to this approach by some researchers. It is perceived as an effective means for stock conservation since it sets a limit on the total harvest (e.g., Boyd and Dewees 1992; Clark 1994). The system is also very adaptable from the standpoint that the TAC is often set on a yearly or seasonal basis. Accordingly, adjustments can be made to account for dramatic changes in the stock or other unforeseen circumstances (Squires, et al.1995). It also provides the industry with a sense of stability in that setting the TAC allows both fishers and processors to make better operational decisions and investments (e.g., Clark 1994). To the extent that the process of setting the TAC and the allocation of the ITQs is transparent, this approach can also enjoy a high degree of public accountability since the public is informed of how and why the TAC is set, and can even have input into the process of setting the TAC.

²⁶ However, it is also argued that the market-based model actually encourages overcapitalization (Schlager 1990).

However, these potential positive outcomes are accompanied by rather a lengthy list of potential negative outcomes. It is also interesting to note that many of these problems are social issues ignored in the economics literature used to support the market-based approach. Others are simply the 'flip side' of the positive outcome and are described in negative terms by the supporters of the community-based model. Industry consolidation and the loss of small fishers are often viewed as a negative result of the market-based approach (e.g., Young and McCay 1995; and, Palsson and Helgason 1996). Others point to social problems. Unemployment is often a negative by-product of an ITQ system (e.g., Squires, et al. 1995; and, Palsson and Helgason 1996). The move to corporate ownership can cause the wealth and control over the fishery to be moved out of the local community (Palsson and Helgason 1996). With this can come loss of community and damage to existing local institutions (Schlager 1990; McCay et al., 1998; and, Palsson and Helgason 1996). Some fishers may also get larger shares of the TAC and new entries (fishers) to the system are restricted by the cost of purchasing quota (Palsson and Helgason 1996). Thus, ITQ systems can create important equity problems.

Another closely related issue is quota allocation. Particularly during the design and initial implementation of an ITQ system, the questions of how the quota should be allocated and what (if any) limitations should be placed on quota ownership loom large (Hannesson, 1991; NRC, 1999; Tietenberg, 2000). Perhaps most fundamentally, how should the initial distribution of quota take place? For example, should quota be auctioned off, or should it be based on catch history? Modeling shows that auctioning is economically desirable (e.g., Jung et al, 1996; Morgan, 1995), but when ITQs are adopted, allocation is usually done administratively on criteria such as catch history (e.g.,

Nova Scotia, New Zealand). Also, whom should the quota be allocated to and how should allocation take place (e.g., Tietenburg, 2000)? If it is allocated to vessel owners, crew are left at a disadvantage (McCay, 1995; McCay et al. 1998). Similarly arguments are made regarding whether the processing sector should receive ITQs (Matulich et al, 1996). Such questions often mean that initial quota allocation decisions being viewed as unjust, and result in legal challenges (Nieler and Sullivan, 1999). After initial allocation takes place, questions remain concerning degrees of transferability. Is quota tied to vessels, are there limits on how much quota an individual or corporations can own, if so, what are the limits, how can quota be traded (NRC, 1999)? To what degree should TACs be allowed to fluctuate (Hannesson, 1990)? All these questions illustrate both the difficulty in designing and implementing an ITQ system, as well as the degree to which the characteristics of an ITQ system can vary depending on these initial decisions.

The strength of the market-based approach, using profit incentives to encourage the most efficient catching, can be the source of other problems. The approach does not eliminate or reduce the incentives to cheat. Instead, it creates different forms of cheating behavior than are observed under the bureaucratic model. For example, fishers have incentives to cheat by high-grading their catch and other forms of quota busting (e.g., Schlager 1990; Palsson and Helgason 1996; Halliday and Pinhorn 1997; and, Turner 1997).²⁷ The market base approach also relies on fishers acting as economically rational actors. But many fishers (particularly small-scale fishers) choose fishing for job

²⁷ High grading refers to the practice of sorting fish at sea and throwing back the smaller or less valuable fish so that the maximum revenue per ton of quota is generated. Other forms of quota busting include: false reporting of catch information; dumping bycatch so that the quota is not used up; mislabeling fish once it is processed on board, trans-shipping or "trucking" fish (catching fish in one quota area, but reporting it caught in another) or, attempting to divert catch to ports outside of the monitoring system so that it does not count against a quota.

satisfaction or lifestyle reasons, rather than as a simple business decision (Gatewood and McCay, 1990). Thus, many fishers will stay in an ITQ fishery or enter the fishery when it is no longer economically rational (McCay, 1995).

This approach also relies heavily having accurate information²⁸. Without this information, uncertainty problems can arise. For example, to set TAC correctly, those setting the TAC must have a sound understanding of the fishery's population dynamics. If the TAC is set incorrectly for several consecutive seasons, the fishery can be decimated in short order, perhaps before scientists have a chance to discover and correct the error.²⁹ Accordingly, scientific uncertainty can be an important problem confronting the implementation of a market-based management program (Mace 1993; and, Loayza 1994).³⁰ Uncertainty is also an issue as ITQ systems manage fisheries as individual species, rather than ecosystem (Wilson, 1995; Duncan, 1993) and treat fisheries as extremely large areas, rather than localized resources (Renee, 1998; Wilson et al. 1999). Finally, as is discussed above, lack of information can lead to enforcement problems, as the incentive to increase profits by misreporting catch data intensifies. While some of these problems can be addressed with technical solutions³¹, lack of information and the resulting uncertainty remain an important issue for the market-based approach.

²⁸ See the "Information Costs" section of this paper for a more in-depth discussion of this issue

²⁹ A good example of this was when the TAC for the Orange Roughy in New Zealand was set incorrectly because scientists did not understand its life cycle. In this case, the MSY and corresponding quotas had to be scaled down by a factor of five to correct the problem (Mace 1993).

³⁰ The TAC setting process is also subject to other problems. For example, it can become a political process and this can be problematic when decision makers are confronted with scientific uncertainty. Accordingly, fisheries managers are subject to agency capture and other forms of rent-seeking behavior.

³¹ For example, New Zealand's use of Global Positioning System (GPS)-based monitors on deepwater fishing vessels has been effective in reducing trans-shipping and misreporting problems.

Community-Based Approach

Like the market-based approach, the community-based gained prominence in part due to growing frustration with the existing approaches. However, historically, many theoretical issues have been explored using community-based management as an example.³² Similarly, researchers often associated with this approach do not take a simple “one size fits all” approach, recognizing that community management can take a variety of forms, and is not always the best solution.³³ It is more eclectic than its counterparts³⁴ with its support primarily in anthropology and sociology, and from fishers unions and cooperatives.

The primary emphasis of this approach is on encouraging fishing communities to regulate themselves or to maintain current systems of self-regulation that may be nested in larger jurisdictions. Self-regulation refers to the social norms, rules, and sanctions for noncompliance that develop over time to ensure the continued sustainability of the resource (Ostrom, 1990). The approach embraces the principle of subsidiarity and argues that decisions affecting peoples’ lives should be made at the lowest possible level (McCay and Jentoft, 1996). Another important aspect of this approach is that it is better able and more inclined to focus on “rules that are consistent with an ecosystem approach ... ‘when, where, and how’ fishing takes place, rather than the usual approach, which lays the emphasis on “how much should be caught”” (Wilson, 1995). While gear limits and

³² For example, the first few chapters of Ostrom’s (1990) *Governing the Commons* are extensively based in game theory, rationality and collective action. Similarly, Hanna et al’s (1996) *Rights to Nature* is primarily focused on defining types of property rights.

³³ For example, Ostrom offers eight design principles that are “essential elements or conditions that help account for the success of these institutions in sustaining the CPR” (Ostrom, 1990:7).

³⁴ This approach goes by different names and addresses including community-based regulation, community based management, self-regulation, folk-management and delegated management authority. (For examples of this stream of literature see: Acheson, 1975; Schlager, 1990; Schlager and Ostrom, 1993; Schlager and Ostrom, 1992; Ostrom, 1990; Mantjoro, 1996; Nugent, et al, 1996; Veitayka, 1998.

closures are not restricted to the community management approach. it appears that this approach is best able to sensitively apply these policy tools to localized fishery problems.

The approach also focuses on maintaining “community welfare, distributional equity, and other social and cultural fishery benefits. An emphasis is placed on fishers as members of coastal communities rather than as components of a fleet ... or as individualistic fishing firms.” (Charles 1992, 385). In this model, the community (or a group of individuals within the community) holds *de facto* property rights to the fishing grounds. Over time the community develops a system of norms and social rules that allocate access and management rights. Common rules include gear limits, restrictions on effort, seasonal restrictions (often to protect breeding stock), rotating positions, and habitat protection rules. Social sanctions are the primary enforcement tool, but these may be backed up by stronger sanctions.

Like the other two approaches, there are several presumed positive outcomes associated with this approach. These include: local control rather than centralized government control (Ostrom, 1990; Hall-Arber and Finlayson, 1997); the preservation of community culture and values (McCay, 1998); internal accountability and reduced incentives to cheat (Ostrom, 1990; Ostrom et al. 1994); better matching of regulatory tools (such as gear restrictions and timing of catch) to conditions in the ecosystem (Wilson, 1995; Acheson and Brewer, 2000); preservation of the small fisher by maintaining gear and effort restrictions; and environmental preservation (McCay and Jentoft, 1996). At a higher level, Berkes and Folke (1998) argue that the community approach (and some forms of the co-management) approach encourage the linking of institutions and environmental systems so that extractive activities (such as fishing) are

more sensitive to fluctuations and change in ecosystems, and thus are in a better position to adjust appropriately to these changes.

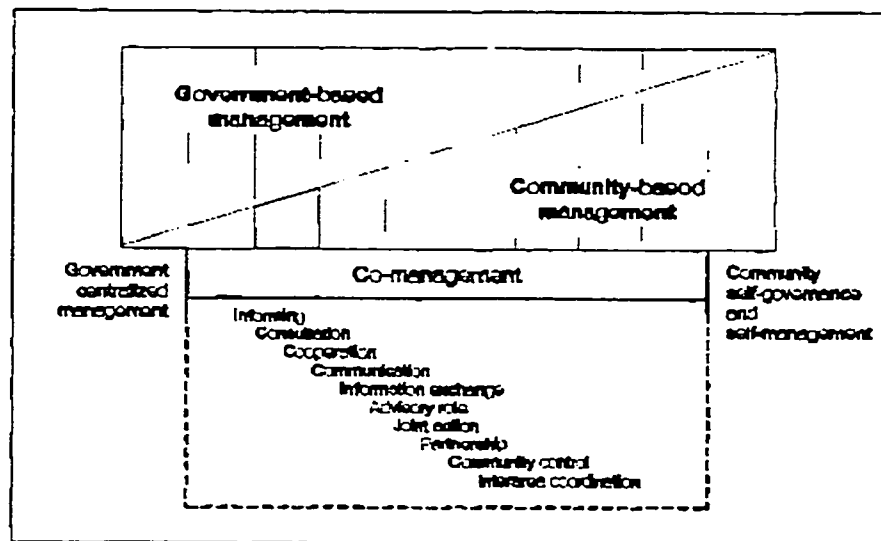
Unlike the other approaches, there are few critics of this approach. There are a few possible explanations for this. One is that proponents of the other two approaches appear not to recognize the importance of the community approach. Instead they criticize the open commons, even though in many cases community management is occurring. (e.g., Gordon, 1954; Scott, 1979; Arnason, 1991). Another possible explanation is that a considerable amount of this approach's research focuses on smaller fishing communities or developing nations (e.g., Mantjoro, 1996; Veitayka, 1998; Knudsen, 1995; Bhatta, 1996; Levine, 1984). so analysts from other approaches that focus on larger scale (or industrialized) commercial fisheries may not see the community approach as viable to the policy problems they address. Since this approach has received less critical attention, it is more difficult to identify potential negative outcomes. Perhaps the most well documented problem with this approach is that it is subject to capture by local leaders and this can lead to social inequalities (Davis and Bailey, 1996; Ostrom, 2000). Also, the conditions under which this approach works may be limited (Ostrom et al., 1999). Finally, there is conflicting evidence on whether norms and customs can change rapidly enough to respond to changes in the ecosystem or incentive structures – particularly if the reason behind these changes are beyond the control of the local institutions (Rose, 2000; Murawski et al, 1997; Berkes and Folkes, 1998).

Co-Management

The previous three fisheries management approaches (bureaucratic, market-based, and community) are usually seen as the primary approaches to fisheries management.

However, another approach in fisheries management is co-management.³⁵ Rather than seeing competing approaches, this literature sees co-management as incorporating a broad spectrum of management approaches and bundling of rights, usually ranging from bureaucratic control to community management. (See Figure 2-2.) For example, Sen & Nielsen define co-management as “an arrangement where responsibility for resource management is shared between the government and user-groups” including a broad range of behavior ranging from government consultation with user-groups, to user-groups managing a resource with the assistance of a central government (Sen & Nielson, 1995: 406).

Figure 2-2: Pomeroy and Berkes' Hierarchy of Co-Management Arrangements



This range of behaviors is broad enough that Jentoft and McCay has described ITQ management (which is usually seen as market-based regulation) as co-management because the fishers often have more control over how and when the fish are harvested

³⁵ For examples of this line of research see: Lim, et al, 1995; Jentoft, 1986; Jentoft, 1985; Jentoft and McCay, 1995; McCay and Jentoft, 1996; Pinkerton and Weinstein, 1995.)

(Jentoft & McCay, 1995). Similarly, primarily self-governing regimes (such as the Southern California groundwater extraction described by Blomquist, 1992) that are granted recognition and support by a central government would also be described as co-management by researchers such as Sen & Nielson and Ostrom. Perhaps McCay (1993:7) offers the best (although still broad) definition of co-management:

The ideal system of co-management is one where almost all management functions are the shared responsibility of government agencies and fishermen. Fishers should be directly involved in decision-making (as opposed to the advisory role they more often have) and have authority to construct and implement regulations.

Thus, while much of the natural resource management literature tends to focus on the differences and incompatibilities between approaches, the co-management literature envisions a wide range of approaches falling across a spectrum from nearly exclusive government control to nearly exclusive community control.

Most of the writing on co-management sees a spectrum of activities, but it is unidimensional: it only extends between government and users. Or with reference to Charles' triangle (see Figure 2-1) it extends only down leg of the triangle. However, there is a growing group within the co-management literature argue that co-management can also develop from market-based management. For example, Scott (1993) argues that ITQ management relieves user groups of the most difficult responsibility – determining how the resource will be distributed. With this contentious issue removed, user groups are in a much better position to form and successfully address the remaining management issues (such as gathering information, rule setting and enforcement, etc).³⁶ Others (e.g., Symes, 1997; Davidse, 1997; Dubbin and vanVliet, 1996) point to the Netherlands as an example of a case where such an approach may be in development. But date, there are no

³⁶ A more detailed discussion of this point takes place in the "Property Rights" section of this chapter

documented cases of a fully developed co-management regime developing from the market-based approach. However, as McCay et al (1998) points out, there are important equity concerns when ITQs form the basis for membership in a management organization. This line of argument is important to this dissertation since (as is explored in Chapter 7) it appears that such a co-management system is in the process of development.³⁷

The co-management and community management literature streams also have developed several typologies to describe the range of activities and rights they encompass. Examples of particular interest include: Pomeroy & Berkes' (1997) broad scale of co-management activities; McCay's (1993) typologies describe resources, property rights, and management regimes; Hanna's table of property rights regimes; Ostrom and Schlager's (1996) more detailed analysis of the multiple bundles of property rights involved; and Townsend & Pooley's internal and external definitions of "local fisheries management institutions." While these typologies vary in exact terminology, some broad common themes emerge. These are:

1. Levels of management participation are seen as a ladder – which participants can climb up or down.
2. Property rights/duties and regime types/management structures, while separate concepts, are linked and move in tandem.
3. In order to be successful, any co-management regimes must carefully match local conditions, users management abilities, and the legal and logistic support of the central (or state) government.
4. Co-management (especially the forms of it closer to community management) focus on the approach as a means of democratizing the management of the resource. This is seen in itself as an important result of the approach.
5. With a few exceptions, a small, local, geographically-based community is seen as the basis for co-management.

³⁷ A more detailed discussion of this point takes place in the "Research Questions" section of this chapter, as well as in Chapter 7.

Another issues in co-management is how these regimes develop. Two different ways are highlighted. First, many regimes are long-lived institutions (e.g. traditional management regimes) that are either supported by or interacting with existing central or regional governments. (e.g. Ostrom, 1990, Jentoft 1985, Jentoft 1989, Lim et al. 1995) In many of these cases, the origins of this approach are lost in the mists of time, but maintain a modern co-management form.

Other co-management systems are more recent. For these, the 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 predicts that:

co-management is most likely to develop out of a real or imagined crisis in stock depletion, or a problem of comparable magnitude. 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. (Pinkerton 1989: p. 27)

Other conditions identified by Pinkerton as conducive to co-management development are a willingness of fishermen to contribute to the financing and management of the regime, and when the development of co-management is either a negotiated process or an experimental process in which co-management functions can be expanded over time.

More recently, Pomeroy and Berkes have suggested that the conditions conducive to adopting co-management regimes can be expanded to include: "... resource deterioration, conflict between stakeholders, conflict between management agencies and the local fishers, and governance problems in general." (Pomeroy and Berkes: p.476) Thus, in recently developed co-management regimes, the conditions most likely to lead to a sustained co-management approach are when there is a perception of crisis, most

commonly within the fishery itself, but is also can be a perceived crisis in a more management-oriented problems such as conflict among stakeholders, users, and management agencies.

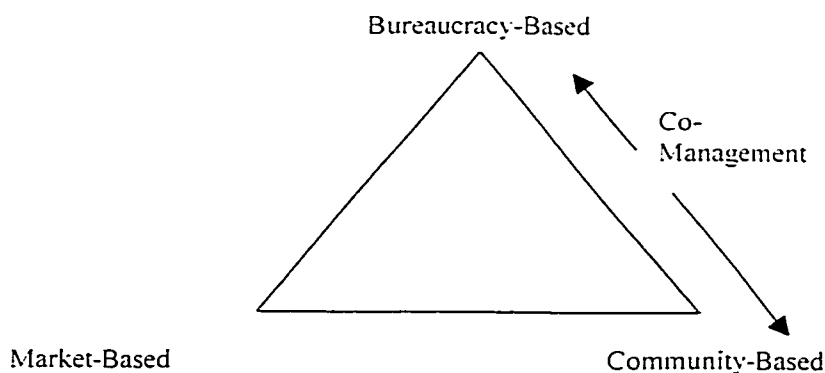
Finally, another important discussion within the co-management literature is the best form for co-managing organizations to take (e.g., Townsend, 1995; Noble, 2000; Jentoft et al; 1998). As described by Townsend and Pooley (1995) there are four types of co-management possible. These are: self-organizing governance: communal governance (power invested in local government): cooperative government (similar to traditional farm co-ops); and corporate management (where members are issued shares based on investment and vote accordingly). Traditionally, co-management is most often associated with self-organizing governance and the idea that a community grounded with the resource is best able to manage a resource such as a fishery (e.g., Sen and Nielsen, 1996; Wilson et al, 1994; Jentoft, 2000).

However, proponents of co-management argue that because of their structure, groups involved in co-management are the best means for resolving conflicts and securing the common good among diverse members (e.g., Jentoft, 1986; Jentoft 1989; Jentoft and Sandersen, 1996). Corporate management is the final approach gaining attention. Proponents of this approach (such as Townsend, 1995 and Townsend and Pooley, 1995) argue that corporate governance will lead to better decision-making because the corporate approach “creates stronger and clearer incentives for far-sighted investment in the resources that are created under cooperative or communal management” since the rights within the corporate structure are better defined than under cooperative or community (Townsend and Pooley, 1995: 57). This debate is important

first because it illustrates the depth of complexity of designing institutions capable of managing a CPR such as a fishery.³⁸ Also, as co-management is adopted in more fisheries, this issue will become much more salient.

As currently presented in the literature, co-management is somewhat idiosyncratic. The other approaches (bureaucracy, market, community) are frequently discussed as representing three distinct approaches – the corners of the Charles (1992) triangle. The co-management approach is then presented as a combination of approaches. It is seen as a spectrum of management approaches that combine bureaucracy and community management (see Figure 2-3). Thus, while the other three approaches are seen as “core” approaches, the co-management approach is presented as a “side” approach, which combines aspects of two core approaches. As is discussed later in this chapter, (see Figure 2-5) this interpretation is not the best way to conceptualize these four distinct approaches.

Figure 2-3: Presentation of Co-Management in the Literature



Transaction Costs Associated with Policy Approaches

³⁸ See Ostrom, 1999 for a discussion of the reasons behind this complexity.

The sections above describe the policy approaches associated with various theoretical orientations towards resource management. Here, I briefly assess the transaction costs associated with each approach based on the discussion above. The IAD framework draws attention to three interrelated transaction costs associated policy implementation: (1) coordination costs: (2) information costs: and, (3) strategic costs (Ostrom, et al. 1993). See Table 2-3 for summary. Transaction costs are likely to

Table 2-3: Summary of Transaction Costs Associated with Management Regimes

	Bureaucracy-Based Approach	Market-Based Approach	Community Based Approach	Co-Management Approach
Information Costs: costs of searching for & organizing info and errors resulting from ineffective blend of scientific and time & place info	<ul style="list-style-type: none"> - Heavy reliance on scientific info - Need info on stock dynamics, time & place - Fishers have incentive to not provide info - Time & place info often incomplete or inaccurate 	<ul style="list-style-type: none"> - Heavy reliance on scientific info - Need info on population dynamics - Fewer incentives for fishers to mis-report - Inaccurate info can create over-fishing (less room for error) - Uncertainty creates opportunity for rent-seeking 	<ul style="list-style-type: none"> - Little reliance on scientific info, high reliance on time & place info - Info gathering part of routine - Lack of scientific info has high costs if rapid change occurs - Lack of info when sharing with "outsiders" 	<ul style="list-style-type: none"> - Info requirements depend on system characteristics - formal management responsibilities by fishers reduce rent-seeking - possible reduction info gathering costs (vs. bureaucracy & market) as fishers have incentive to share info
Coordination Costs: costs of negotiation, monitoring, and enforcing agreements (i.e., the rules governing the fisheries resources)	<ul style="list-style-type: none"> - High costs for agency developing policy and public comment - High monitoring & enforcement costs 	<ul style="list-style-type: none"> - High costs for agency developing policy and public comment - Annual costs for setting TACC - Costs for fishers trading ITQs - Contradictory data on monitoring & enforcement costs 	<ul style="list-style-type: none"> - High costs in initial development of rules & norms - Once rules are established, low ongoing costs - Low monitoring and enforcement costs 	<ul style="list-style-type: none"> - Costs vary depending on system characteristics - Believed to be less than bureaucracy but more than community.
Strategic Costs: costs from asymmetries in info, power, or other resources. Some get benefits at cost of others. Freeriding, rent seeing, corruption	<ul style="list-style-type: none"> - Administrative agencies subject to capture - Rent seeking likely during policy development 	<ul style="list-style-type: none"> - Administrative agencies subject to capture - Rent seeking likely prior to initial distribution. - TACC setting process subject to rent seeking - Industry consolidation may lead to anti-competitive behavior 	<ul style="list-style-type: none"> - Rent seeking activities may take form of consensus building - Elite can promote own interests at expense of community - Elite can capture decision-making process 	<ul style="list-style-type: none"> - Rent seeking activities may take form of consensus building - Elite can promote own interest at expense of industry

increase as the number of bargaining partners and routine interactions increase (Levi 1990, 403). They can also increase when asymmetries of information and power exist. Thus, as jurisdictional complexity increases and the actors' interests become increasingly heterogeneous, transaction costs are likely to increase. The following briefly discuss each set of costs and some of the general observations about the importance of these costs in the bureaucratic, market-based, community-based, and co-management based approaches.

Information Costs

Information costs are those associated with searching for and organizing information and the errors resulting from an ineffective blend of scientific and time and place information (Hayek 1945). Scientific information is "acquired by individuals through education and/or experience about the regularities of relationships among key variables rather than the particular state of those variables in a specific context (Ostrom, et al. 1993, 50)." Time and place information refers to the knowledge "acquired by individuals who know the nature of a particular physical and social setting (Ostrom, et al. 1993, 50)." It is important to recognize that an effective fisheries management program will require both scientific and time and place information. Fisheries managers need to understand the species and its population dynamics. Fisheries managers also need accurate information about different breeding population and changing local conditions in order to make more accurate population projections. Significant transaction costs can be incurred if the information is combined incorrectly.

Information costs, particularly scientific information costs are an important topic for fisheries management, in part because the scientific information is so difficult to gather and interpret. For example, those responsible for Canadian Atlantic stock assessments in the early 1990s "only claim accuracy within $\pm 30\%$ " (Ray, 1996:19).³⁹ Stock evaluations and modeling of fish stocks are complex and information intensive activities in an arena in which scientific information is often difficult to come by. For example, in New Zealand, there are five different possible methods of calculating reference fishing mortality, each with different levels of information requirement (Annala et al., 1999:16). Developing and interpreting these stock assessments is in itself a specialized scientific field, which I will not summarize here. But detailed information on the issues and challenges surrounding fish stock evaluations are available in NCR, 1998 and Hilborn, 1997.

This issue becomes even more complex when efforts are made to match this scientific stock assessment information with policy making. One issue is uncertainty and the way it is treated by policy makers. Evidence from Canada suggests that in the face of uncertainty, managers will consistently interpret the margin of error optimistically. As Ray (1996:20) notes "One would expect rational planners, confronted with evidence of consistent upward bias in their predictions, to incorporate some allowance for this consistent prediction error in subsequent predictions. This did not happen."

This uncertainty is also a problem in the bio-economic models that underlie the market-based approach.⁴⁰ Early in the development of this approach, the problem was

³⁹ Or as one fisher I interviewed put it, "doing a stock assessment is like trying to count sheep from a helicopter on a cloudy day."

⁴⁰ See Anderson, 1986 for a detailed discussion of the economic theory and modeling behind ITQ management.

that these models tended to underestimate the uncertainty issues discussed above. For example, in 1989, Anderson began his description of a “conceptual model” of the ITQ approach by stating: “assume an independent fishery which prosecutes a fish stock with a sustainable yield curve that generates the average revenue curve depicted in Figure 1b” (p. 192). Except for a brief discussion of the constraint that scientific information puts on bycatch fisheries, this is the sole discussion of the biological or scientific component of the model in a 19 page discussion.

More recent bio-economic models explicitly incorporate an extremely wide array of both biological and economic data (e.g., Sparre, 1994). But these models still operate under the assumption that this information is completely accurate – an assumption that many fisheries scientists would call into question. As Grafton et al note: “too frequently, managers fail to adequately take into account the uncertainty in fisheries. As a result, harvests may exceed an appropriate level from both an economic and a biological perspective” (Grafton et al, 1996: 96). Much like the bureaucratic approach, there appears to be reluctance in the approach’s underpinnings to recognize and directly address the issue of uncertainty or the cost of gathering enough information.⁴¹

Directly addressing uncertainty and other scientific questions leads to more detailed questions and potential information costs – some of which are not yet being dealt with by the fisheries management community. For example, there is a growing literature emphasizing the importance of taking an ecosystem approach, rather than treating fish as

⁴¹ Arnason offers an alternate school of thought. He argues that approaches such as ITQ management are efficient users of information since the amount of centrally collected information required is minimal. In a “share quota” system (an ITQ system based on proportional rather than tonnage allocation) “since the state of the fish stock is a major determinant of fishing firms’ profits, they may be relied on to assemble the relevant biological information. In fact, given a reasonably competitive environment, only those firms that efficiently collect and interpret the relevant information will survive. All this information will be reflected in the demand and supply of share quotas” (Arnason, 1991: 413).

single stocks.⁴² But as Botsford notes “because of the complexity of marine ecosystems and the difficulty in sampling them, fishery scientists have only rarely taken an ecosystem approach to management” (Botsford, 1999: 509).

Another issue is the scale at which management takes place. As Wilson et al (1999) show, fish populations can be panmictic (where high rates of migration make localized population issues irrelevant) or metapopulations (where low rates of migration and interaction between localized populations make spatial issues important), and these characteristics need to be taken into account for fisheries management. Wilson et al show that especially for metapopulations, national and even region management is not the optimal scale. Instead, for these populations, management should focus on the structure and habitats of local populations.⁴³ Essentially, for some species the scale at which management takes place is important. As with the ecosystem approach, this is an information intensive approach, the cost of which are daunting. But the costs of not addressing these issues could be even more costly.

Turning to information costs and specific fisheries management approaches, each approach to fisheries management has a different set of information costs and the potential for information asymmetries and distortions. The bureaucratic and market-based approaches both have clear requirements for scientific information. In the bureaucratic approach, knowledge of stock dynamics and the relationship between gear (troll type, mesh size, etc.) and catch is needed to ensure that the regulations developed under the bureaucratic approach do not allow catch to the regulated threshold. Thus, time

⁴² See Botsford, 1999 for a discussion of this literature.

⁴³ In an earlier (and perhaps simpler) version of this analysis, Wilson et al., 1994 argued that the chaos and complexity of fisheries made broad-scale management difficult or impossible. In many ways, the 1999 work represents a more formal and better-specified version of this earlier (and perhaps more widely known) analysis.

and place information is very important for this approach to succeed: but collecting this time and place information can be more problematic in the bureaucratic model. Since an individual fisher's success in the bureaucratic model is dependent on their knowledge of time and place information such as the location (i.e., feeding grounds) and behavior of stocks (i.e., migratory patterns), there are incentives to withhold or distort this information to maintain their competitive advantage. Moreover, large centralized bureaucratic systems often have difficulty collecting, acting upon, and communicating information. They are also vulnerable to information distortions (V Ostrom 1989). Thus, fisheries managers often have incomplete or inaccurate time and place information upon which to base management decisions.

While accurate scientific information is important for both the bureaucratic and the market-based approaches, different types of scientific information are important to the two approaches. Under the market-based approach, the emphasis is on understanding fish stock populations rather than the emphasis on fish behavior and interaction with gear that characterizes the bureaucratic approach. In order to make accurate population projections, fisheries managers need to understand the population dynamics of the species and have some understanding of how local conditions influence the reproductive cycle. Because fishers are guaranteed a percentage of the TAC, there are fewer incentives to guard or report false time and place information. However, the market-based approach is much more reliant on an accurate synthesis of scientific and time and place information to set the TAC. For example, the scientists' lack of understanding the Orange Roughy's life cycle actually created overfishing in New Zealand because the TAC was set too high based on inaccurate scientific information. Thus, the market-based approach's use of

limits set on a specific harvest quantity leaves it less room for error than the bureaucratic approaches broader access rules which might be more capable of absorbing this type of scientific error (Mace 1993).

The heavy reliance on accurate information also presents numerous opportunities for participants to engage in strategic behavior when there is scientific uncertainty that can increase transaction costs. For example, under conditions of uncertainty, scientists are often unsure whether to provide their “best guess” or to take a more pessimistic view of the population levels to counteract anticipated political pressures (Buhl-Mortensen and Torenson 1997). Uncertainty can also move setting the TAC out of the purely scientific realm and subject the process to more political pressure. For example, it creates opportunities for industry scientists to challenge government scientists with respect to setting the TAC. This can make setting the TAC a political rather than a scientific decision. This creates opportunities for some to engage in rent seeking behavior while others (e.g., small fishers) are unable to lobby or rent seek as effectively.

Co-management can reduce these costs, as increased formal management responsibilities reduces the incentive to engage in such rent seeking behavior. It may also reduce information gathering costs (both time/place and scientific) relative to the bureaucratic and market-based approaches as the long term benefits of better management that come from participating in information gathering activities becomes clearer and more immediate.

In many ways, the community-based approach has the lowest information costs. Little emphasis is placed on scientific information. Instead, the systems tend to be built around intensive time and place information gathered as fishers go about their daily work

of harvesting the resource and monitoring (i.e., enforcing) each other's behavior. It is also important to point out that long enduring rule systems are often the product of a long trial and error process of trying to get the rules right (Ostrom 1990). In this respect, they have developed an adaptive management system similar to that being advanced in the resource management literature (Berkes and Folkes, 1998; Gunderson, et al. 1995; Lee 1995, 1993; Walters 1986). Careful attention also must be paid to cases where the community management approach is not successful (sometimes due to an ineffective blend of scientific and time and place information) so that this approach is not recommended inappropriately.⁴⁴ The lack of scientific information can also create the potential for incurring information costs when the community is faced with rapid change (social, technologic, economic, etc). Costs can also be incurred when communities must decisions with respect to granting "outsiders" access to harvest a portion of the community resource since they may have inaccurate scientific information (e.g., incorrect stock estimates).

Coordination Costs

Each approach also incurs a different set of coordination costs. Coordination costs include those invested in negotiating, monitoring, and enforcing agreements, which in this case would be the rules governing the fisheries resource (Ostrom, et al. 1993, 120). Both the bureaucratic model and the market-based model will require a significant investment in time and staff resources to develop the policy proposals and to then undergo the negotiation, bargaining, and public comment necessary to obtain the requisite approvals by decision makers. In addition, the market-based approach has the

⁴⁴ A detailed discussion of fragile and failed community-based institutional arrangements can be found in Ostrom (1990, 143 – 181).

added coordination cost of setting and allocating the TAC on a yearly basis. This can leave the system in a state of flux that greatly increases the costs of negotiating and maintaining the ITQ system. There are also a whole host of additional negotiation costs associated with the system of trading the ITQs among fishers.

The bureaucratic and market-based approaches also face a different set of monitoring and enforcement costs. One of the main criticisms of the bureaucratic model is that it creates well known incentives to “cheat” and break the rules established by the central government. For example, “one study showed that in the Georges Bank fishery, regulations were frequently violated by a quarter to a half of all fishers. These violators used illegal mesh on almost all trips and fished in closed areas on about a third of their trips (Halliday and Pinhorn 1997, 103).”

There is more disagreement concerning the costs associated with monitoring and enforcement in an ITQ system. One could argue that enforcement costs are lower than the bureaucratic model because managers no longer need to conduct detailed monitoring of gear and other regulatory requirements (Clark, 1988). For example, in the surf clam and ocean quahog fisheries, British Columbia halibut fishery, and US Atlantic wreckfish fishery, enforcement costs have been lower because they have achieved cooperation with fishers, and reduced on-boat monitoring (Buck 1995). One could also argue that tracking fish might be less labor intensive than tracking fishing practices (e.g., Clark 1994). The alternative argument is that it merely creates incentives to engage in different forms of cheating behavior (e.g., high-grading, discarding, etc.) (e.g., Pálsson and Helgason 1996). For example, the enforcement costs in the Netherlands were such that they decided to return to a bureaucratic model based on input controls (Squires, et al.

1995). Tracking the fish and administering a quota system can also be costly. Accordingly, the costs for monitoring and enforcement in this approach appear to be mixed (Squires, et al. 1995).

The negotiation costs under the community-based approach are someone different. Rather than being the product of a political process, they are the result of a social process of developing shared norms of behavior and acceptable rules of behavior. This process can take a long time and it can require considerable work on the part of the community (Ostrom 1990, 90). However, once the system is well developed the costs of negotiating agreements is greatly reduced. Moreover, the system of self-regulation arguably has lower enforcement costs than the other two approaches, once this approach is fully developed. Due to the variety of management regimes associated with co-management, it is difficult to specify the coordination costs associated with this approach, however, it is reasonable to expect the costs to range between those associated with the bureaucratic approach and the community approach, depending on where in Pomery and Berkes' (see Figure 2-2) hierarchy the specific regime falls.

Strategic Costs

The strategic costs associated with each approach also vary. Strategic costs result from asymmetries in information, power, or other resources such that some obtain benefits at the expense of others. Common strategic costs include free riding, rent seeking, shirking, and corruption (Ostrom, et al. 1993). Several examples of rent seeking behavior have already been discussed. Because the initial distribution of property rights (e.g., ITQs) is subject to rent seeking prior to and during the initial distribution, it is inappropriate to assume that the distribution will be economically efficient for those

receiving the rights (Jung, et al. 1996). For example, fishers and industry often seek to modify the rules or annual TAC settings so they can extract more rent from the resource. While this can result in short-term financial gains for the fishing industry, the health of the stock and society as a whole may suffer if stocks decline over the long-term. Given the political component of the two approaches, it is also possible that the administrative agencies will be subject to capture by these groups. For example, some argue that fisher and industry capture of the regional fishery management councils in the United States is nearly complete and has resulted in both an inefficient industry and policies that hastened the collapse of some species (McManus 1994; and, Wilen 1995). Another important, but little examined, strategic cost that could emerge out of an ITQ system would be the opportunities for corruption and collusion that might result from industry consolidation. While it is unclear how pervasive this type of behavior is, it could create important inefficiencies in the market and lead to a variety of equity problems.

It is interesting to note that while rent seeking behavior is viewed in negative terms in the bureaucratic and market-based models, the same activity in the community-based approach or the co-management approach may be viewed in positive terms as consensus building or community leadership. This is not to imply that all consensus building or organizing activities are rent-seeking. Many if not most consensus building activities are positive and necessary parts of building and maintaining the social institutions necessary to support these approaches. However, the potential for rent seeking activities in these approaches should not be entirely discounted. It should also be noted that the institutions associated with the co-management and community management approaches are not necessarily bastions of equality and elites can engage in their own form of rent-seeking

behavior that may be costly to the community or the larger society in which it is located. Elites can also capture the system by controlling who has access to the decision-making process (Davis and Bailey 1996).

Comparing these approaches using three types of transaction costs, differences between the four fisheries management approaches are clear. Each approach includes specific institutional arrangements that vary between approaches. Similarly, each has its own set of policy objectives and normative biases that lead to each approach having different policy objectives and transaction costs. Each approach also tends to rely on a different set of policy instruments and institutional arrangements to implement their policy proposals. As a result, each approach offers a different set of potential positive and negative outcomes and transaction costs. Much of the work of those working in this policy arena is matching these approaches and their inherent cost and benefits, and strengths and weaknesses with the specific situation existing in a particular fishery management problem.⁴⁵

Property Rights⁴⁶

A final body of literature that deserves attention is the property rights literature that explores the influence that property rights have on individuals and groups

⁴⁵ Rose, 2000 offers a strong analysis of the strengths and weaknesses of the community and market-based approach, illustrating when each approach is most appropriate. She notes: "Putting together all the factors, one is struck by the degree to which TEAs [Tradable Environmental Allowances] and CPRs [ITQs and community-based approaches] are mirror images, having the opposite strengths and weaknesses. ... Thus while TEAs have been the flagship for modern property rights schemes in environmental resources, there is also something to be said for CPRs as property-based environmental management regimes. Indeed, one can say the most good about them precisely at the points where TEAs tend to be least effective as environmental protectors."

⁴⁶ This discussion focuses on property rights in the context of common pool resources. It does not address the broader issues of property rights in contexts such as real estate, privately owned property, etc. Thus issues such as takings and the rights of land owners vs. the rights of the state are not addressed.

perceptions of and interactions with resource, including CPRs (Neher et al, 1989; Hanna et al, 1996; Scott 1993).

What are property rights?

Property rights can be surprisingly difficult to define. Discussion of property rights can be muddled because in a political setting, “property rights” is often used as loosely interchangeably with terms such as “ownership,” “private property” or “privatization.” For example, in New Zealand, in political debate over fisheries management, the term “property rights” is often synonymous with “ITQs.” To a more limited extent, this also occurs (sometimes unintentionally in some of the academic literature when a writer discusses “property rights” but focuses on approaches that are closely associated with ITQs and similar policy proposals (e.g., Hannesson, 1991; Terrebonne, 1995; Grafton, 1995).

In this context, I am focusing on the broader conception of property rights embodied in the more pure academic discussion. Property rights can be defined as follows:

Regimes of property rights -- the structure of rights to resources and the rules under which those rights are exercised -- are mechanisms people use to control their use of the environment and their behavior towards each other. Property rights systems are a part of society's institutions: the norms and rules of the game, the humanly devised constraints that shape human interactions. (Hanna et al, 1996: 1)

The key point of this definition is that property rights are the rules describing how people interact with or use a resource – particularly how changes in property rights change incentives in relationship to the resource. This can be elaborated upon by noting, “A property right is 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 changes in property rights come explicit or implicit responsibilities. It is also important to acknowledge, as McCay notes, that property rights are not synonymous with management regimes: “property rights are not the same as management systems, although they are logically connected” (McCay, 1996: 131). McCay goes on to illustrate that a class of property rights can have several different management systems or regimes associated with it.⁴⁷

Typologies of Property Rights

The property rights literature primarily focuses on property rights as they relate to the balance of rights between stakeholders. Within this context, they are frequently described in typologies as entailing a spectrum or a ladder of right and responsibilities in which power and responsibility over a resource shifts from the government to the users.⁴⁸ Examples of these typologies include: Hanna et al. 1996 and Townsend and Pooley, 1995. Hanna et al describe a scale where “owners” range from individuals through groups and the state to no specified owners, and the rights and duties change depending on the owners (Hanna et al, 1996: 5). Similarly, Townsend and Pooley describe a rights regime composed of “rights based management” which is essentially ITQ rights, “co-management” where the government and fishing coops or communities share rights, and “contractual” where a defined set of rights are permanently transferred from the government to a fishing institution (Townsend and Pooley, 1995: 49-51). Other typologies of property rights extend their classifications beyond the private/state

⁴⁷ For example, a common property right may have a management regime that is laissez-faire, communal, state, market, or international. (McCay, 1996: 130-131)

⁴⁸ In many ways, this use of a spectrum or ladder is similar to the co-management literature, and there is indeed considerable overlap and cross-fertilization between the literatures.

spectrum. For example, Berkes and Farvar use a typology consisting of no property, communal property, state property, and private property (Berkes and Farvar, 1989). These typologies all often broad categories in which specific regimes can be placed, but they do not offer a great deal of analytical leverage. The Ostrom and Schlager scale described below addresses this problem.

Their scale offers a more specific typology of property that does not restrict analysis to a government/user spectrum, but instead focuses on bundles of rights and responsibilities that can be held by individuals, firms, governments, or nobody (Schlager and Ostrom 1992; Ostrom and Schlager, 1996). This typology is based on the operational rights of access (e.g., walking in an area), withdrawal (taking fish or cutting a tree), management (e.g., determining how and when trees are cut), exclusion (deciding who has access rights), and alienation (ability to sell a property).⁴⁹ (See Figure 2-4.) As these rights vary, the position of the party holding the rights changes. For example, an owner holds all five rights, while an authorized user only has the rights of access and withdrawal. While these rights are often discussed as being between a government and a group of users, it also describes relationships between individuals, groups, or firms.⁵⁰ This typology is important because:

The significance of a well-established property-rights system is the security that enforced property rights gives to individuals and groups of individuals that their access, withdrawal, management, exclusion, and/or alienation will be recognized in the future by potential competitors for these rights. With such assurance, individuals can make credible commitments to one another to develop long-term

⁴⁹ See Ostrom and Schlager 1996 for more specific definitions.

⁵⁰ For example, my landlady has all five rights for the house in which I live making her an owner. I merely have access rights (and some informal management rights involving gardening) and thus I am an authorized entrant. If my landlady was to hire a rental agency, that company would have access, management, and exclusion rights (withdrawal rights do not exist in this example) making that company a proprietor.

plans for investing in and harvesting from a common-pool resource in a sustainable manner (Ostrom and Schlager, 1996: 137).⁵¹

Research has shown that at a minimum having claimant status (access, withdrawal, and management) are necessary if local users are to have sufficient interest to manage a resource sustainably, although having proprietor status is preferable (Schlager and Ostrom, 1993; Agrawal and Ostrom, 1999). Thus, there is presumed to be a clear link between property rights and the success of the management regimes for common pool resources, such as fisheries.

Figure 2-4: Ostrom and Schlager’s Typology of Property Rights

	Owner	Proprietor	Claimant	Authorized User	Authorized Entrant
Access	X	X	X	X	X
Withdrawal	X	X	X	X	
Management	X	X	X		
Exclusion	X	X			
Alienation	X				

The Complexity of Property Rights

It is also important to note that under these typologies, property rights are not always as they might first appear. For example, ITQs are often (though somewhat inaccurately) described as “privatizing” a fishery. However, if one uses Ostrom and Schlager’s typology (see Figure 2-4) ITQ owners, are not owners. Instead, they are merely authorized users because they only have the rights of access and withdrawal. The government retains the remaining property rights (management, exclusion, and

⁵¹ To return to my rental example: many of my neighbors, upon seeing my management (gardening) efforts assumed that I had purchased full ownership rights, which I have not. Perhaps this is evidence that I am not acting entirely rationally in this arena. However, the fact that I only buy annuals rather than perennial plants shows that I am indeed acting consistently with Schlager and Ostrom’s analysis.

alienation). Furthermore, research indicates that over time, the property rights held by groups can change and grow – with varying degrees of success (e.g., Ostrom, 1990; Blomquist, 1992; Scott, 1993).

Linked to the complexity of property rights is the implication for shifts among management approaches. Anthony Scott (1993, 1999) is perhaps the most prominent writer exploring this point. He argues that the primary reason that some fishers fail to organize into self-governing organizations is a combination of information costs and (perhaps more importantly) conflict over distribution of the resource. 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 recently expanded upon this, noting that:

[A]n ITQ regime automatically provides the fixed (percentage) sharing needed to win fishers’ support for co-operative management ... In the formation of the ITQ regime there was resolved an exclusivity problem that could have caused many kinds of collective organizations to fail: the assignment of permanent agreed shares to vessels or persons. ... [W]hen the fishery administrators arrange to set up an ITQ regime, they have already taken two giant steps toward exclusive membership closed to outsiders (no free riding); and fixed permanent sharing of the catch in ITQ percentages, untouchable by the day-to-day decisions of the organization (Scott, 1999: 19).

Scott goes on to note that once 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. This possibility is expressed by the dotted line in Figure 2-5.

McCay et al (1998) sound a note of caution about this insight. First, they suggest that the successful development of co-management practices may be due partially to the allocation of ITQ rights, but that it is also due to the community created by ITQs. More

importantly, however, they raise important equity and management concerns as quota owners have the power and the incentive to choose the narrower interests of the quota owners over the broader issues of all fishers or the fishing community. Thus, "care should be taken to address this problem of representation when designing ITQ and other individual rights systems (McCay et al. 1998: 23).

In this section, I have briefly discussed the basic concepts of property rights theory as well as some of its implications for natural resource policy and fisheries management. Its importance as it relates to this dissertation, is multifaceted. First, this literature provides a useful lens for analyzing rights and responsibilities in the New Zealand fishery. The predictions and warnings developed by Scott (1993, 1999) and McCay et al (1998) also resonate with the New Zealand case, as a co-management regime is presently forming from the basis of an ITQ system.

Analysis and Conclusion

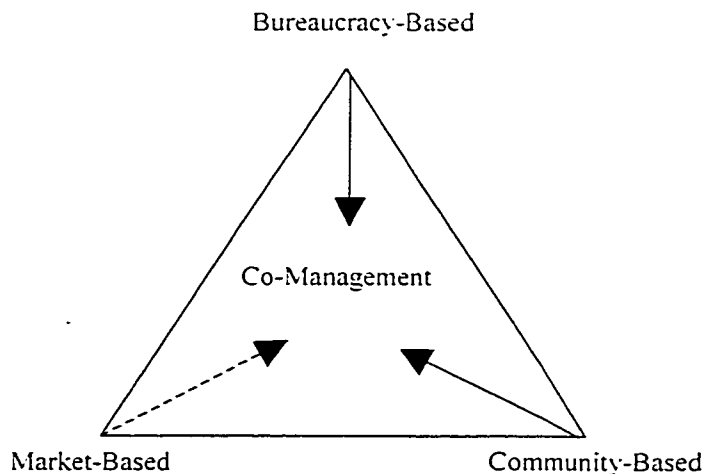
This chapter introduced the Tragedy of the Commons as the dominant lens for examining CPR issues. It then described the four main approaches to managing CPRs (bureaucracy, market-based, community-based, and co-management). Transaction costs are then used as a unifying method of examining these four approaches. Finally, the property rights literature is presented as a means of gaining insight into the relationships between these approaches.

A key point can be developed from these literature streams is developed in the following paragraphs. Much of the literature presents the first three management approaches (bureaucracy, market-based, and community-based) as competing and opposed approaches – as presented by Charles (See Figure 2-1) three points on a triangle.

However, the co-management approach also exists. The co-management literature predominantly describes the approach as developing out of a convergence of the bureaucracy-based and community-based approach. Essentially, it can be seen as a set of arrangements running along the triangle leg between the community point and the bureaucracy point. (See Figure 2-3.)

However, if we turn to the property rights literature, Scott's 1993 and 1999 analyses raise the possibility of co-management also developing out of a convergence between the market-based and bureaucracy-based approach. This occurs because ITQs provide a means for resolving conflicts over the distribution of the resource. In Figure 2-5, this is represented by the dotted line. If this development were possible, it would mean that co-management is the spectrum of management approaches created by combining aspects the three main management approaches. This is represented in Figure 2-5 by the space in the middle of this triangle.

Figure 2-5: Integrative Presentation of CPR Management Approaches



Thus, co-management is not just a simple set of arrangements running along one leg of the triangle. Rather, co-management can be thought of as a spectrum of

institutional arrangements in which management responsibilities are shared between the users and government. The origins of co-management can come from a variety of regimes, but a key foundation characteristic being users having a strong bundle of property rights. These rights can be distributed to a long-lived social group (e.g., community management) or to individuals and companies (e.g., market-based regulation); but the foundation of a strong bundle of property rights is necessary for the development of a co-management regime. The research presented in this dissertation will show that the convergence theorized by Scott has indeed taken place in New Zealand's fisheries management, and that co-management can develop from and into a wide range of institutional arrangements.

This chapter has presented a range of literatures influencing our understanding of CPR and fisheries management. It has also introduced some insights into how we think about co-management regimes. Chapter 3 will present the existing literature on New Zealand's fisheries. It will then introduce the research questions driving this dissertation and describe the research methods. Chapter 4 will provide background information on New Zealand, and on the origins of QMS (the first research question). Chapter 5 examines the effects of QMS. The next chapter uses property rights as a lens to understand changes in QMS. Then Chapter 7 focuses on recent changes behind the development of co-management and the possibility of this particular co-management approach succeeding. Finally, Chapter 8 will draw together the themes of this dissertation, focusing on the lessons learned from this research and its importance to the development of our understanding of market-based regulation and co-management as policy tools in natural resource and fisheries management.

Chapter 3: Case Background and Research Design

To have mastered “theory” and “method” is to have become a *conscious thinker*, a man at work and aware of the assumptions and implications of whatever he is about.

-- Giovanni Sartori. *Conceptual Misformation in Comparative Politics*

Introduction

This dissertation has introduced the concept of Individual Tradable Quotas (ITQs) as an important form of natural resources (and particularly fisheries) management. The previous chapters have presented the policy issues surrounding ITQ management (focusing on common-pool resources, property rights, and fisheries management). The focus of this chapter is presenting the research questions and case upon which this dissertation is based, as well as the data sources and research methods used in the analysis.

First, this chapter presents the existing literature on New Zealand’s Quota Management System (QMS). Presentation is restricted to existing literature rather than a detailed case description because the first research question explores why QMS was adopted. Thus, the full case description is presented in Chapter 4 and incorporates an analysis of this research question. After presenting the literature, I describe the numerous qualitative and quantitative data sources used in this dissertation. Once this background information is presented, I introduce the research questions and design – both linking questions to the theoretical background and describing how I use the various data sources to analyze these questions. Finally, I discuss how these multiple sources and methods will be used together in a manner that enhances the robustness and integrity of this research.

Existing Research on New Zealand's Quota Management System

In this section, I provide a brief overview of the existing research on New Zealand's ITQ system which is referred to as the Quota Management System or QMS. Here I will pay particular attention to the consequences that various authors have argued result from QMS, as these (along with the broader literature) are sources of my research questions. Academic publications about New Zealand's QMS first began to appear in 1988, approximately two years after ITQ management was adopted. These early articles were primarily written by members of the Ministry of Fisheries, and can be described as advocacy pieces that described and promoted the approach. These articles made broad positive assessments of QMS such as "very simply ... [QMS] ... has been successful in addressing the twin objectives of conserving and protecting the resource from over-fishing and in improving the economic performance of the commercial industry" (Clark 1993) and "the ITQ policy is not seen as a panacea to all fisheries management problems, but does offer the best medium to long-term solutions" (Crothers, 1988: 12).⁵²

This promotional pattern can be seen as continuing with New Zealand's current efforts to devolve their fisheries to a co-management system. In this situation, the positive reporting takes on a political flair since the policy is still being developed and may not be fully implemented. These articles usually document the rise of early stakeholder groups (such as the Southern Scallop Fishery or the Orange Roughy Management Company), and argue for their continued development. For example,

⁵² Examples of these promotional articles include Clark et al. 1988; Clark, 1993; Crothers, 1988; Batkin, 1996. Others (such as: Sharp, 1997; Gaffney, 1997; Batstone and Sharp, 1999) are closer to historical descriptions of the development of and changes to QMS. These writing are primarily historical documentation, however, Gaffney raises concerns that the data availability preclude by a lack of assessment and monitoring systems in place: while Sharp and Batstone and Sharp raise issues primarily associated with economic efficiency and the possibility of co-management. These concerns are more subtle than those described below.

Harte et al. state: “New Zealand should also heed the call to re-evaluate its fisheries management system ... Fisheries managers should be enhancing rights-based management by empowering fishers ...to take greater responsibility for fisheries decision making, implementation, and enforcement (Harte et al., 1998:2). In making statements such as these, the authors also implicitly or explicitly criticize the QMS for being unresponsive to the needs of the fishery or fishing industry, and for preventing the fishing industry from taking on responsibilities that the industry would be better equipped to address. Other examples of this type of argument include: Harte et al., 1998; Harte, 1998; Clement, 1999; Craig, 1999; and Hughey et al., 2000.

This does not mean, however, that all writing on New Zealand’s QMS follows this promotional pattern. Perhaps the largest body of work systematically examining QMS comes from Christopher M. Dewees.⁵³ Dewees describe his goal as to “assess perceived problems and benefits of this new system and its effects on the fishing industry” (Dewees 1989: 131). However, Dewees himself is quick to caution, his work cannot be seen as representative of the entire fishing industry, but rather of the Auckland region inshore fishery which has some unique characteristics. (Dewees, per. com: 2000) In 1987 and 1995 he conducted interviews in the Auckland regional fishery. Dewees initially found that overall reaction to QMS was positive, although there were concerns over bycatch discarding, accuracy of initial ITQ allocation, consolidation of quotas, and barriers to youth entering the industry.

⁵³ A substantial part of this dissertation is a third wave of Dewees’ survey. For discussion of this, see Chapter 3.

In 1995, Dewees re-surveyed his initial sample (thus providing panel data), and conducted additional interviews with fishing company managers, individual fishers, Maori-owned fishing business staff, Ministry of Fisheries staff, and leaders of environmental and conservation organizations (Dewees 1998; Dewees 1996a; Dewees 1996b). Briefly, the results of the 1995 surveys showed a difference between the large vertically integrated companies and the smaller scale fishers. “Companies stated that their firms’ relatively secure fish supplies resulting from the ITQ system enabled them to do long term planning and value-added product development. The small-scale quota owners had mixed feelings” (Dewees 1998 p. S135). Later, he elaborates that the majority of fishers and managers believe that the fisheries are better off under the QMS, but the smaller-scale fishers express concerns about short and long term economic security (Dewees 1998).

These, broadly positive analyses, echo the themes discussed earlier in the literature of the positive effects of ITQ systems, and now of the QMS approach. Also like the broader literature, similar critiques about the negative effect of QMS are raised. These start with information costs, and continue through social effects and concerns about co-management. Sissenwine and Mace (1992) raised one of the earliest concerns over QMS when they wrote an influential piece that pointed out some systematic problems with QMS, such as difficulties with stock assessments: “there is little evidence of improvement in the condition of fisheries resources; but since stock assessment information is limited, it is difficult to know” (152). They also argued (in contrast to other authors) and the fact that the

government regulation was not reduced since licensing restrictions were replaced with quota ownership requirements and new record keeping rules were introduced. However, the authors emphasized that these concerns should not be interpreted as a condemnation of QMS. The scientific concerns gained wider attention and were more strongly re-iterated soon after in Mace, 1993.

Perhaps the broadest critique comes from Duncan (1993). In a wide-ranging conference report she raised many concerns about fundamental aspects of QMS. Perhaps most basic is her argument that quota leasing and consolidation of quota ownership to large companies separate the “on-the-water” fishers from the ownership incentive, thus diluting the conservation incentive of ownership. She also notes social effects of quota aggregation, arguing that “The increase in jobs shown in industry statistics involves, in large part, a transfer of employment from small-scale more independent operators supporting rural businesses, to larger scale company vessels supporting factory and processing work in the more urban centers” (30). She also warns of extensive compliance problems, noting that in some areas estimates are that as much as 80% of domestic fish sales come from the black market (5); as well as the “Total Allowable Catch” (or TAC) setting process, both echoing Mace’s scientific concerns, and adding questions about a lack of representation for non-commercial interests.

Wallace (1998: 5) expands upon these concerns over TAC setting. She describes how the industry wields what may be considered excess influence in TAC setting process:

For the most part those who attend are from the Ministry, the research provider, or from industry – usually one environmental NGO if any can attend. Recreational fishers and customary Maori fishers rarely attend – partially because of the enormous time commitment required. The non-

industry stakeholders are for the most part employed in other occupations and as voluntary organizations cannot attend long meetings stretching into days and weeks.

Wallace also critiques the QMS for emphasizing a single-species approach over an ecosystem approach, as well as for de-emphasizing input controls. (All of which are concerns raised by observers in the broader fisheries management arena.) Finally, she argues “Co-management ... has to a large extent served as a Trojan horse for the capture by the industry of fisheries management at the expense of other users.” (Wallace, 1998: 10)

Finally, Renee has made a well-reasoned critique that argues that while ITQs are a useful policy tool, implementation problems have flawed QMS. Specifically, his concerns are similar to those of Wilson et al.. that the QMS regional boundaries are too large for the characteristics of the fishery or fisheries and thus do not match ecosystems. He also points out broader social concerns about QMS such as: over-riding the rights of smaller local communities; aggregation of quota ownership; and the removal of part-time fishers (Rennie, 1998).

Together, these three researchers present a critique of QMS that is similar to that seen in the wider literature about market-based regulation. The arguments raised both for and against QMS echo the themes explored earlier in the debate over ITQs. Indeed, when the published articles that form the debate over QMS are examined, it can be seen as a microcosm of the larger debate over market-based regulation.

Finally, a variety of researchers are exploring a variety of specialized issues within the QMS system. For example, as discussed above, stock assessment is an

important issue. As a result, there is a body of work exploring the science of the stock assessment process. (E.g., Annala et al. 1989; Annala. 1993; Harley et al. 2000a; Harley et al. 2000b.) Another stream is enforcement under QMS: focusing on how enforcement changes when an ITQ system is introduced, and the best strategy for increasing compliance – especially voluntary compliance. (E.g., Crothers. 1999; McClurg. 1994; Sullivan and Nielander. 1999.) Finally, the issue of Maori rights and compliance with the Treaty of Waitangi attracts considerable attention⁵⁴ and focuses on both explaining the origins and legalities of the treaty claims, as well as the government's legal and programmatic responses to these claims.⁵⁵

Data Sources

In exploring the policy questions raised by the existing literature and the particulars of New Zealand's QMS, many data sources are available, some of which I developed others I gathered during my field study in New Zealand. These sources include: data from a panel survey of fishers (dating from the policy's inception in 1986-87, 1995, and 1999), as well as a 1999 survey of companies, a 1999 survey of stakeholder groups, analysis of historic (1987-1999) quota ownership data, expert interviews, document analysis, and existing studies of QMS.

Historic Auckland Region Surveys⁵⁶

A key part of the research for this dissertation is a panel survey of fishers and companies in the Auckland region. (See Table 3-1 for a summary of all three waves of the Historic Auckland Region Survey.) Since 1986-7 Christopher M. Dewees (a social

⁵⁴ See Chapter 4 for a discussion of Maori rights and the Treaty of Waitangi.

⁵⁵ Examples of this stream include: Memon and Cullen, 1992; Orange, 1988; Cassidy, 1999; and Moon, 1999.

⁵⁶ This survey was approved by Indiana University Human Subjects Committee as protocol #99-2776.

anthropologist at University of California, Davis) has been conducting surveys of fishers in the Auckland region (one in 1986/7 and one in 1995). Since he interviewed the same sample each time, beginning with the introduction of QMS, he created an important source of panel data to track the experiences of a cohort of the fishing industry within one region of New Zealand. I contacted Dr. Dewees, and he agreed to work with me so I could conduct a third wave of the survey. The 1999 round of the survey I conducted closely followed Dewees' earlier surveys, with a few questions added to address the specific research questions examined in this dissertation not already covered by this instrument.

Table 3-1: Summary of Historic Auckland Region Survey

	Wave 1*	Wave 2	Wave 3
Year	1986-7	1995	1999
Number of Respondents	62	48	39
% of Wave 1	...	77%	63%
% of Wave 2	81%

* Survey uses random sample of 100 quota owners

A strength of this data source is that many of the questions relevant to this dissertation were asked in the first and second rounds of this survey, so panel data are available for many questions. (A copy of the 1999 survey is provided in Appendix 3-1.) However, a weakness is that the survey is it is a regional survey, not a national survey. The survey is representative of the region, but it has characteristics of the region not necessarily found elsewhere, such as a larger proportion of smaller fishers than other regions, a fishery (snapper) that has been under more severe pressure than stocks in other regions⁵⁷. But as panel data stretching over the life of the Quota Management System, the strengths of this survey clearly outweighs its weaknesses. Furthermore, the small-

⁵⁷ This analysis is based on my and Chris Dewees' observations. The detailed data needed to do a full analysis of representation is not available.

scale fishers in this survey can be identified and used to compare differences in perspective between small fishers and large companies during 1999.

Deweese's first survey was conducted over a nine-month period in 1986-7. Subsequent surveys were conducted by Dewees in 1995 and by myself in 1999. The initial list of commercial fishers and fishing company managers came from an unstratified random sample of 100 fishers on the list of provisional quota holders in the Auckland region. (See Dewees, 1989 for a detailed explanation). Sixty-one fishers and company managers were interviewed in the initial survey. Small-scale fishers (those with one or two boats under 20 meters) dominate the sample, with a limited number of large vertically integrated companies based in the Auckland region. In 1995, Dewees conducted a second survey, based on the list of 61 fishers and company managers who participated in the 1986/7 interviews (Deweese 1996, 1998). That survey had 48 respondents, or 79% of the initial survey.

In 1999, with Dewees cooperation, I conducted a third round of the survey. (See Tables 1 to 3 for detailed analysis of the 1999 survey). Over a three-month period, I interviewed 39 fishers, or 63% of those participating in the initial survey and 81% of those participating in the second survey wave. Three participants in the 1999 survey (or 5% of the initial survey) were interviewed in the third round, but not the second round. Also, of the original 62, five had died or were too sick to be interviewed, and 12 could not be located. Thus, of those who were physically available for interviews, 85% of those who participated in the first survey wave and 93% of those who participated in the second survey wave were interviewed.

Overall, the dominant reason for not participating in this round of the survey was missing participants (61%) followed by refusals (22%) then death or illness (17%). But it is interesting to note that reasons for not participating in the third round of the survey varied somewhat between those who participated only in the first wave and those who participated in both the first and second waves. Among those who only participated in the first wave, by 1999 64% were missing, 27% had died or were ill, and 9% refused to participate. For participants in both the first and second waves, 58% were missing, but the proportion of refusals increased to 33% while the influence of death and illness decreased to 8%. This may indicate a demographic shift in the survey as those fishers who were older when the survey began, are slowly being removed through death and illness. Tables 3-2 and 3-3 provide a detailed summary of response rates and reasons why respondents did not participate in the 1999 survey.

Table 3-2: Detailed Breakdown of 1999 Auckland Region Survey Response Rate ⁵⁸

	Survey Response Rate (vs. Wave 1)		Survey Response Rate (vs. Wave 2)	
	Comparison Base	Response Rate	Comparison Base	Response Rate
All	62	63%	48	81%
Surviving*	58	67%	47	83%
Located**	50	78%	43	91%
Available***	46	85%	42	93%

* Total from survey wave minus those who died or were too ill to respond.

** Total from survey wave minus those who were missing
(see text for discussion of search procedures)

*** Total from survey wave minus those who were missing, died, or were too ill to respond.

⁵⁸ Response rate in 1995 comparison is over-estimated (about 5%) due to 3 respondent participating in Wave 3 but not Wave 2.

Table 3-3: Reasons for Non-Participation in 1999 Auckland Region Survey

	All Wave 3 Non-Participants		Participated in Wave 1 But not Wave 3		Participated in Waves 1 and 2 But not Wave 3	
	Number	Percent	Number	Percent	Number	Percent
Died/Ill	4	17%	4	19%	1	10%
Missing	14	61%	12	57%	5	50%
Refused	5	22%	5	24%	4	40%
TOTAL	23	100%	21	100%	10	100%

In addition to contacting survey respondents at their last known address, I conducted additional searches to ensure maximum response rate and tracking of non-respondents. First, for individuals who were not at their last recorded locations, I searched phone books in the Auckland region and sought referrals from other fishers. For those who were not found this was I searched publicly available death register⁵⁹ and regional voter rolls.⁶⁰ A respondent was classified as dead only if they were reported dead by Dewees, the family or were located on the death register. I classified respondents as missing only if they were not located by any of the means discussed above.

I first contacted fishers and companies by letter, using contact information provided by Dr. Dewees or the location research described above. I followed up with phone calls, which resulted in scheduling an appointment or removing the contact from the survey list. Nearly all interviews took place in the respondent's home or office. In a few cases, where an in-person visit could not be arranged, the interview was conducted over the phone. All respondents were assigned a code number to assure anonymity.

⁵⁹ Approximately three years of the death register were unavailable due to a failure to overlap paper and microfiche versions.

⁶⁰ In New Zealand, all citizens are required to register to vote. Voter registration information is compiled and made public in the "voter rolls," a record that includes their address and occupation. The search of the New Zealand voter rolls covered the area from the northern reaches of the Auckland region through the central North Island. It is possible that fishers may have relocated beyond the reaches of this search, but the time and resource constraints of this research, prevented my expansion of the search of the voter registry beyond this region.

Interviews were structured, with a mix of open-ended questions and closed-ended questions (requiring either brief factual answers or Lichart scale answers). However, probing questions were used to clarify responses. Written notes were recorded and immediately transcribed to typed notes. These records were later coded, with open-ended responses kept for qualitative analysis.

Nation-Wide Corporate Survey⁶¹

In 1999, I conducted a second survey of participants in the fishing industry. Instead of focusing on a cross-section of the fishing community in a particular region, this survey focused on large and medium sized fishing companies throughout New Zealand. The New Zealand Seafood Industry Council's (SeaFIC) research librarian identified 29 companies (Crozier, 1999). Four active members of the fishing industry⁶² then identified appropriate people to participate in these interviews, and in some cases identified additional companies or suggested removal of other companies that were involved in export brokering rather than the fishing industry. This created a final survey list of 36 companies: 20 in the North Island, 16 in the South Island.⁶³ (See Table 3-4 for summary of survey characteristics.)

Table 3-4: Summary of Nation-Wide Corporate Survey

	North Island	South Island	Total
Contact List	20	16	36
Interviewed	17	9*	26
Percent Interviewed	85%	56%*	72%

* Difference between response rates fails to reach .05 significance using a proportion test.

⁶¹ This survey is an extension of the Historic Auckland Region Survey.

⁶² Tom Norris of the Treaty of Waitangi Fishing Commission (Te Ohu Kai Moana), Milan Barbarich of Anton's Seafood, Donal Boyle of Clement & Associate, and Daryl Sykes of the New Zealand Rock Lobster Industry Council

⁶³ Three companies that were interviewed as part of the Auckland Region Survey were not re-interviewed for this survey. This was due to the significant overlap between the two surveys.

These companies were initially contacted via a faxed letter,⁶⁴ with follow-up contact made by phone to arrange appointments for interviews. Interviews were conducted with 26 companies (17 North Island and 9 South Island), representing 72% of companies nation-wide (85% of North Island companies, 56% of South Island companies). While this difference in response rate between companies in the North and South Islands may appear to be a cause for concern, a proportion test on the difference in response rate failed to reach statistical significance at the .05 level. Furthermore, for both North and South Island companies, the response rate was above 50%. Of those not participating in the survey, six refused, and I was unable to arrange interviews with three.

I interviewed representatives of participating companies either in-person at their office or via phone, if we were unable to arrange an in-person interview. Interviews usually lasted between 45 minutes and an hour (although a few lasted up to two and a half hours). Questions in this survey were adapted from the 1999 Auckland Region survey. (See Appendix 3-2 for copy of survey.) As with the Auckland Region survey, interviews were structured, with a mix of open-ended questions and closed-ended questions (requiring either brief factual answers or Lichart scale answers). However, probing questions were used to clarify responses. All respondents were assigned a code number to assure anonymity. Written notes were recorded and immediately transcribed to typed notes. These records were later coded, with open-ended responses kept for qualitative values.

⁶⁴ For reasons I have not been able to determine, faxes are the preferred means of business communication in New Zealand. Thus, faxed letters were more appropriate than the mailed letters that would have been expected in the United States.

Stakeholder Survey⁶⁵

The final survey conducted for this dissertation was a mail survey of the stakeholder groups⁶⁶ within the New Zealand fishing industry. SeaFIC identified a comprehensive list of stakeholder groups. Most of these groups are new-style stakeholder groups formed for the purpose of managing a specific fishery. However, a few of these groups are more traditional commercial fishing organizations that are nonetheless considered members of SeaFIC and thus stakeholder groups. Stakeholder groups were asked to complete a four-page survey on issues such as the group's characteristics, organization, management, interactions with other groups, and their views of the future. (See Appendix 3-3 for copy of survey)

Surveys were mailed out on August 16, 1999 and the last survey was received on September 15, 1999. The 1999 Fisheries Amendment Act, which authorized the formation of stakeholder groups, was passed during this period. However, the passage of this act was widely expected and would not have influenced survey responses. Thirty-two surveys were distributed and eighteen were returned, giving a response rate of 56%.⁶⁷ A brief comparison of responding and non-responding groups showed little significant difference between the two, so the survey is viewed as representative. One possible exception to this is that regional single species groups may be slightly over-represented, and national multi-species groups may be slightly under-represented. (See Table 3-5 for a summary of survey characteristics) Since the total number of responses is small, analysis

⁶⁵ This survey was approved by the Indiana University Human Subjects Committee as protocol #99-3191

⁶⁶ Stakeholder groups are defined and discussed extensively in Chapters 2 and 4.

⁶⁷ One group identified by SeaFIC (Paua 2 Industry Association) was not included because no contact address was provided and the provided phone number was incorrect.

of closed-ended questions and coded questions is restricted to simple descriptive statistics, while open-ended questions are used for qualitative analysis.

Table 3-5: Summary of Stakeholder Survey

	Regional Groups		National Groups		Total	
	Single Species	Multi Species	Single Species	Multi Species	Single Species	Multi Species
Participants	7	2	7	2	14	4
Non-Participants*	1	1	6	4	7	5
Total*	8	3	13	6	21	9

* Two non-participating groups could not be characterized, so total is less than 32.

Historic Quota Ownership Data

In addition to survey data that measure opinions and perceptions, data are available from Clement & Associates (a fishing industry consulting firm) tracking the actual annual by individuals and companies (broken down by quota management area and species) for the period 1986 to 1997. Analysis of these data provides insights into patterns of ownership and whether consolidation of quota ownership is occurring.

Qualitative Data Sources

A wide variety of qualitative sources of data are also used. Miles and Huberman defined qualitative data as follows:

In some senses, all data are qualitative; they refer to essences of people, objects and situations ... [W]e focus on data in the form of words – that is, language in the form of extended text. ... The words are based on observation, interviews, or documents (Miles and Huberman, 1994: 9).

Thus, some of the data already discussed can be considered qualitative data. Perhaps the most obvious of these are extended comments taken from survey participants. In addition to the survey data, several other qualitative data sources are used in this dissertation.

These sources include: interviews with experts, historical documents, and published books and articles.

Expert Interviews

A vital source of information for this dissertation is expert interviews. Sources were identified from a variety of sources. One primary source was Christopher M. Dewees (see Historic Auckland Regional Survey) who provided an extensive list of contacts. In addition, I created a list of key people based on industry publications and documents. Further contacts developed as interviewees suggested additional interview sources, and on occasion interested individuals who were not part of the research project suggested interview sources.⁶⁸ Interviews were conducted in person, with handwritten notes that were immediately transcribed to typed notes. Since experts were from a variety of fields (e.g., academia, Ministry of Fisheries, National Institute of Water and Atmospheric, Treasury, and industry groups) there was no standard interview format. Instead, interviews were tailored to individuals. The experts have verified all quotes and information attributed to them, and they are quoted by name only with their permission. When requested, or if the person could not be located to confirm the quote, a description (e.g., “a fishing company leader”) than a name identifies the experts, in order to preserve anonymity.

Historical Documents

Another extremely valuable source of information for this dissertation is historical documents. This includes many sources. One type is yearbooks, government department

⁶⁸ For example, my contact for the head of the New Zealand Federation of Commercial Fishermen (Peter Jones) was a painter who worked with my family, and whose father-in-law had emigrated to New Zealand with Mr. Jones.

annual reports, and industry group annual reports; all of which provide snapshots of the industry at regular points of time, and also provide an annual source of detailed “current” statistics. When examined over time, these documents can yield insights into regulatory and industry change, as well as a wealthy source of descriptive historical data.

Other types of historical documents are: studies (often unpublished), position papers, parliamentary submissions, reports, and advice documents. These documents, preserved from when they were part of an active debate over policy can provide key insights into how policies developed, and the perceived influences of policies on segments of the industry. Also, they can provide subtle insights into the mood and concerns of the time that might otherwise be lost. Finally, a small but useful collection of theses, dissertations, and academic/practitioner conferences also provide insights into the vision of the industry at the time of writing, as well as preserving data sources that might well otherwise be lost.⁶⁹ Together, all these different types of documents offer a rich well of primary sources that will be an important resource in this dissertation.

Published Books and Articles

Like “historical documents,” “published books and articles” includes a range of source.⁷⁰ In this case, one type of publication I rely on heavily are non-academic books and articles that provide historical and current descriptions of fishers and the government that regulates them. (e.g., Makarios’ *Nets, Lines and Pots* series or Hargreaves’ *On The*

⁶⁹ A vital resource in collecting these documents was the SeaFIC library. This library contains a truly impressive wealth of books and documents tracing many aspects of the fishing industry in New Zealand. I wholeheartedly recommend this library as a primary source to anybody conducting research on this topic. SeaFIC should also receive considerable credit for not only maintaining this important resource but also providing a public service by making it publicly available to researchers.

⁷⁰ The line between “Published Books and Articles” and “Historical Documents” can be blurred. For example, Thomson’s *Story of New Zealand* which he wrote in 1859 to describe the history and current conditions in New Zealand (partially to encourage immigration), is now a rich source of historical detail (Thomson, 1859).

Next Tide) These often provide rich detail otherwise unavailable. Another source is industry and government publications (such as the monthly *Seafood New Zealand*). Articles in these publications can be an excellent source of detailed information about policy changes and the state of the industry. For example Peter Stevens' series of articles on changes in fishing ports throughout New Zealand provides detail and perspective otherwise unavailable. Letters to the editor in these publications can often provide vivid insights into the mood of the fishing and regulatory communities. Finally, the published academic literature is an important resource. It can illustrate points, and specific articles (such as Connor, 1999) can provide direct data sources that either supplement or replace the need to original research.

Research Questions and Design

Up to this point, this chapter has focused on describing the existing literature on New Zealand's fisheries and identifying the data sources that are used in this dissertation. This section now introduces the research questions that will drive this dissertation. After introducing each research question and its theoretical background I will describe how I use the data sources to illuminate the research questions. I combine both qualitative and quantitative data sources and analytical methods.

This approach to examining the research questions encourages both the rigor and testing associated with quantitative research and the descriptive detail and insights that come from qualitative research. Furthermore, the multiple data sources will encourage triangulation.

Research Question #1: How and why was New Zealand's Quota Management System Adopted?

One important question for policy analysts is how innovative policies (such as QMS) are adopted. Why are new policies adopted in some countries or states but not others. Indeed, there is a long-established literature surrounding policy innovation. Some of the public administration literature (e.g., Lindbloom, 1959) argues that most policy changes occur incrementally. To date, much of the political science research on this topic has focused on policy adoption in American states using quantitative methods (e.g., Berry & Berry, 1999; Minstrom, 1997; Hays & Glick, 1997). This stream identifies variables such as internal politics, economic and social characteristics, the actions of neighboring states, elite ideology and motivation, as well as the role of change agents.⁷¹

Within New Zealand, there are competing explanations. Published analyses (e.g., Clark et al, 1988) point to an inshore fisheries crisis. But many involved in the industry point to a more incremental approach based on the experience of deepwater fisheries being expanded to inshore fisheries (e.g., Norris, 1999). Answering this question will shed light on an important background question and will provide an opportunity to examine how well the New Zealand experience fits with the variables identified in other studies of innovation. This research question, will be addressed in Chapter 4 as part of the background information on New Zealand and the Quota Management System. It will focus simply on the two competing explanation (crisis vs. incremental) described above,

⁷¹ Everett Rogers (1995), who comes from the communication tradition, has gone a step beyond this by developed a conceptual model of the innovation process. He outlines the process (from agenda setting, matching, redefining, clarifying, routenizing) but more importantly he identifies variables that influence the rates of adopting innovations.

rather than the broader range of issues raised in the literature. These broader questions will be the focus of later research on this case.

In exploring this question, the emphasis is on reconstructing events from a period ten to twenty years ago. (QMS was adopted in 1986.) Historical documents will be the primary resource for this question, as they provide a vital and rich source for understanding this question. While conducting field research, I identified an extensive set of documents that trace the development of QMS as a policy option and the adoption of that policy. Since they were written during the events, they directly capture the priorities and thinking of the time. Additionally interviews with industry and participants directly capture their memories of this process. Published books and articles also capture memories, but these are already filtered through at least one author. Finally, although this was not a question directly asked in the Auckland Region or Corporate survey, some participants chose to volunteer their views on the introduction of QMS.

Research Question #2: What effect did the Quota Management System have on the structure and characteristics of the fishing industry in New Zealand?

As was discussed extensively in Chapter 2, the fisheries management literature includes detailed discussions of the potential positive and negative effects of ITQ-based systems. Proponents of market-based regulation argue that the approach improves economic efficiency and productivity, while protecting fisheries at a sustainable level. It may also increase fisher incomes, modernize the industry, reduce overcapitalization, and help eliminate the "race for fish". Critics suggest, however, a variety of negative outcomes are associated with ITQ

management. For this dissertation, analysis is restricted to the following effects: sustainability of the resource, perception of economic efficiency,⁷² industry consolidation, and compliance issues.

Some notes should be made defining these effects. Sustainability refers to whether the resource (in this case the fisheries) is being harvested in a manner, which insures it will not be depleted over time. As was noted in Chapter 2, information or lack of information is an important issue to examine when addressing this effect. The second effect examined is perception of the economic efficiency of the QMS. As noted earlier, analysis of the actual economic efficiency of QMS is not the focus of this dissertation. Rather, I am examining the perception of economic efficiency among those involved in QMS. Industry consolidation broadly refers to smaller players leaving the industry while a smaller number of larger players gain dominance. More specifically, it can refer to whether the distribution of quota ownership (i.e., who owns what amount of quota) has shifted toward a smaller number of large quota owners over time. Finally, compliance issues refer to the degree to which fishers are obeying the fishing rules, and what types of rule-breaking activities occur.

To examine the extent to which these effects occur, I will use a variety of resources. The Auckland Region survey will be particularly helpful because it provides a set of panel data, and thus the opportunity to directly compare the characteristics of respondents over time. This will provide evidence for all four issues. Furthermore, some fishers address peripheral topics associated with these issues such as small-scale fishers and scientific uncertainty, but these questions were not asked systematically.

While it cannot provide the historical data, the Corporate Survey asks similar questions, and thus will be able to expand the analysis of perceptions of these issues to

⁷² Please note: an analysis of the economic efficiency of QMS is beyond the scope of this dissertation. Instead, I will examine the perception of economic efficiency among those involved (such as fishers and companies).

include a wider geographic area, and the larger companies that dominate the industry. A final source of systematic data is the quota ownership data set. By examining changes in quota ownership over time, direct nation-wide evidence is available to document changes over time in industry consolidation.

In addition to these more systematic, primarily quantitative sources a variety of more qualitative sources are used. Expert interviews are important because they provide knowledge and a perspective other than those of the fishers on these effects. Similarly, historical documents provide an opportunity to document these effects as they occur (either noting the change as it occurs or by comparing documents early in QMS adoption to more recent documents). Finally, published books and articles can be used in a similar manner as historical documents to examine these effects. These resources will be particularly useful for issues such as sustainability and compliance issues.

With its extensive history, New Zealand offers an excellent opportunity to examine the extent to which the effects associated with ITQ management occur. This will have important implications for understanding what the effects of the market-based approach are, and thus what potential effects need to be considered when adopting this approach.

Research Question #3: How and why have perceptions of the property rights ITQs represent changed? What are the effects of these changing Perceptions?

While parts of the market-based literature tends to view property rights as either wholly owned by the state or private entities (e.g., Clark, 1994; Hatcher, 1997; Grafton, 1996), as is discussed in Chapter 2, a much more complex view of property rights is appropriate. Over time, and with changes in both fisher behavior and regulatory activity,

the kind of property rights an ITQ represents can change or be interpreted differently by different groups.

It appears that in the New Zealand fisheries the type of property rights ITQs represent appears to be open to interpretation. Over time, the understanding of what they represent has changed, and different parties (e.g., fishers vs. environmentalists) see the rights differently. This leads to questions about the exact nature of the property rights ITQs represent, and how these can change. Studying these changes in New Zealand will help develop our understanding of why property rights change and the mechanisms through which this happens. Since some of this literature (e.g., Scott, 1993) explicitly focus on ITQs as a method for encouraging expanded management responsibilities and thus greater property rights, New Zealand is a particularly important case to study. This question will be addressed in Chapter 6.

Unlike previous research questions, the Auckland Regional and Corporate surveys do not play a significant role in analyzing this question. While a few questions may provide insights into perceptions of property rights or the evolution of the property rights regime, this is more as a result of respondent's interests and comments than direct questions in the surveys. Thus, historical documents, books, and articles are particularly important for this question. Like Research Question #1, these sources (particularly historical documents) will be used to trace changes – this time changes in QMS management, how they influenced perceptions of property rights, and how these changes in perceptions influenced behavior. Books and articles will also accomplish this, but in most cases they provide a less direct measure than historical documents. Finally, expert interviews provide another direct source of information on these changes. Once again,

these interviews are particularly useful when they provide perspectives that offer an alternative to the fishers (such as government officials, environmentalists, or reporters).

Research Question #4: What are the characteristics and origins of New Zealand's co-management approach? How likely is this approach to succeed?

In New Zealand, the market-based QMS is being supplemented with a co-management system in which corporate-based stakeholder groups take on many management activities. Understanding the development of New Zealand's co-management system is an important issue, for several reasons. As with Research Question # 1, understanding the development of a new regime will help gain insights into policy innovation. But the issue is of particular interest because it offers an opportunity to explore Scott's (1993, 1999) ideas that ITQs can encourage the development of co-management. This case offers an opportunity to better understand how the transition that Scott predicts might actually occur. Furthermore, if co-management goes ahead (which seems to be a near certainty), it will be co-management layered on top of the existing ITQ-based system. This approach is very different from previous fishery co-management systems, and as such is well-worth documenting and understanding.

An even more important aspect of this question is examining the approach's probability of success. Ostrom's (1990) design principles offer eight criteria associated with successful self-governance. When combined with the lessons from the evolution of California's groundwater management, this offers a structure for assessing the possibility of success for the transition from QMS to co-management. This question will be addressed in Chapter 7.

The primary source of data for this question is the Stakeholder Group Survey. It was designed to explore the characteristics of stakeholder groups, their responsibilities, interactions with other interests (such as environmental groups or Maori), and their vision for the future. Thus, the Stakeholder Group Survey is key to understanding how this approach will work, and providing the information necessary to assess its likelihood of success. Other data sources are used to understand the origins of co-management. Historical documents, books and articles are amongst the most important here. Documents such as position papers can be used to trace the rise of co-management, while a combination of documents and recently published academic articles shows how participants anticipate the approach will work. Similarly, expert interviews provide an important source of information on both the origins and working of this approach. Finally, while it was not directly addressed in either the Corporate Survey or the Auckland Regional Survey, some participants in the Corporate Survey discussed the development of co-management. These comments are a useful source of information, much like the expert interviews.

Together, Research Questions 1 through 4 provide a comprehensive guide or map for understanding the dynamic history and development of policy associated with New Zealand's Quota Management System. (Table 3-6 summarizes how data sources and research methods will be combined for each research question.) Each research question examines an interesting policy issue that has applications not only to this case, but also to other fisheries management systems that are considering adoption of an ITQ system or have already adopted ITQ systems.

Table 3-6: Research Questions and Data Analysis

Research Question	Data	Application
Question 1 How and why was New Zealand's Quota Management System (QMS) Adopted	Auckland Survey	Question 30 may provide insights.
	Corporate Survey	Not a major source of information. Questions 20 and 24 may provide some insights.
	Expert Interviews	Several interviews directly address this question.
	Historical Documents	Analysis of position papers, annual reports and government documents provide insights.
	Books and Articles	Publications, both written during introduction and those with an historical perspective are valuable.
Question 2 What effects did the QMS have on the structure and characteristics of the New Zealand fishing industry?	Auckland Survey	Changes characteristics of participants are directly tracked. (e.g., question 5-12, 14,15, 25, 27) Perceptions of effects and change in perceptions are tracked. (e.g., 13A-Q, 16-18)
	Corporate Survey	Perceptions of effects observed in some questions (e.g., 8A-L, 9-13, 16, 18-20)
	Quota Owner Data	Changes in quota ownership provide direct evidence of some effects such as consolidation.
	Expert Interviews	Several interviews directly address this question.
	Historical Documents	Several reports directly address specific aspects of this question (e.g., consolidation); analysis of position papers, annual reports and government documents provide insights.
	Books and Articles	Some published academic articles or conference papers address part of this question. Other questions are addressed in books and articles written for a general audience or the fishing industry.
Question 4: How and Why have the conceptions of the property rights ITQs represent changes? What are the effects of these changing conceptions?	Auckland Survey	Not a major source of information. Questions 14-18, 33 may provide insights.
	Corporate Survey	Not a major source of information. Questions 9-12, 24 may provide insights.
	Expert Interviews	Several interviews directly address this question.
	Historical Documents	Documents, particularly position papers and annual reports, provide an important method to document changes over time. They document both policy change and changes in perceptions.
	Books and Articles	Books and articles document changes over time. Popular sources and tracking change in the presentation of QMS to the international academic community.
Question 4: What are the characteristics and origins of New Zealand's co-management approach? How likely is this approach to succeed?	Corporate Survey	Not a major source of information. Questions 11,12,14,15, & 24 may provide insights.
	Stakeholder Survey	A primary source of data for this question. Survey designed to extract group plans and expectation for how co-management will function.
	Expert Interviews	Several interviews directly address this question.
	Historical Documents	Document such as position papers and legislation trace the rise of co-management and describe how parties anticipate the approach will work.
	Books and Articles	Recent academic, industry and general publications illustrate perceptions of how approach developed and will work.

A Note on Methods

This dissertation is above all a case study. As such it is subject to methodological strengths and considerations of this approach. As is illustrated by many distinguished research projects, though. (Putnam's *Making Democracy Work* being a recent example) a case study has definite utility as it is possible to combine a several methods and data sources within it, enhancing the quality and importance of the work. In my search to answer the research questions described above, I am above all carefully thinking through the assumptions and implications of each step (as Sartori would put it, being a "conscious thinker"). For each research question, I have described multiple data sources – both multiple types of data and multiple sources within each data type – providing increased confidence in results. As described by Yin:

Every student knows the original derivation of the concept of triangulation: a point in geometric space may be definitively established by specifying the intersection of three variables ... This concept has been borrowed for dealing with social science evidence: The more robust fact may be considered to have been established if three (or more) sources all coincide. This type of triangulation is the most desired pattern for dealing with case study data ... An important clue is to ask the same question of different sources of evidence: if all sources point to the same answer, you have successfully triangulated your data (Yin, 1993: 69).

This approach and the use of multiple data sources, both qualitative and quantitative, allows me to examine New Zealand's fisheries management regime and the research questions raised in this chapter.

Appendix 3-1: 1999 Auckland Region Fishers Survey

1999 New Zealand ITQ Survey Protocol

Interview #: _____
 Date: _____

Respondent Characteristics

1. Are you still involved in commercial fishing? (If yes, go to Question 5. If no, go to Question 2.)
2. Why did you leave fishing?
3. What are you doing now?
4. How do you feel about your decision to leave commercial fishing?
5. How many fishing vessels do you use? _____

6. For this (these) vessel(s) are you:
 - _____ sole owner
 - _____ part owner
 - _____ non-owner (operator only)

7. For the vessel(s) you own(ed) or operate(d) what is (were)

	Vessel 1	Vessel 2	Vessel 3	Vessel 4	Vessel 5
Length					
Year Bought					
Year Built					

8. What fishing methods/gear do you use? What are the most important methods/gear?
9. Can you give me an estimate of the market value of your vessel, gear and equipment at this moment?
10. Can you give me an estimate of the market value of your quota holdings at his moment?
11. What are the primary species that you fish for?
12. Are you leasing quota (in or out)? What species? (Amount/place?)
 - A Why are you leasing quota (in or out)?
 - B (If leasing quota out) What do you do instead of fishing

General Impressions of ITQs

13. I'm going to read you a series of statements about New Zealand's ITQ system. Tell me whether you strongly agree, agree, disagree, or strongly disagree with each statement. (*Handout A*)

	SA	A	D	SD	?
A My economic condition has improved under ITQs					
B ITQs conserve the fish stock that I fish for					
C ITQs make fishing physically safer					
D ITQs are compatible with my beliefs about fisheries management					
E I feel more secure about my retirement under ITQs					
F ITQs make it more difficult for young people to get into fishing					
G Unemployment is a bigger problem under ITQs					
H The fishing industry is more efficient under ITQs					
I ITQs increase the enjoyment I get from fishing as a career					
J The New Zealand fishing industry is better off under ITQs					
K I am receiving adequate ITQs information to make sound business decisions					
L The ITQ information I receive is understandable					
M I have sufficient opportunities to comment on ITQ policy.					
N The ITQ policy development process is open to my involvement					
O There are opportunities to address problems and grievances within the ITQ system and MFish.					
P The ITQ system is responsive to the needs of the fishing industry					
Q The ITQ system makes it difficult for small fishers to successfully compete in the fishing industry					

Comments on Question #13

14. I am handing you another ladder. The bottom rung (-5) represents "much worse" 0 represents "same" and +5 represents "much better" what number best represents how you feel the ITQ fisheries management system compares to the previous methods used to manage New Zealand's inshore fisheries. (*see Handout B*)
15. Using the same ladder, what number best represents your situation under ITQs compared to your situation before ITQs
16. From your experience with ITQs, what would you consider to be the positive effects and successful parts of New Zealand's ITQs system?
17. From your experience with ITQs? What do you see as the principal problems with the ITQ system? Any solutions?
18. Has the level of cheating changed under ITQs? In what way?
19. To what extent is MFish and the ITQ system responsive to concerns of the fishing industry/community? (how would you describe the relationship between MFish and the industry? How much influence do you have on ITQ policy?)
20. To what extent does the ITQ system adjust to changes in the fisheries or the fishing economy? (what changes have you seen? What adjustments should be made?)
21. How have small fishers and owner operators fared under the ITQ system?
22. How have larger fishing companies fared under the ITQ system?

Individual Experience under ITQs (remind, all individual information is confidential)

23. Are you making changes in your fishing methods because of ITQs? What changes?
24. At this time are you:
 - _____ Increasing your financial commitment to fishing?
 - _____ Keeping your financial commitment to fishing about the same?
 - _____ Lessening your financial commitment to fishing?
 - _____ Getting out of the fishing business?

Are you experiencing any problems with maintaining or changing your commitment?

- 25 I'm handing you a ladder illustrating economic fishing conditions. The top (10) is best, the bottom (1) is the worst. (*Handout C*)

For your fishing business

Where on the ladder are economic fishing conditions today? _____

Where were they for the two years before the ITQs? _____

Where will they be five years from now? _____

For New Zealand's fishing industry in general

Where on the ladder are economic fishing conditions today? _____

Where will they be five years from today? _____

26. Now I have some questions about crew under ITQs

A Have you increased or decreased your crew numbers? Why?

B Have you changed how you pay your crew since ITQs? (e.g., wages, shares, quota cost sharing, etc)

27. I am handing you a card with fishing income ranges on it. Please tell me the letter of the amount that represents the total fishing production of your vessel(s) in 1998

(See Handout D)

A Less than \$5,000

B \$5,000 to \$9,999

C \$10,000 to \$19,999

D \$20,000 to \$29,000

E \$30,000 to \$39,000

F \$40,000 to \$49,999

G \$50,000 to \$74,999

H \$75,000 to \$99,999

I \$100,000 to \$199,999

J \$200,000 to \$299,999

K \$300,000 to \$500,000

L Over \$500,000

28. How did you get started in fishing? What are your future plans?

29. If for some reason you could not fish anymore, how long do you think it would take for you to get into another line of work?

_____ a few days

_____ a year or longer

_____ a few weeks

_____ never (couldn't do anything else)

_____ a few months

30. When you think about the quota trading,

A did you have enough information when ITQs were introduced to make sound business decisions about buying, selling, or leasing quota?

B do you have enough information today?

C Are the current aggregation limits appropriate and enforceable

31. How has the Maori (Waitangi) settlements effected your business?

32. How has recreational fishing effected your business?

33. Do you have any additional comments about ITQs and the state of fishing in New Zealand?

Appendix 3-2: 1999 New Zealand ITQ Company Survey Protocol

Interview #: _____

Date: _____

Respondent Characteristics

1. How many fishing vessels does your company use? What type? (E.g., trawler, longline)
2. What fishing methods/gear do you use? What are the most important methods/gear?
3. Can you give me an estimate of the market value of your vessel, gear and equipment at this moment?
4. Can you give me an estimate of the market value of your quota holdings at this moment?
5. Could you estimate for me (in dollars) your company's fishing production (i.e. gross earning) in 1998?
6. What are the primary species that you fish for?
7. Are you leasing quota (in or out)? What species? (Amount/place?) Why?

General Impressions of ITQs

8. I'm going to read you a series of statements about New Zealand's ITQ system. Tell me whether you strongly agree, agree, disagree, or strongly disagree with each statement. (*Handout A*)

		SA	A	D	SD	?
A	My company's economic condition improved under ITQs					
B	ITQs conserve the fish stock that my company fishes for					
C	ITQs make fishing physically safer					
D	ITQs are compatible with my beliefs about fisheries management					
E	ITQs make it more difficult for young people to get into fishing					
F	Unemployment is a bigger problem under ITQs					

G	The fishing industry is more efficient under ITQs					
H	The New Zealand fishing industry is better off under ITQs					
I	My company receiving adequate information about ITQs to make sound business decisions					
J	My company have sufficient opportunities to comment on ITQ policy.					
K	The ITQ system is responsive to the needs of the fishing industry					
L	The ITQ system makes it difficult for small fishers to successfully compete in the fishing industry					

9. I am handing you another ladder. The bottom rung (-5) represents "much worse" 0 represents "same" and +5 represents "much better" what number best represents how you feel the ITQ fisheries management system compares to the previous methods used to manage New Zealand's inshore fisheries. (*see Handout B*)
10. Using the same ladder, what number best represents your company's situation under ITQs compared to your situation before ITQs
11. From your experience with ITQs, what would you consider to be the positive effects and successful parts of New Zealand's ITQs system?
12. From your experience with ITQs, what do you see as the principal problems with the ITQ system?
13. Has the level of cheating changed under ITQs? In what way?
14. To what extent is MFish and the ITQ system responsive to concerns of the fishing industry/community? (how would you describe the relationship between MFish and the industry? How much influence do you have on ITQ policy?)
15. To what extent does the ITQ system adjust to changes in the fisheries or the fishing economy? (what changes have you seen? What adjustments should be made?)

Corporate Experience under ITQs (all individual information is confidential)

16. Has your company made any changes in your fishing methods because of ITQs? What changes?
17. At this time are you:
 - _____ Increasing your financial commitment to fishing?
 - _____ Keeping your financial commitment to fishing about the same?
 - _____ Lessening your financial commitment to fishing?
 - _____ Getting out of the fishing business?

Are you experiencing any problems with maintaining or changing your commitment?

19: I'm handing you a ladder illustrating economic fishing conditions. The top (10) is best, the bottom (1) is the worst. (*Handout C*)

For your fishing business

Where on the ladder are economic fishing conditions today? _____

Where were they for the two years before the ITQs? _____

Where will they be five years from now? _____

For New Zealand's fishing industry in general

Where on the ladder are economic fishing conditions today? _____

Where will they be five years from today? _____

20. Now I have some questions about crew under ITQs
- A Have you increased or decreased your crew numbers? Why?
 - B Have you changed how you pay your crew since ITQs? (e.g., wages, shares, quota cost sharing, etc)
21. When you think about the quota trading.
- A did you have enough information when ITQs were introduced to make sound business decisions about buying, selling, or leasing quota?
 - B do you have enough information today?
 - C Are the current aggregation limits appropriate and enforceable
22. How has the Maori (Waitangi) settlements effected your business?
23. How has recreational fishing effected your business?
24. What are your company's future plans?
25. Do you have any additional comments about ITQs and the state of fishing in New Zealand?

Handout A: Thoughts about ITQs

Please tell me what you think of each statement about ITQs:

strongly agree

agree

disagree

strongly disagree

don't know

Handout B: ITQ management comparison

Comparison of ITQ fisheries management system with previous system

+5	Much Better
+4	
+3	
+2	
+1	
0	Same
-1	
-2	
-3	
-4	
-5	Much Worst

Handout C: Economic Fishing Conditions

Economic fishing conditions ladder:

10	Best
9	
8	
7	
6	
5	
4	
3	
2	
1	Worst

Appendix 3-3: 1999 New Zealand Stakeholder Group Survey⁷³

Code # _____

1999 Survey of Fisheries Stakeholder Groups

Thank you for participating in this survey. Your response will help build an understanding of the nature and role of stakeholder groups in New Zealand fisheries management. All the information you provide will be kept confidential. Results will be presented in aggregate (e.g., "25% of stakeholder groups have less than 50 members") or will not be attributed to specific groups (e.g., one group stated "the 1999 Fisheries Amendment Bill is an important opportunity.") If you need additional space, please continue on a separate piece of paper. Also, if you have any documents that would help me understand how your stakeholder group works, I would be grateful to receive copies.

Contact Information:

Group Name _____ Contact Name _____
Address _____ Phone Number _____
_____ E-mail Address _____

Stakeholder Group Characteristics:

1. What stakeholders does your stakeholder group represent? (e.g., snapper fishers in QMA 1) _____

2. When did your stakeholder group start? _____
3. How was your stakeholder group formed? _____

4. Who is eligible to be a member of your group? (e.g., corporations, owner-operators, quota owners, quota leasees, non-fisher) _____
5. How many members does your group have? _____
Of these members, how many are:
corporations _____ owner operators _____
quota owners _____ quota leasees _____
non-owners _____ other (please describe) _____
6. How is your stakeholder group managed? (please tick all that apply)
Professional staff (working only for stakeholder group) _____
Volunteers _____
Professional staff (with other duties) _____
Other (please describe) _____

Stakeholder Group Responsibilities

7. Stakeholder groups can have a variety of responsibilities. For each responsibility listed below, please tick whether your group has this responsibility now, or plans to it on in the future.

⁷³ Due to space constraints and difference between A4 and 8.5x11 paper, formatting of this survey is not exactly as presented here.

	Do this now	May do in a year	May do in 2 years	May do in 5 years	Do not plan to do this
A Encouraging communication in stakeholder group					
B Providing a single unified voice for your stakeholders					
C Placing rules or guidelines on harvesting or selling (e.g., tagging, gear restrictions)					
D Undertaking activities to enhance fishery production (e.g., seeding)					
E Monitoring the condition of the fishery (e.g., scientific log program)					
F Monitoring fishing activity of members (directly or through hired personnel)					
G Imposing penalties on members for breaking group rules					
H Imposing penalties on members for breaking fishing law					
I Providing a mechanism to resolve conflict between members					

If you ticked that you presently have any of these responsibilities, please describe how your group:

A Encourages communication in stakeholder group: _____

B Provides a single unified voice for stakeholders: _____

- C Places rules or guidelines on harvesting or selling: _____

- D Undertakes activities to enhance fishery: _____

- E Monitors the condition of the fishery: _____

- F Monitors fishing activity of members: _____

- G Imposes penalties on members for breaking group rules: _____

- H Imposes penalties on members for breaking fishing law: _____

- I Provides a mechanism to resolve conflict between members: _____

8. Stakeholder groups can be organized and make their decisions in a variety of ways. Please describe who has the right to vote in your stakeholder group (e.g., quota owners) and how votes are weighted (e.g., one license = one vote, one quota ton = one vote). _____

9. Is voting restricted to quota owners? _____ Yes _____ No

10. Can non-owning fishers vote? _____ Yes _____ No

11. Can non-fishers vote? _____ Yes _____ No

12. What role (if any) do recreational fishers play in your stakeholder group? _____

13. What role (if any) do environmental groups play in your stakeholder group? _____

14. What role (if any) do customary Maori interests play in your stakeholder group? _____

15. Does your stakeholder group negotiate with any groups representing recreation fishers, environmental interests, or customary Maori interests?

_____ Yes _____ No

If yes, please describe how these negotiations take place. _____

16. Does your stakeholder group have smaller organizations within it?

_____ Yes _____ No

If yes, please describe their responsibilities, and how these responsibilities are different from your stakeholder group's responsibilities. _____

17. Is your stakeholder group part of any larger organization (e.g., SeaFIC)?

_____ Yes _____ No

If yes, please describe their responsibilities. _____

Stakeholder Groups in the Future

18. What are the biggest challenges or problems you see your stakeholder group facing? _____

19. What role do you anticipate SeaFIC playing in the future management of your fishery? _____

20. What role do you anticipate the Ministry of Fisheries playing in the future management of your fishery? _____

21. May I contact you if I have further questions?

_____ Yes _____ No

22. Would you like to receive copies of the results of this study?

_____ Yes _____ No

Thank you for participating in this survey!

Please return the survey in the enclosed envelope by August 31, 1999

Chapter 4: Development and Change in the New Zealand Fishing Industry

Introducing quota management was like shoving the industrial revolution through the fishing industry in a few years

-- Daryl Sykes

Introduction

As is discussed in Chapter 2, a broad and rich literature on common-pool resources, property rights, fisheries management, and policy development, raises questions and hypotheses on a variety of issues surrounding market-based Individual Tradable Quota (ITQ) management systems. New Zealand introduced its Quota Management System (QMS) in 1986. Thus, New Zealand is one of the earliest nations to introduce an ITQ system for managing its marine fisheries.⁷⁴ As such, New Zealand presents a useful opportunity to study the influence of the ITQ management approach.

In New Zealand, there is a long history of involvement in the fishing industry, but one restricted to a relatively small proportion of the population. As a nation, New Zealand had little interest in fisheries management. Indeed, looking in two prominent history books I found no discussion of fishing or the fishing industry, but over 30 index references to farming (Barber, 1989; Sinclair, 1997). Similarly, when the government publicized New Zealand's primary industries, it tends to focus on the agriculture, horticulture, timbering (forestry) and tourism that make up a much larger proportion of the nation's economy⁷⁵. One must go to the fishing industry's main lobbying organization (the New Zealand Seafood Industry Council – SeaFIC) to learn that

⁷⁴ Individual Tradable Quotas (ITQs) refers to the broad policy of using tradable quotas as a method of regulating an activity such as fishing. Quota Management System (QMS) refers specifically to New Zealand fisheries management system.

⁷⁵ For example, in 1998, dairy accounted for 18% of exports, meat for 13%, and forestry for 6% (SeaFIC)

\$NZ1.23 billion in exports (5.5% of total exports) is earned from fishing (SeaFIC). This chapter presents New Zealand as a case, first providing some historical background and context, then exploring how and why QMS was adopted. This is followed by a description of QMS and important changes that led to its current form.

History of New Zealand Fishing: The Maori to 1945

While fishing has not played a large role in New Zealand's national history, when one digs below this surface, a dynamic history of fishing has a significant impact on the both the fishing industry and fishing policies today. This history begins with the Maori⁷⁶ and continues through European arrival to the present day. Perhaps the very first reference to fishing comes from the Maori creation myths.

Maui, in spite of his timid brother's fears, pulled up the fish that bears his name. The Maori say the Fish of Maui is New Zealand ... The Maori people say that the north island of Aotearoa, which is certainly much shaped like a fish, is Te Ika a Maui; and according to some tribes, the south island is the canoe from which he caught it. And his hook is the cape at Heretaunga once known as Temataua Maui, Maui's fishhook (Alpers, 1964: 50-57).

At the time of European arrival, fishing was an important part of Maori culture.

Originally, fish traps and nets (including some seine nets up to 1000 meters long by 10 meters deep) were made from flax (Makarios, 1996: 7). Later, metal fishhooks were popular in trade with the Europeans. (Orange, 1997: 26). One early historical accounts of the Maori note "Every fish found in the surrounding sea is eaten by the natives, except

⁷⁶ New Zealanders of Eastern Polynesian origin first landed in New Zealand some time after 400 AD (Sinclair, 1997: 2). I use the term "Maori" to refer to these people and the term "European" to refer to the people from Great Britain and Europe who arrived in New Zealand since the late 18th/early 19th century. The term "European" is used rather than "Pakeha" because some Europeans consider this term derogatory (although there is considerable debate over this), and all ethnic groups have the right to self-identification. (Garland, 2001) "New Zealander" is a generic term for citizens of both ethnic groups. Similarly, the term "New Zealand" is used rather than "Aotearoa" because it is the most commonly recognized internationally.

the shark ... their success in fishing, are indirect proofs that much of the ancient food of the people is derived from this source" (Thomson, 1859: 152-153).

Fishing and development of the fishing industry was not restricted to the Maori. Indeed, by 1937 it appears that the Maori continued subsistence fishing, but were not involved in commercial fishing: "Coastal Maoris still regard the sea as the most important source of food-supplies: and although the dug-out canoe has given place to the dinghy or motor-launch ... [t]he Maori, however is rarely seen among those who now follow the professional fisherman's occupation"(Hefford, 1937: 74). There is a continuing history of European involvement in the fishery. Towns and regions such as Bluff, Timaru, Island Bay, Paramata, Tauranga, and the Hauraki Gulf were known as fishing communities, and at the turn of the century, fishing companies began to form.⁷⁷

Government regulation of commercial fishing began in 1877 when the Marine Department first administered the Fish Protection Act of 1877. This act was passed in response to concerns over damage caused by drag netting of sole and flounder in spawning. For approximately the next century, fishing policy followed two conflicting goals. It worked to conserve the fisheries through size and gear limit, then later (1903) through licensing restriction and reporting requirements.⁷⁸ Yet at the same time, the government also intervened to promote a second goal⁷⁹: the development of the fishing industry through export incentives, experimental trawling (to map new fishing grounds) subsidies and government-supported loans (Martin, 1969: 113-115; Slack 1969). In these early decades of the fishing industry, export was at times discouraged. It was

⁷⁷ For example, Sanford formed in 1904 (Makarios, 1996; Titchener, 1981).

⁷⁸ E.g., Fisheries (Dynamite) Act 1878, Fisheries Conservation Act 1884, Fisheries Amendment Act 1903, Fisheries Act 1908, Fisheries Amendment Act 1945.

⁷⁹ E.g., Fisheries Encouragement Act 1885, Fishing Industry Promotion Act 1920, Industrial Efficiency Act 1936, Fisheries Amendment Act 1963. A good summary of this legislation is found in Slack, 1969.

viewed as a somewhat frivolous use of a limited resource that should be kept for within-nation benefit (Slack, 1969).

A detailed understanding of the last century of fisheries regulation is not necessary to understanding the current fisheries policy, however, an understanding of the last few decades is necessary to understand the context in which QMS operates. The logical point to start this more detailed examination is in 1945 when the end of World War II and the implementation of a new fisheries management system coincided. During the War, the fishing industry was severely curtailed, with not only a large proportion of the workforce enlisted but also much of the fishing fleet mobilized for the war effort during World War II (Makarios 1996).

History of New Zealand Fishing: 1945 to QMS⁸⁰

With the end of the war, an increase in fishing effort was anticipated, and at the same time, concerns for fisheries conservation (which had been growing throughout the late 1930s and early 1940s) were codified in the Fisheries Amendment Act 1945. This Act vested regulatory authority in the Marine Department, and created restriction by introducing port licenses. These not only restricted the number of boats in each port but also which restricted each commercial fishing boat to a single fishing area – usually a single port. Fishers could only operate and land in the port for which they were licensed. Local port authorities were given the authority to distribute licenses. In so doing they were to consider conservation concerns and the needs of former servicemen seeking employment (Slack, 1969: 13-14). It appears that area closures also came into use at this

⁸⁰ See Table 4-1 for a summary of government activity between 1945 and 1986.

time, as the partial closure of the Hauraki Gulf around 1950 is the first reference I found to the use of this management technique (Dibble, 1954: 6).

This approach was criticized for reducing efficiency in the industry as both the number of fishers and their movements were restricted, thus reducing competition and fishers' ability to work in different grounds as weather and seasons changed (Morris, 1968:133; Sutch, 1962: 31). However, it is also reasonable to argue that this policy strengthened local fishing institutions as port-based fishing management organizations maintained control of the local fisheries.⁸¹ The vestiture of power in the port authorities could also help explain New Zealand's continued emphasis on the inshore and near-shore fisheries that were easily managed by this system: while government involvement in offshore fisheries was restricted to a minimal level of exploratory trawling.

Table 4-1: Timeline of Major Fishing Laws and Regulations 1945 to 1986

Law/Regulation	Description
Fisheries Amendment Act 1945	"Port licenses" that restricts fisher to specific ports. local port authorities restrict and distribute licenses.
1957 Extension of Territorial Limits	New Zealand Territorial Limits expanded from 3 miles to 12 miles
Fisheries Amendment Act 1963	Power removed from port authorities. Open licensing system with no cap on number of licenses or fishing areas. Essentially, fisheries are open access.
Fishing Industry Board Act 1963	Created the Fishing Industry Board as a government board with the power to raise levies for the purpose of marketing, industry coordination, and improved government relations
1977 License and Gear Limits	As concern over state of inshore fishery grows Ministry gets power to declare fisheries "controlled," and then put license and gear limits in place
Territorial Sea and Exclusive Economic Zone Act 1977	Economic Exclusion Zone extended to 200 miles. Government and industry begin to explore deepwater fisheries

⁸¹ This could be the case, as a fair number of the "old time" fishers I interviewed mentioned the influence of the port authorities. But my historical research revealed almost no documentation of port authorities and their influence. However, this should not be seen as authoritative since the history of port authorities was not a primary focus of my research.

1976-1979 Government Budgets, 1977 Incentives	Deepwater fishing vessels may be purchased duty-free Joint ventures with foreign companies encouraged (MAF annual report 1978) This is supplemented in 1977 with a series of loans, grants, and saving schemes designed to encourage industry investment inshore and deepwater
1982 inshore emergency	Moratorium on new inshore fishing licenses declared
1983 "New Zealandization"	Program encouraging New Zealand fishing of deepwater fishery begins, allocating companies a proportion of TAC based on investment, catch, and processing.
Fisheries Amendment Act 1983	Licenses of part-time fishers rescinded, fishery management plans tailored to specific fisheries authorized (but never implemented due to 1986 legislation).
Fisheries Amendment Act 1986	Quota Management System (QMS) introduced in inshore fisheries. Deepwater allocation incorporated into QMS.

The Fisheries Amendment Act remained in place until 1963, but during this time considerable change took place in the fishing industry. While the Marine Department was following this policy, external events were beginning to change the face of the fishing industry. According to Slack (1969) one important influence was L.R. Richardson, a marine biologist who found large amounts of pelagic and other species that were not being exploited. He began advocating for a considerable expansion of the industry. At the same time, and probably more importantly, Japanese fishing boats began to first explore (in 1956) and then fish within New Zealand's continental shelf. By 1959, Japanese boats were regularly fishing in New Zealand's waters (Titchener, 1981: 100). As a result of these incidents, in 1957, New Zealand declared its 12-mile limit on foreign vessels. Minimal amounts of snapper (which was the primary domestic market) could be caught 12 miles out. So, as the large domestic companies stepped in to "fill the gap" left by the Japanese fishers, they began to explore the export market as a revenue source for these "new" deeper water species.

As a result of these changes in conditions and priorities, a parliamentary committee was formed in 1961 to explore fisheries reform. A report was filed in 1962, and in 1963 legislation was passed radically changing the industry. As a result of this report, the Fisheries Amendment Act of 1963 was passed repealing the 1945 Act and introducing an open registration system in which there was no cap on the number of licenses granted. Also, the Fishing Industry Board (FIB) Act of 1963 was passed, creating the FIB with the goals of: increasing economic productivity, encouraging domestic and international marketing, increasing coordination between the industry and government, and encouraging the expansion of the fishing industry. The FIB was made an official government board – meaning that it had the power to support itself through raising levies. It lacked, however, the power of some boards created at this time (such as the Dairy Board) to be the sole exporter and marketing agent for the entire industry.

Inshore Developments

The passage of these two acts represents an enormous upheaval in the fishing industry – one that was perceived at the time as great a change as the introduction of QMS was considered some 20 years later. For the near-shore fisheries, protections that had limited competition both in the number of fishers and where they could fish were removed. This effectively increased the pressure on both the fishermen and (as would be seen later) the fish. Discussion of the changes at the time described how “the fishing industry has undergone what could literally be termed a revolution” and how before the 1963 Act “with restricted licensing in effect in New Zealand ports there was literally no competition” (Morris, 1969: 133). Concerns over the state of the fish stock in the near-

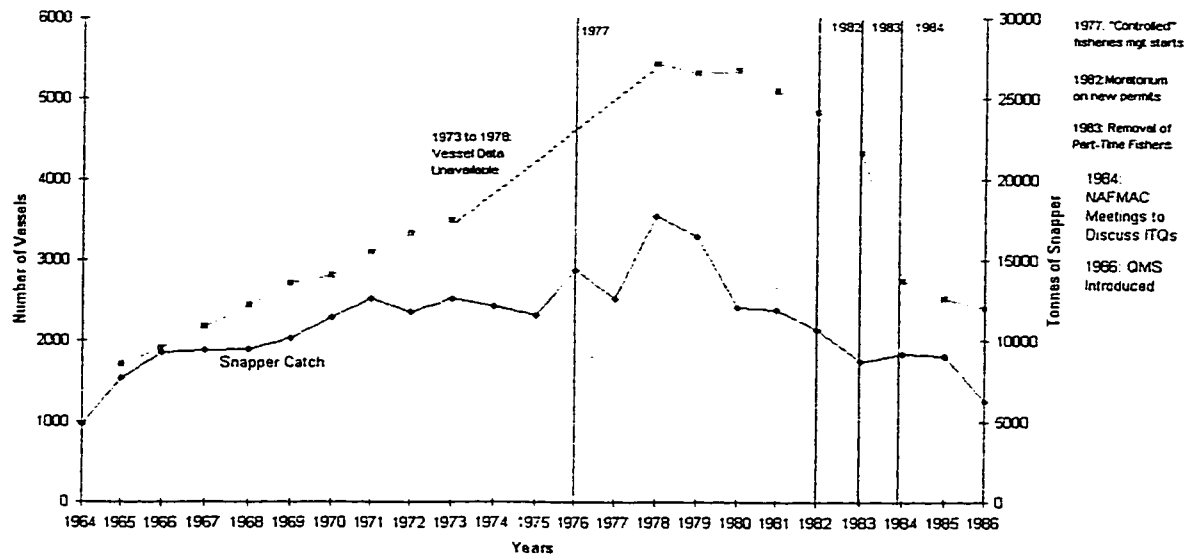
shore fisheries were also raised quite early (Crapper, 1969; Jennings, 1969). This concern would later come to dominate the near-shore fishing industry.

In spite of these concerns, over most of the next fifteen years, this open-access policy continued. Indeed, during the 1970s and early 1980s, entry into the industry and expansion was encouraged with a variety of government-supported loans, tax concession, grants, savings schemes, export incentives, and training incentives (Catch, 1977; MAF 1980). During this time, the number of licensed commercial fishermen operating inshore and the number of registered commercial vessels rapidly increased, and with that, the pressure on the inshore fish species also increased dramatically. This dynamic is illustrated in Figure 4-1, where the catch of one of the primary inshore catches is plotted against domestic vessel registry. Pressure also increased as the power and capacity of the fishing vessels increased. "Since 1945 the average size of trawlers has increased from 12 to 16 meters and from 16 to 26 gross tons. Engine power has risen from an average of 40 bhp to 150 bhp" (Department of Statistics 1980: 412).

In these conditions, many inshore species were under considerable pressure. In one dramatic case, national commercial landings of snapper (an economic mainstay) "plummeted from 17,660 in 1978 to 8,729 in 1983" (Ministry of Agriculture and Fisheries (MAF), 1984: 5). There were several responses to this pressure. First, in 1977, the Ministry was authorized to declare specific fisheries "controlled." (Department of Statistics, 1981) Once a fishery was "controlled," the Ministry could place restrictions such as moratoriums on issuing new licenses for specific species (Clark et al, 1988: 326) and gear limits

(Watkinson, 1976: 9-14). Then in 1982, a moratorium on all new fishing permits was enacted (MAF, 1984: 27). But the pressure on the inshore fisheries continued to increase. Figure 4-1 illustrates the interaction of increased pressures, fish stock change, and changes in regulations.

Figure 4-1: Snapper Catch and Effort 1963 to 1986⁸²



Deepwater Developments

In the deepwater fisheries, a different story was unfolding. As described by one observer, “The fact that the Japanese found it worth while to steam thousands of miles to fish New Zealand waters pointed to the real or potential value of the fisheries” (Waugh, 1969: 77). In 1957, New Zealand had extended its territorial limits to 12 miles, and some extension of the fishing industry (particularly into the export markets) began. Then in 1963, de-licensing was introduced, in part to encourage the development of offshore fishing.

⁸² Data Sources: 1964-1973 = Marine Department Annual Reports. 1975 to 1986 = New Zealand Yearbooks. For snapper catch, 1974 = average of 1973 and 1975. Vessels = all registered domestic commercial fishing vessels.

In 1977, the Territorial Sea and Exclusive Economic Zone Act was passed extending New Zealand Economic Exclusion Zone (EEZ) to 200 miles. For several years, the Japanese, Korean, and the USSR heavily fished this region, but not by the local New Zealand fleets. As a result, a foreign market had already developed for New Zealand fish, port facilities were available to support factory trawlers, but New Zealand boats were not fishing this region (Bradstock, 1979). Indeed, New Zealand companies did not own a single factory trawler prior to the 1977 Act (Jarman, 1978: 9). One Ministry report would later describe the situation this way: “[F]ew New Zealanders had ever fished the waters over which we claimed control, local vessels and shore processing facilities were not equipped to handle the fish species involved and MAF had only a superficial knowledge of the fish resources available” (MAF, 1982:25).

Many of these vessels operated under “licensed fishing” arrangements in which government-to-government agreements between New Zealand and Japanese, Korean, and the USSR governments allowed vessels from these countries to be licensed in New Zealand. But the catch belonged to the fishing vessels’ nation. New Zealand companies had no role in these fishing operations. In addition, The Government also allowed ventures in which New Zealand companies had minimal investment in vessels or processing facilities, but could charter the foreign vessels and crew to fish within the EEZ (Scott, 1982). However, this approach (labeled “joint ventures”) gave the New Zealand companies minimal control over the fishing, pricing, and other aspects of the business. It also resulted in relatively little benefit, as fishing boats were usually foreign owned, with foreign crew and the majority of processing taking place at sea.⁸³

⁸³ Information on licensed fishing and joint ventures is based on Norris, 2001.

These efforts were part of economic development efforts that took place during the late 1970s. In addition to the policies discussed above, the New Zealand government encouraged development of New Zealand's deepwater capacity by allowing duty-free importation of large fishing vessels, as well as the same range of subsidies offered inshore fishers⁸⁴ (Catch, 1977; MAF 1980). For a limited period of time, the industry also received price supports on some deepwater species (Scott, 1982: 39).

Both licenced fishing and joint ventures allowed most of the economic productivity of the fishing grounds to be captured by foreign fishing fleets, rather than the New Zealand fishing industry. So, the Government developed a "New Zealandization" program in which domestic companies were encouraged to work cooperatively with foreign fishing venture with the goal of training New Zealand companies and crews to eventually take over (Department of Statistics, 1981: 416). The first of these ventures was approved in 1978 (Department of Statistics, 1982: 426).

Efforts to manage the charter fishing and joint ventures used an administrative system of setting Total Allowable Catch (TAC). Under this approach, the government set a TAC based on the existing catch. Quotas were then assigned to classes of fishers e.g., domestic, joint venture, foreign (MAF, 1980: 28). These quotas were assigned to large groups of fishers, and were not transferable (MAF, 1980: 28). But they are the first use of TAC and quotas that I found in government records.

⁸⁴ The incentive plans (tax incentives, subsidized loans, price supports, and joint ventures) can be thought of as part of the Muldoon Government's larger "Think Big" policy. This policy (driven by the development literature) involved government promotion of capital-intensive industries that it hoped would propel growth in the rest of the economy. The most infamous of these "Think Big" programs was one that made synthetic gasoline and would not break even until oil hit \$25/barrel, which was half the predicted cost of oil at the time. (Easton, 1997: 18-19)

Later⁸⁵, the allocation of quota under the “New Zealandization” program changed. Under the new arrangement, the Ministry allocated proportions of the TAC to the New Zealand companies that had been involved in joint ventures based on investments in vessels, processing, amount of catch, and percent of catch processed on shore. Allocations were made annually. Quotas had limited transferability, and recipients could trade quota among themselves. But it was not fully tradable and there were no long-term rights (Norris, 1999). This management approach continued in the deepwater fisheries until 1986, when the allocation system was integrated into the QMS. Thus, it can be argued, the first use of an ITQ-like system in New Zealand grew out of an administrative effort to encourage development of a fishing industry, rather than an effort to control excess effort.

Introduction of QMS

How and why QMS was introduced to New Zealand is an interesting question that is worth exploring⁸⁶. Here, I briefly explore two competing explanations that dominate the understanding of why QMS was adopted, and offer my own interpretation.

Dominant Explanations

The most often offered explanation is that QMS arose rapidly out of the inshore fishery crisis of the early 1980s (E.g., Clark, et al. 1988, Boyd, 1999; Shirley, 2000a.). Another explanation is that QMS arose out of the successful use of a quota-based system to manage the deepwater fisheries (e.g., Norris 1999, Wood, 1999). Under this second explanation, the deepwater quota system (described in the previous section) provided a

⁸⁵ Norris (1999) dates the change to 1982. Craig (1999) dates the change to 1984.

⁸⁶ Indeed, in future research, I plan to use introduction of QMS as a case to explore questions raised in the innovation literature.

successful model for quota management, and thus the credibility and impetus needed to adopt QMS nation-wide.

Returning to the first argument: others trace the beginning to the stock crisis in the inshore fishery (e.g., Clark, et al. 1988, Boyd, 1999). The extent of this crisis and the actions taken through 1982 to avert depletion are described above. However, these actions were not enough. In 1983, new legislation rescinded the licenses of part-time fishers (those making less than \$5000 per year).⁸⁷ This legislation also introduced the concepts of detailed fisheries management plans for specific fisheries.

According to this view, however before these plans could be implemented, they were abandoned in favor of the QMS approach. A series of meetings were held in 1984, during which inshore fishers were consulted and agreed that an ITQ-based system was the best approach for managing New Zealand's inshore fishery crisis. As a result, the Fisheries Amendment Act of 1986 was passed. In October 1986, QMS was introduced to the inshore fishery, and the deepwater fishery TAC system was transferred into the QMS.

An Alternative Explanation

While both these arguments have merits, an in-depth examination suggests an expanded explanation that incorporates aspects of the two previous arguments. First, it should be noted that discussion of either ITQs or ideas similar to ITQs is a theme running through the Annual Reports of the Fishing Industry Board (summarized in Table 4-2) as early as 1973 – roughly 13 years before QMS was implemented and more than 10 years before public debate.

⁸⁷ See Appendix 4-2 for a discussion of the full impact of this policy.

Table 4-2: Summary of Fishing Industry Board (FIB) Discussion Of ITQ-Based Management as Presented in FIB Annual Reports

Document	Statement
Fishing Industry Board (FIB) Annual Report 1973 (p.5)	"For some time now many industry members have been advocating a critical examination of resource management practices in order to ascertain whether or not there should be a radical change in management policies. Under the system of free entry ... which followed de-licensing in 1962, there has been a considerable increase in fishing pressure and there is a growing feeling that during 1973 and 1974 a revision of this free entry policy may be necessary in regard to the paua, eel, rock lobster, and wet fish sections of the industry"
FIB Annual Report 1974 (p.14)	"New Zealand has long accepted land tenure and private ownership of what is probably our greatest resource, namely, productive land. There will need to be a new approach to the productive areas of the sea if the production of fish and fish products is to enter successfully the transitional stages between a hunting and a farming industry."
FIB Annual Report 1979 (p.7)	"Fishermen and fisheries scientist have indicated their fears that over fishing is taking place ... There remains considerable concern ... that any form of control which could reduce this problem would bring the industry back to the restrictions which applied under the licensing system prior to 1962. There is increasing dialogue between the industry and the Ministry and it now appears possible that some appropriate measures may be available which will protect the resources and those exploiting them without constraining them within a rigid licensing system."
FIB Annual Report 1982 (p.15)	"Board staff have conducted extensive investigations of systems applied elsewhere, and it is considered that one developing concept, that of management by individual allocation, should be carefully considered by industry, Board, and Government. ... The concept relates to the allocation of individual quotas or private property rights to fish resources, and is no different from what happens with almost all other primary resources such as forestry, farming, and mining. ... In the interest of debate and informed comment on this very important concept, the Board brought to New Zealand Lee Anderson from the University of Delaware. ... During his visit to New Zealand he held seminars for the industry and Government officials, which contributed to a greater appreciation of the objectives of fisheries management and a recognition that the principal goal must be the efficient economic use of resources."
FIB Annual Report 1983 (p.7)	"An increasing number in the industry are coming to the view that following a reduction in effort, consideration must be given to transferable boat quotas as has been done in the deepwater fishery. This could provide the stable basis needed for the inshore industry to prosper, new fishermen to enter the fishery, and older fishermen to obtain some return for their investment on their retirement."

FIB Annual Report 1984 (p.4-5)	"There is a growing support for the concept of individual transferable quotas as part of a long-term management strategy – they are already working in the deepwater fishery and have obvious potential for the inshore fishery. But despite much analysis, work, discussion, and communication, this situation has not changed over the past twelve months, since the mechanisms needed to resolve the problems have not yet been put in place."
--------------------------------	---

The key point about these reports is that they show a long-term discussion of ITQ management among high-level members of the industry and government. They also show an advocacy of this approach on the part of the industry organizations that both had a regulatory mandate to work with the government and were more closely associated with the interests of the larger fishing companies than the owner-operators.⁸⁸ This is also confirmed by subtle details of the recollections of those involved in or observing the process – even if they personally offer one of the explanations describe above. For example, Boyd (1999) notes that before introducing QMS, they “went through three years of consultation to appease and address questions and concerns.” Similarly, Blanshard (1999) notes “the first mutterings [of QMS] started around 1983.” And Ashby (1999) notes “QMS was first talked in 1978 about when snapper started to decline.”

This exploration suggests that the adoption of QMS was a long-term proposition that probably did not spring solely from the deepwater fishery experience or the 1980s inshore fishery crisis. Instead, I argue, the adoption of QMS was the result of a long-term evolution in thinking throughout the industry that was influenced (at least in part) by the dominant academic advice of the time (e.g., Lee Anderson). The origins of this thinking can be traced back at least as far as the FIB in the early 1970s. This thinking gathered

⁸⁸ The New Zealand Federation of Commercial Fishermen (NZFCF), which represented owner-operators, had a seat on the FIB, but the FIB was viewed as more representative of the larger interests. (e.g., Stevens, 1999)

strength over time, and with the successful adoption of a similar approach in the deepwater fishery⁸⁹ it gathered momentum – particularly among the larger companies that dominated the deepwater fishery. When the inshore fishery crisis hit in the early 1980s (see Figure 4-1), the industry leaders were unsympathetic to traditional input controls, and began pushing for an ITQ based system like QMS. (See summary of FIB 1982 Annual Report in Table 4-2.) The election of the Lange government and the subsequent embracing of market-oriented policies provided the window for QMS to be promoted to the rank and file⁹⁰ then with their support be passed into law in the Fisheries Amendment Act of 1986. Thus, both explanations for the adoption of QMS (inshore crisis and deepwater-inspired evolution) identify important aspects of their adoption, and when combined with a lengthened timeframe offer what I believe is a more complete explanation of why QMS was adopted in 1986.

Intellectual Origins of QMS

This addresses what organization led the movement to adopt QMS, but another question is who provided the intellectual leadership behind the adoption of QMS. During expert interviews two competing explanations arose: Treasury and the FIB.

- ◆ “The FIB sold the idea of QMS. I fought for buybacks, and ended up with buybacks of catch history [rather than of boats]” (Stevens, 1999)
- ◆ “Quota came in as part of the Labour government changes in 1984. They wanted it in by 1985 but the timeframe was too short for the Ministry to handle, thus it was invoked 1 October 1986.” (Ashby, 1999)
- ◆ “FIB was behind much of it [introduction of QMS]. ... They may have promoted it to Treasury, etc.”
- ◆ “The intellectual leadership for the economic reforms commenced in the mid 1980s and came mainly out of the policy team at Treasury that included Wilkinson, Kerr, Scott, Bushnell, etc. The QMS was a small part of the overall economic reform

⁸⁹ In many ways it is quite ironic that this free-market based approach gathered much of its support from a program that started in the government interventions of the “Think Big” era.

⁹⁰ This process is discussed in detail in the “Adopting and Implementing QMS” section.

agenda. The specific intellectual concepts of QMS came out of North America from the works of Anthony Scott, Peter Pearce, and Lee Anderson. These concepts were promoted by the Fishing Industry Board (Phil Major, Alex Duncan) and the Ministry of Fisheries (John Belgrave, Ray Dobson, and Ian Clark)" (Crothers, 1999)

- ◆ "The thinking was that we had to try something new, like Lee Anderson's ideas. ... Original goal was to start in October 1984, but we missed that goal. It was not a Labour program." (Norris, 1999)
- ◆ "Treasury did not have much of a role. At the time of QMS, they didn't have their head yet." (Blanshard, 1999)

Both the Treasury and the FIB explanations have considerable credibility. Looking first at Treasury, QMS fit into the intellectual and political atmosphere of the times. When Lange's Labour government was elected in 1984 the country was in the grips of a recession. The new Government faced a budget deficit, balance-of-payment problems, bloated state-owned corporations (such as the railway and a postal banking system), and an immediate currency crisis. In response to these challenges, the Government exposed New Zealand to the marketplace by: floating the New Zealand dollar, removing subsidies, and privatizing many state-owned corporations.⁹¹ There is also considerable evidence that the Treasury was the intellectual leader behind this opening of the economy.⁹² Indeed, many would consider this statement "common knowledge". Furthermore, Lange's new government (which was when Treasury gained its dominant role) also coincides with when the concept of ITQs was introduced to the rank and file of the fishing industry.

However, there is also considerable evidence to support the FIB argument. First, a larger number of the experts interviewed supported this explanation than the Treasury

⁹¹ See Easton, 1997; and Boston & Holland, 1987 for a detailed discussion of the Fourth Labour Government

⁹² Many books and articles have been published about this within New Zealand. Perhaps the compelling of these is the chapter "The Treasury: Philosopher-Kings for Commercialism" in Easton, 1997. Additional sources on this topic include: Dalziel, 1991; Easton, 1989; Easton, 1990; Jesson, 1985; and Boston & Holland, 1987

explanation. Furthermore, there is the extended documentary record (see Table 4-2) of FIB's evolving support for a program such as QMS dating back as far as 1973. But a key piece of the puzzle is the FIB bringing Lee Anderson⁹³ to New Zealand in 1982 – two years before Labour's election and Treasury's ascendancy. The FIB Annual Report of that year notes:

During his [Lee Anderson's] visit to New Zealand he held seminars for the industry and Government officials, which contributed to a greater appreciation of the objectives of fisheries management and a recognition that the principal goal must be the efficient economic use of resources. (FIB, 1982: 15)

Since Anderson made presentations to a variety of Government officials concerned with fisheries management, it would be reasonable to conclude that during this visit, he may have met with Treasury officials concerned with this industry. Even if he didn't, directly meet with them, it is likely that a group such as Treasury would be up to date on recent theories and policy proposals – especially those coming from the economic tradition (in which many Treasury analysts had their undergraduate or graduate training). Based on this evidence, I would suggest that the idea of adopting ITQs in New Zealand came primarily from the FIB, but it also found an early intellectual home in Treasury. When the Labour Government came to power, it created an intellectual and political environment in which both the FIB and Treasury could both advocate QMS to both the Ministry of Fisheries and later (for the FIB) the fishers themselves.

Adopting and Implementing QMS

⁹³ Lee Anderson is a University of Delaware professor who widely published on ITQ management, and can be considered a major spokesperson for the approach.

Introducing QMS to the Fishing Industry

In 1984, the concept of ITQ management went public, when the Ministry, in conjunction with industry leaders, began a series of consultation meetings in fishing ports across the country. The National Fisheries Management Advisory Committee (NAFMAC) sponsored these meetings. NAFMAC was a group commissioned by MAF in 1982 to “provide a national overview of the management of fisheries resources; oversee the implementation of regional fisheries management plans; provide a forum for discussion of proposals for the management of specific fisheries of national importance; and make recommendations to MAF” (MAF, 1982: 27-28).

The purpose of these NAFMAC meetings was to introduce the concept of ITQs and to gain agreement of the fishing community to implement QMS. As part of this meeting, a booklet (commonly known as the “Blue Book”) was distributed outlining how the Ministry envisioned the QMS operating. (MAF, 1984) The “Blue Book” outlined a system in which fishers and fishing companies would receive quota based on the tonnage of catch they had caught and sold in the previous years. Aggregation of quota would be limited to 10% of any inshore species. Reduction in catch would be accomplished through a buy-back program, while future increases the government would sell quota. All future reduction in catch would be accomplished through government buy-back of quota. Fishers were also expected to pay a “resource rental” fee as a way to “pay for [the] privileged access to harvest the resources commercially” (MAF, 1984: 15).

The meetings in which QMS was introduced were described by many present (both fishers and presenters) as tense. Indeed some participants named these meetings the “NAFMAC Flying Circus” or variant of that (e.g., Stevens, 1999; Crothers, 1999;

Jones, 1999; Sykes, 1999). One person reported presenting at meetings and having a chair thrown at him (Crothers, 1999). Wood (1999) offered the following description of a typical NAFMAC meeting:

Meetings started with a slide presentation. Then we gave every person two copies of the Blue Book. We had a panel of Ministry people and industry representatives. We took 20 or 30 minutes of abuse from the fishermen then we got down to discussion. It seemed to be individual operators vs. bureaucrats. A few things came out of the meetings that changed policy – restructuring assistance, aggregation limits, and minimum quota holdings.

Some observers also noted that both sides appeared to believe that the adoption of QMS was inevitable (e.g., Boyd 1999; Sykes, 1999).

Today, many fishers express frustration because of the government's "failure" to "live up to" what they saw as "promises" made to them in these meetings and the Blue Book.

- ◆ "The blue book was presented as our ticket. ... They said 'this is how it will work.' The government put a gloss on it. They put understanding of people out. The book may have been written with some sincerity but once they had agreement they wanted out. ... The fishers were conned to a degree." (Blanshard, 1999)
- ◆ "We agreed to ITQ based on promises in the blue book. No gear restrictions, no closure. But under recreational pressure all this started to take place." (#16, Auckland Survey)
- ◆ "[There were] no problems when we got started. Problems started to come later when they changed the rules, like loss of perpetuity. If fishers were presented with the system as it is now back then, there's no way we would have accepted it." (#2, Auckland Survey)
- ◆ "We were told as fish stocks increased, so would our quota, but it never did." (#1, Auckland Survey)

These meetings did, however, build the support the Ministry wanted for this policy. In

1983, NAMFAC released its report on QMS. In part, the report noted:

Fishermen saw merit in the scheme in that it could increase efficiency, spread catches, allow for retirement of older fishermen and recruitment of new entrants. However, fishermen were skeptical of Management's ability to prevent non-aggregation and to monitor individual quota. This

concept could not be transferred directly from the Deepwater Policy but needed careful analysis and discussion before implementation. (NAFMAC, 1983)

Using these meetings and report as a basis, the Fisheries Amendment Act of 1986 was passed, introducing QMS to the inshore fishery, and transferring the TAC system in the deepwater fishery into the QMS.

However, a close reading of this report indicates that the acceptance of QMS by the smaller fishers was hesitant. This is confirmed by an analysis of Dewees' 1987 Auckland Region survey. As is discussed in Chapter 3, this survey has a large proportion of smaller fishers, and as such it can be interpretive as indicative of the perceptions of the smaller fishers. As Table 4-3 indicates, these fishers felt that they lacked adequate information and involvement in the QMS development process. When combined with the comments presented above, an image emerge of QMS management being developed and advocated by industry and government leadership (as is illustrated in Table 4-2), then reluctantly accepted by the larger community of the smaller "on the water" fishers after the NAFMAC meetings and the fear of extensive inshore fisheries collapse on the part of these smaller fishers.

Table 4-3: 1987 Auckland Region Survey on Adoption of QMS (Likert Scale 1=strongly disagree 4=strongly agree. Test value = 2.5)

	N	Mean (Std Dev)	t (df)	Sig (2-tailed)
At ITQ development, information I received was accurate	60	2.18 (.83)	-2.943 (59)	.005
At ITQ development, I felt involved	57	2.04 (.84)	-4.157 (56)	<.001
At ITQ development, I could plan long term	59	2.10 (.80)	-3.810 (58)	<.001
At ITQ development, there was good information about the tendering process	61	2.13 (.72)	-4.011 (60)	<.001
The ITQ appeals process is fair	50	1.90 (.86)	-4.916 (49)	<.001

Initial Implementation and Buy-Back

QMS management began in October 1986. Inshore fisheries were immediately placed under QMS, with deepwater allocations being switched into QMS a few weeks later. This was a time of considerable upheaval in the industry. Indeed, one observer noted that the introduction of QMS was “like shoving the Industrial Revolution through the fishing industry in a few years” (Sykes, 1999). These problems began with quota allocation and continued through the buy-back process.

Allocation was based on historical catch records: specifically their best two years of catch history from 1982, 1983, and 1984 as reported to MAF. There were concerns among fishers that the “wrong” years were chosen, that their catch records were inaccurate, and that extenuating circumstances made these years inaccurate measures of their activities. In many cases, this situation was exacerbated by the fact that a large number of fishers had sold a large amount of their catch “off the books.” Since this catch was not reported, it was not included in initial catch allocation⁹⁴. In response to these concerns, an appeal process was developed. Initially designed to last for one or two years, it lasted for six years and dealt with 2,194 appeals. Stevens, 1992: 6) Quota could be appealed based on one of five reasons: inaccurate catch history; inaccurate return of catch (including failure to report full catch); exceptional circumstances; short history; and ownership questions (Information Bulletin, 1986: 2). Appeals of quota allocation was extensive. Indeed, “of 1,800 individuals notified of their catch history, 1,400 lodged

⁹⁴ As many fishers would sell up to half their catch “off this books” this was a considerable loss. For example, a fisher who needed 5,000 tons a year to keep fishing was allocated 3,000. This practice was quite common. Indeed, one former company owner (Auckland Survey #33) reported that in the snapper fishery, “skippers would only sell for half cash.”

objectives” (Clark et al. 1988: 327). The appeal process was a stressful and contentious time for the industry. As summarized by one observer: “It was a traumatic and necessary exercise that had to be carried out in order to make the transition. We should all be thankful that it is now behind us” (Stevens. 1992: 7).

Quotas were initially distributed to licensed commercial fishing permit holders based on previous catch history.⁹⁵ The ITQ owner then has the right to catch, sell, or lease their quota. Fishers were then invited to sell all or part of this back to the government through a tendering process in which fishers bid how much quota they were willing to sell back to the government and at what price level. This was a time of considerable confusion in the industry. Fishers were uncertain about whether to sell their quota, at what price to sell it, and how much to sell. As summarized by one participant: “we were flying in the dark in the beginning” (Auckland Survey #1).

This may have been compounded by confusion over exactly what quota and sale of quota represented. For example, the Blue Book described quota as follows, emphasizing quota as a long-term asset:

An ITQ is the right to catch a certain quantity of fish each year within a certain area. These quotas will be allocated in perpetuity and, in most instances, for one fisheries management planning areas. They can be bought and sold in the same way as any other asset.” (MAF, 1984: 10)

but when advice on the tendering process was published by the FIB, it emphasized the tendering process and quota as a means of being compensated for leaving the fishery. For example: “each fisherman calculates how much he needs in total to adequately compensate him for the loss of income which leaving the fishery entails.” (FIB 1986: 6)

⁹⁵ Initially, these distributions were called “provisional catch histories.”

In the end, the Ministry ended up doing two rounds of tendering to remove enough quota from the fishery. Fishers were particularly under pressure to sell quota during the second round because the Ministry had announced, “if sufficient offers were not forthcoming, cutbacks in quota to the extent necessary would be made without compensation.” (FIB 1986: 1) As a result of the allocation and buy-back processes, many small-scale fishers sold back their quota at what are now considered low prices and either left the fishery or continued fishing with leased quota.

Changes in QMS Management: 1986 to 1999

Since its introduction until 1999, New Zealand’s QMS is broadly viewed as having changed in some important details of management, while maintaining the essential principles (Clement, 1997). This contention is open to discussion (as I will do in Chapter 6 where I argue that that many of these changes in details had important influences on the perception of property rights). However, for descriptive purposes, it is true that the essential details of QMS remain, in spite of recent changes. Several of these changes merit attention in a general description of QMS. These changes are discussed below and summarized in Table 4-4.

Table 4-4: Major Changes to the Quota Management System 1986 – 2000

Event	Result
1986 Fisheries Amendment Act	Quota Management System introduced
1986 Buy-back program	Many small-scale fishers sold back their quota at what are now considered low prices and either left the fishery or continued fishing with leased quota.
1989/90 Switch from Tonnage to Proportional Allocation	Government no longer enters market to raise or lower TAC. Instead quota owners bear the risks and benefits of changes in TAC.
1992 Treaty of Waitangi Settlement	Maori were granted 10% of existing quota; the Government purchased half of Sealord Products at a cost of \$150 million for Maori tribes and an agreement that 20% of all new fishing stocks brought

	into QMS. The Treaty of Waitangi Fisheries Commission (TOKM) now manages these resources until final distribution.
1992 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.
1996 Fisheries Amendment Act	Introduced a series of administrative changes designed to streamline management. Also introduced the "precautionary principle" of resource management
1999 Fisheries Amendment Act	Legislation enables Ministry of Fisheries to delegate some management powers to stakeholder groups.
2000 Moratorium on Stakeholder Groups	Clark Government announces a moratorium of at least one year on stakeholder group management.

Switch from Tonnage to Proportional Allocation

When QMS began, ITQs were introduced as tonnage, with the understanding that the government would enter the market to purchase quota when TACs needed to be reduced, and would sell ITQs when they could be increased. But this approach changed in the late 1980s. As described by Crothers (1999):

"In 1988/1989, as a result of improved information Orange Roughy stock sizes and productivity, it was decided to drastically reduce the TACs. This reduction would have cost the Government several hundred million dollars. This was something the Government would not entertain considering the fiscal constraints it was operating under and the fact that it had only just recently allocated the quota to fishers at no cost – allocated by way of catch histories, not competitive tender.

Instead they entered negotiations with the industry, and agreed that in response for some compensation for the Orange Roughy holders, all quota would be converted from absolute tonnage to a proportion of the Total Allowable Commercial Catch (TACC) (e.g., Jones, 1999).

An important aspect of this change to proportionality is that rather than having ITQs representing a specific tonnage, the actual amount of fish that can be removed

changes as the TAC changes. Thus, one year an ITQ may represent a greater tonnage of fish, while the next year it may represent the right to harvest fewer tons of fish. This allows the government to reduce the TAC without having to “buy back” ITQs, but it also imposes greater uncertainty about future catches on the commercial fishing community.

This was particularly a concern with the smaller inshore fishers, many of whom had been allocated quota less than what they had fished prior to the introduction of QMS. Indeed, this change is at the basis of many of the charges that the government broke its “blue book promises.” This change from absolute tonnage to proportionality also has important property rights implications. This aspect of is discussed in greater detail in Chapters 6 and 7.

Treaty of Waitangi Settlement

One important and unexpected influence on the New Zealand fishing industry and QMS is the Maori rights movement.⁹⁶ Soon after QMS was introduced, Maori tribes began filing suit against the government arguing that the second article of the Treaty of Waitangi⁹⁷ gave all fishing rights in New Zealand exclusively to the Maori tribes, and thus the New Zealand government was not able to distribute fishing rights quota. The tribes were quickly granted an injunction against the government, and negotiations over Maori claims commenced. As an interim measure, Maori were granted 10% of existing fishing quota and \$1.5 million. Negotiations were completed in 1992 with the

⁹⁶ For a more in-depth discussion of the Maori rights moment and Maori history, see Christie, 1997 Orange, 1988; and Sinclair 1997. For a detailed treatment of the Sealord deal, see Moon, 1999.

⁹⁷ The Treaty of Waitangi was signed between the Crown and the Maori Tribes in 1840. This document outlined the terms under which the tribes recognized the sovereignty of the British Empire. While New Zealand does not have a Constitution, in many ways the Treaty of Waitangi can be seen as a similar founding document. Section 2 of the Treaty states: “Her Majesty the Queen of England confirms and guarantees to the Chiefs and Tribes of New Zealand ... the full exclusive and undisturbed possession of their Land and Estates Forests Fisheries and other properties which they may collectively or individually possess as long as it is their wish and desire to retain the same in their possession ...” (Christie, 1997: 166)

Government purchasing half of Sealord Products (the largest fishing company in New Zealand) at a cost of NZ\$150 million for Maori tribes and an agreement that 20% of all new fishing stocks brought into QMS (Christie, 1997: 57). Management of these resources is presently the responsibility of the Treaty of Waitangi Fishing Commission (also known as Te Oka Kai Moana or TOKM)

This settlement had several effects on the industry. At an immediate level, the reallocation of 10% of quota (which the Government did enter the market to buy) may have added to problems in quota availability since 10% of quota is now held by one organization that is required to lease it out annually until a final distribution of assets (among the tribes) is approved (e.g., Company Survey #6 and #8).⁹⁸ Furthermore, the quota allocation, when combined with the Sealord ownership has created a significant loophole in the aggregation rules. The settlement has also created resentment – particularly among the smaller owner-operators – who saw the settlement as a handout to a group that (from their perspective) had the same opportunities as them, but failed to take advantage of them. Others argued that New Zealand had always prided itself on being an egalitarian society, but now saw that as undermined as the settlement created two classes: Maori and non-Maori with differential access to quota. The following quotes illustrate the critique of the small fishers:

- ◆ “I’m very resentful to give them a piece of my quota. ... Mind you a lot of the early Maori fishers were forced out at the start of the system because they were under the \$10,000 a year limit, and had their licenses revoked. But for others it’s the second time they’ve been given quota. (Auckland Survey # 10)
- ◆ “[The settlement hurts us on] new species. Basically only a few of us were fishing for kahawai and should have gotten huge quota. Now 20% of our quota will immediately to Maori. We should at least be compensated.” [Auckland Survey # 19]

⁹⁸ However, it can also be argued that for smaller fishers who rely of leased quota, the settlement has increased quota availability since it must be leased annually.

- ◆ “The settlement is bad for both fisher and Maori. I fish for quota owned by the local Iwi [tribe]. They won’t lease to Maori because they sell on the black market or don’t catch at all. Then the local Maori shot at me for fishing in their waters. Hurts me because I can’t fish where I get shot at and the local tribes don’t get their money so they’re frustrated.” (Auckland Survey #19)
- ◆ “It’s just annoying people that they go so much. ... They had the same opportunity as me to get a license.” (Auckland Survey #20)
- ◆ “Why should one group of people have rights over another group? Its racist. Maori at Clark Creek threatened to shoot me at the public ramp ... New Zealand should be one people.” (Auckland Survey #34)
- ◆ “If they want to fish, then let them do it traditionally. They’re free to compete on the market like the rest of us.” (Auckland Survey # 38)

Larger players in the industry saw the situation differently. Indeed most companies now see the settlement as a positive, and negative comments focus on a tightening quota market rather than racial issues. This different perspective is reflected in their comments:

- ◆ “Thank God for the Maori, its particularly difficult to take quota away from them!” (Company Survey #1).
- ◆ “I think the Waitangi settlement improved QMS. Now the ITQ system is locked in because otherwise the Government would be accused of devaluing the Maori settlement” (Company Survey #2).
- ◆ “Our company is half owned by Maori. We don’t get preferential treatment with Maori quota though. I think the Sealord deal was an excellent way of settling a historical case.” (Company Survey #5)
- ◆ Waitangi settlement created uncertainty, drove up quota lease prices, as Maori tender it annually.” (Company Survey #8)

These comments hint at the influence of the Treaty of Waitangi settlement on perceptions of property rights – an issue that is examined in Chapters 6 and 7.

Switch from Resource Rentals to Cost Recovery

The switch from cost recovery to resource rentals has quite different origins. When QMS was introduced, resource rentals were charged. These were designed to capture “excess profit” and return some benefit to the people of New Zealand (through

the government) for allowing the fishing industry to capture and gain the economic benefit of their fish. However, in 1994, there was a switch to cost recovery. One explanation for this change focuses on the Treaty of Waitangi settlement. As described by Graham Kelly (New Zealand Labour Party) in Parliamentary debate over the 1999 Fisheries Amendment Acts:

[T]he cost recovery charges ... were the result of changing from the resource rentals that occurred when the quota management system was first introduced in the 1980s. It was when the Maori fisheries settlement came in that Maori said: "We're not going to pay resource rentals to ourselves. Therefore, we will have it changed." Immediately the cost recovery was introduced ...

Under this explanation, the Ministry shifted to a cost recovery approach (in which the fishers were paying for the expenses the Ministry incurred in regulating them), as a way of avoiding a renewed debate over whether the Treaty of Waitangi Settlement extinguished the ownership issue. The recollections of Norris, 1999 echo this. Crothers offers a slightly different recollection of these events. He notes:

"The Minister's policy advice to the Government was to introduce cost recovery as well as retain resource rentals. The Government rejected this advice and chose to implement a cost recovery regime and abolish the existing resource rental regime. The basis of this decision was to avoid any further debate over whether or not the Treaty of Waitangi Fisheries Settlement extinguished Maori ownership rights as opposed to access rights."

While the details vary, all three of these accounts agree that desire to avoid reopening the debate over Treaty fishing rights was an important motivation for the shift from resource rentals to cost recovery.

Another explanation (which may be best seen as in conjunction with the Maori explanation) is that the shift to cost recovery was part of the Government's larger movement to "user pays" policies. Throughout the government there was a move to cost

recovery and user pays, and QMS was part of that movement. The shift to cost recovery has created significant tensions between the Ministry and the industry (at all levels) as what used to be seen as a payment for resource management and use of a resource is now seen as a tax forced on the industry to pay for services over which they have little or no control, and in some cases may not want. (Norris, 1999; Craig, 1999; Wallace, 1999) This has helped fuel the devolution movement as the industry began to say – if we have to pay for services such as quota registry, we should be able to choose who does it at what expense. While the devolution has moved beyond this point, cost recovery was a major catalyst.

1996 Fisheries Amendment Act

The Fisheries Amendment Act was passed in 1996. It was primarily an administrative piece of legislation designed to clarify and streamline previous administrative changes and Acts. Administrative changes included creating a quota registry under which loans could be recorded, and an updated definition of ITQs. The Act created a new catch balancing regimes and the elimination of “carry over” provisions under which quota owners could over-fish up to 10% of their quota one year, then charge it against the following year’s catch. The Act also introduced a new mechanism for bringing species into QMS, changed which offenses were subject to quota forfeiture, changed quota aggregation limits, and introduced permit and vessel registration requirements. It also introduced a requirement that all vessels (including charter vessels) must operate under New Zealand safety and labor laws -- including minimum wage requirements. Finally, the Act explicitly introduced environmental principles as an explicit concern of QMS, requiring management to take into account long-term species

viability, biological diversity (including bycatch management), and habitat preservation as well as use of the precautionary principle in decision-making. (Gaffney, 1997; MFish 1996)

It is worth noting that many in the industry are now dissatisfied with the 1996 Fisheries Amendment Act. Industry leadership argues that the additions and changes made with during the Select Committee stages have made the legislation practically unworkable. Industry is particularly concerned with property and quota forfeiture provisions that the industry believes is not proportional to offenses; technical difficulties with the scheme for administering ACE; the elimination of "carry over" provisions; and the application of New Zealand minimum wage laws to foreign charter boat crews (NZFIA 1996: 3-5; NZFIA 1997: 5-8). Responses to the Auckland Region survey affirm that concerns over the quota forfeiture provisions and the elimination of the "carry over" provisions extend beyond the large companies to the "on the water" fishermen. Also, there is frustration among the environmental community who argue that the full impact of the precautionary principle has been reduced as both the Ministry and industry have shifted their focus away from implementing the precautionary principle and towards stakeholder group management. (Wallace, 1999)

Rise of Stakeholder Groups

The rise of stakeholder groups as entities responsible for the management of fisheries resources is discussed extensively in Chapter 7. It is summarized extremely briefly here. During the 1990s, a devolution movement began within the commercial fishing industry. The goal of the devolution movement is to shift management responsibility for the QMS from the Ministry of Fisheries towards "stakeholder groups"

composed of ITQ owners. This shift does not replace QMS. Instead, stakeholder groups with management responsibility would be layered on top of the existing QMS. In September 1999, this movement was recognized when the 1999 Fisheries Amendment Act was passed, and groups began to develop management plans that would outline how they would manage the resources. However, in 2000, after a new Government was voted in, a one-year moratorium on stakeholder groups was announced. As of this writing, while the enabling legislation is still on the books, the future of stakeholder group management is uncertain.

The Quota Management System Today

New Zealand fisheries management system has an EEZ that covers an area of 1.2 million square nautical miles or approximately 15 times New Zealand's land mass. (See Appendix 4-1.) There are approximately 1000 species in the EEZ, of which 100 are considered commercially significant. (Statistics New Zealand, 1999) In the 1996/7 fishing season, 33 species were under quota management as 185 separate fish stocks. These stocks totaled approximately 531,000 tons of quota-managed species, and 79,000 tons on species not under quota management (Clement, 1997). In 1997, the marine fishing sector accounted for 4,180 full-time equivalent jobs, and there were 2,170 domestic vessels, 59 foreign charter vessels, and 16 foreign licensed vessels. In 1995, seafood exports accounted for NZ\$1.2 billion, with the top species being squid, orange roughy, hoki, and rock lobster (Statistics New Zealand, 1999). With the exception of lobster, these are all mid to deepwater species requiring large-scale fishing operations.

The QMS has multiple and often contradictory goals to meet. Clark, et al. describe the system's goals as "to allow the industry to respond in an economically

efficient manner to market forces, to compete internationally, increase profitability, and maximize returns to the nation through resource rentals” (Clark, et al., 1988). More recently, Clement outlined nine specific goals that the QMS addresses.⁹⁹ However, the Fisheries Act of 1996 states the goals much more simply: “the purpose of this Act is to provide for the utilization of fisheries resources while ensuring sustainability” (Fisheries Act 1996: 98). The QMS can be seen as having two primary goals – maintaining (or building) healthy fisheries, and doing so in a manner that encourages an economically efficient industry. Within these two broad goals, more specific objectives (such as those described by Clark and Clement) have been articulated.

To reach these objectives, the QMS divides the waters of New Zealand’s EEZ into ten fisheries management areas. (See Figure 2) Then within each of these management areas, the Ministry sets a Total Allowable Catch (TAC) for each species based on the an estimation of the maximum sustainable yield of the fish stock. This TAC is then divided into shares for the Maori cultural fishing, recreational fishing, and commercial fishing (Total Allowable Commercial Catch or TACC). The TACC is then divided into Individual Tradable Quotas (ITQs) that are a specific proportion of the TACC distributed in perpetuity.

Compliance with the QMS is accomplished through a monitoring system that is based on tracking the flow of fish and fish products from the fisher to the final purchaser. Fishing permit holders, licensed buyers, and retail sellers are required to provide

⁹⁹ 1) Rebuild inshore fish stocks where required 2) Ensure that catches are limited to levels that could be sustained in the long term 3) Ensure that catches are harvested efficiently with maximum benefit to industry and New Zealand 4) Allocate catch entitlement equitably based on permit holder’s commitment to the fishery 5) Manage the fishery so industry has security of access and flexibility in harvesting 6) Integrate the management of inshore and deepwater fisheries 7) Develop a management system which can be applied both nationally and regionally 8) Provide financial assistance to help the fishing industry to restructure and meet these goals 9) Enhance the recreational fishery

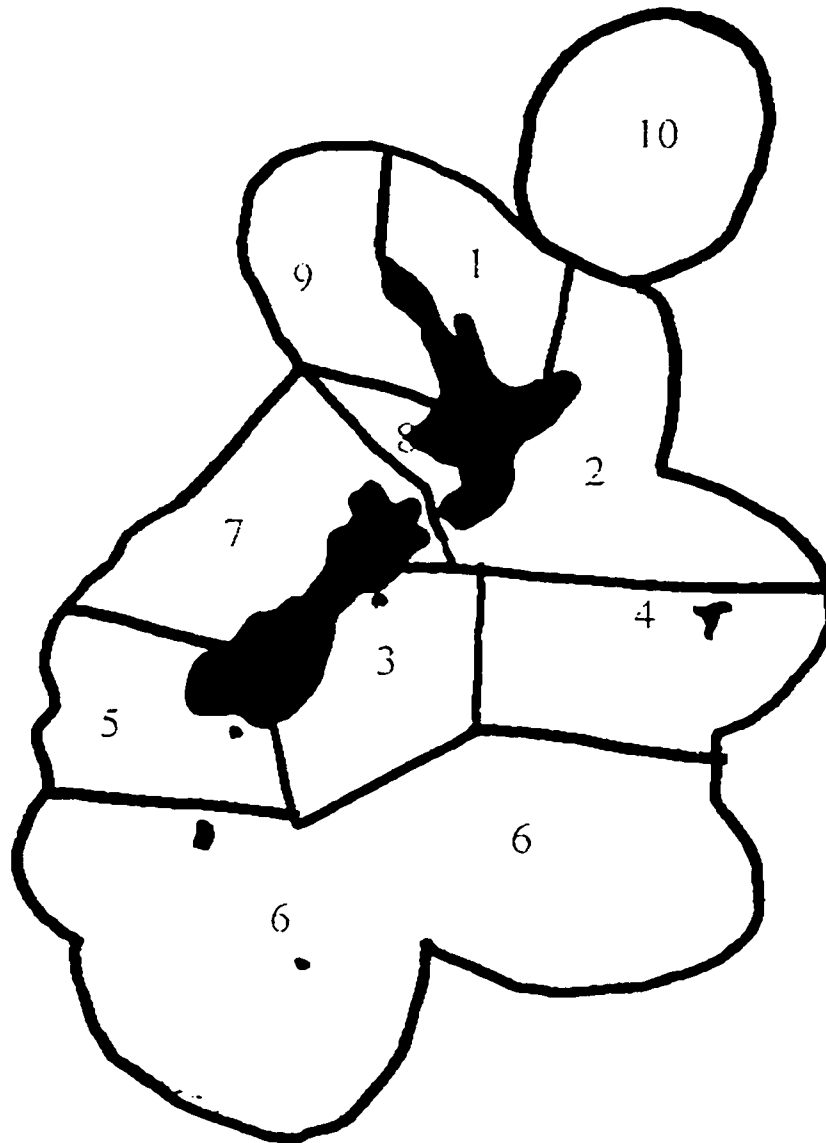
extensive documentation of their catches, purchases, and sales through a variety of paperwork requirements. Additional documentation is required for trading or leasing quotas, and dealing with accidental over-fishing. The commercial fishers pay for most of the cost of the QMS through various fees and annual ITQ and conservation levies (Clement, 1997). Some additional monitoring is provided through a mandatory satellite monitoring system that uses global positioning systems to track fishing vessel movements, but most enforcement comes from tracing paper trails (Fishing News Intl, 1997).¹⁰⁰

Conclusion

This chapter has described New Zealand's fisheries management system. By expanding this description to provide some historical and social background, I have tried to provide some context in which QMS can be examined as an institution. By understanding the existing conditions and conflicts, as well as how QMS has evolved over the previous thirteen years, a background is provided for understanding the more specific issues examined in following chapters – such as effects of QMS, changing property rights, and the devolution movement.

¹⁰⁰ This discussion of compliance is simply a basic description of the aspects needed to understand the working of the approach. Chapter 5 will present an examination of the success of compliance efforts under QMS.

Appendix 4-1: Map of New Zealand's Quota Management System (Adapted from: Clement, 1997)



Appendix 4-2: Effects of Removal of Part Time Fishers

In 1983, the New Zealand government, in an effort to control fishing effort, removed all part-time fishers from commercial fishing. Part-time fishers were defined as those earning less than 80% of their income or less than \$5,000 from commercial fishing. While the fishery was under crisis, and drastic measures were needed, this move had many unintended equity consequences.

This is because it removed a large number of fishers who were either part-time fishers, or subsistence fishers, who used fishing and farming together as their primary source of income. The extent of this social impact is easy to under-estimate, but there was a long history of part-time fishers. Indeed, in 1954, one observer noted:

Of the dominion's total force of 2,474 fishermen in 1952, 1,380 were classified by the Marine department as "fulltime" ... while 1,094 (44 per cent) ... may be classified as part-time fishermen. The North Island with its milder weather, numerous bays for shelter and good inshore fishing grounds have become the domain of a larger "part-time" fishery and 76 per cent of the casual fishermen are located here (Dibble, 1954: 28).

This pattern continued into the 1980s when removal took place. While I could not locate any exact figures for how many fishers were removed, between 1983 and 1984, the number of licensed fishing vessels dropped from 4,320 to 2,744 (Department of Statistics, 1985: 473). This represents a loss of 37% of the 1983 fishing fleet.

In hindsight, some observers now regard the decision to remove part-time fishers as shortsighted (E.g., Blanshard, 1999; Shirley, 2000b). There are equity issues on several levels. First, many fishers relied on the part-time work for a vital part of their income. There are also questions about how many of the part-time fishers were really full-time fishers who sold a considerable amount of their catch "off the books." Others were

removed because they were undocumented partners on a boat where another fisher was recorded as sole owner. Since quota distribution was based on recorded sales, many full-time fishers may have been removed from the fishery when they could not document their catch history.

Another concern is that many of those removed from the fishery were Maori, particularly in the Northland where a mix of subsistence farming and fishing was part of the long-established culture. It can be argued that the removal of a substantial part of the Maori from the fishing industry, followed a few years later by the introduction of ITQs, provided fertile background (as well as leverage) for later court cases regarding QMS and the Treaty of Waitangi.

Chapter 5: Effects of QMS Management

Fishermen and their attitudes have changed a lot. They're a different breed now.--
Fisherman John Walker, in Kirk Hargreaves' *On the Next Tide*

Introduction

As one of the first nations to adopt an ITQ system, New Zealand provides an important case for studying the effects of this management approach, not only from a biological and industrial perspective, but also from a more social perspective. Chapter 4 provided an historical context for examining the Quota Management System (QMS), as well as an explanation for why QMS was adopted when it was and in the manner it was. This chapter explores the effects of QMS on the structure and characteristics of the New Zealand fishing industry by examining five specific effects that are often attributed to the ITQ management approach. Together, examining these effects provides an opportunity to examine the influences of QMS systematically over a long period of time. Doing so, will help us better understand (at least for the New Zealand case) what effects can be reasonably attributed to ITQ management. This will be followed by an exploration in Chapter 6 of changes in the perceptions of ITQs and the property rights they represent.

As is discussed in Chapters 2 and 3, proponents and opponents of ITQ-based management attribute a variety of positive and negative effects to this management approach. Positive effects attributed to ITQ management include: sustainable fishing, and increased industry efficiency. Negative effects include: industry consolidation and loss of small-scale fishers. The degree to which compliance with fishing laws increases or decreases is a debated issue.¹⁰¹ Examining these effects is a challenge because as

¹⁰¹ Another important question is: "how successful is QMS as an institution?" According to Ostrom et al. (1993), five criteria that can be used to examine the success of an institution are: economic efficiency,

noted by Annala “sadly, there is not much in the way of hard information available, but there is a great deal in the way of perceptions” (Annala 1996: 46). This Chapter will address this problem by using a variety of data sources such as: the Auckland Region survey, the Nationwide Company survey, expert interviews, historic documents, and published books and articles. Some of these data sources (such as the most recent round of the Auckland Region survey and the Nationwide Company survey) have not been used before, and (as is discussed in Chapter 3) the use of multiple data sources will allow triangulation, which increases the confidence one can have in the overall findings.

Sustainable Fishing

A key positive aspect attributed to ITQ management by researchers is that it provides an effective means for stock conservation and sustainable fishing since it sets a limit on the total harvest.¹⁰² The system is also adaptable from the standpoint that the Total Allowable Catch (TAC) is often set on a yearly or seasonal basis. Accordingly, adjustments can be made to account for dramatic changes in the stock or other unforeseen circumstances (Squires, et al. 1995). However, critics point out that the information costs of this approach are high (e.g., Sparre, 1994) and that the information necessary for a TAC approach simply may not be available (e.g., Mace, 1993).

Two important issues need to be addressed when examining the sustainability of the QMS approach: First, there is the issue of the underlying stock assessment process and the degree to which it fulfills its purpose of providing the information necessary to accurately set TAC and giving all interested stakeholders have an opportunity to

equity, fiscal equivalence, accountability, and adaptability to both fishery and economic conditions. I hope to address this question in future research.

¹⁰² Particularly in New Zealand, advocates of ITQ management have made dramatic claims about sustainability (e.g., Clark et al. 1988; Crothers, 1988; Clark, 1993).

participate in the process. Second, the broader question of the degree to which ITQ management results in stock conservation and sustainable fishing can be addressed.

Stock Assessment Process¹⁰³

New Zealand has a well-established and elaborate stock assessment process that involves both the review of scientific information and an extensive consultation process.¹⁰⁴ A fishing year runs from October to October each year. This TAC setting process is summarized in the flow chart in Appendix 5-1. The scientific assessment begins with working groups composed of MFish, National Institute of Water and Atmospheric (NIWA) and other scientists, industry groups (both SeaFIC and stakeholder groups), Maori, recreational and environmental interests. These groups prepare reports on fish stocks for specific fish stocks for the coming fishing year. All these reports are then reviewed in an Annual Plenary session which Annala (1999) described as acting as a "wider peer review." The Annual Plenary focuses primarily on assessing the changes in the state of specific fish stocks. They specifically avoid making recommendations on TAC since the Minister must make this decision after also taking social and economic effects into account (McKoy, 1999). The result of this is the Annual Plenary Report, which is usually distributed in May to all participating stakeholders, as well as policy staff in the Ministry of Fisheries.

¹⁰³ Unless otherwise noted, this description of the process is based on 1999 interviews with John Annala (Manager, Science Policy, Ministry of Fisheries)

¹⁰⁴ Two additional processes influence the stock assessment process and take place concurrent to it. The first is the "nature and extent process" in which the Ministry of Fisheries (MFish) and stakeholder groups (primarily industry stakeholder groups) negotiate the priorities, and division of costs between the Ministry and industry for the coming fiscal year. This process is usually the first step where scientific research priorities are discussed. This is followed by the "tendering" (or purchasing) of scientific research services by the MFish is an additional process, which can take up to a year from when the Ministry proposals are finalized until research is available to the formal stock assessment process. Presently, nearly all tendered research is conducted by NIWA.

At this point, the scientific assessment ends, and the “review of sustainability” begins. This process is based in MFish and starts with an in-house review that focuses on the scientific, economic, and social issues. This takes place in late May, and results in an “initial advice paper” which is then sent out for consultation with stakeholders.¹⁰⁵ While the details of the consultation process vary (it can include public meetings, written submissions, stakeholder meetings, etc), it takes place between June and July with the goal of gathering responses on the recommendations that MFish will offer the Minister. Results of the consultation process are incorporated into a “final advice paper” which includes summaries of submissions and MFish’s responses. This document is completed by late July and submitted to the Minister, who uses it to make the final decision on TAC.

This process has considerable support – particularly in the scientific community. Dr. John McKoy (NIWA’s Director of Fisheries Research) expressed the positive aspects of the stock assessment approach best:

Our initial approach was to keep ITQ research and thinking secret to avoid companies getting an unfair advantage. But early on it became clear that this approach wouldn’t work, so we decided to open it up to all interested parties. This led to the development of the formal working group process. This allowed: 1) a freer flow of information 2) independent assessment 3) input of interested groups 4) education 5) avoiding conflict further down the road. The downside of the process is that people with vested interests use the process. But that was recognized ahead of time and we decided to go ahead anyway. Our concerns were borne out, but it has advanced a vigorous critical review. ... Substantial disagreements are reflected in the documentation, and we usually manage to reach a consensus. The process means things don’t usually spill out into court (McKoy, 1999)

This assessment is echoed by Starr et al. (1998: 529) who note that “contested assessments provide a number of benefits including (i) intensive peer review (ii) the ability to bring data from all parties to the assessment process, and (iii) better

¹⁰⁵ The same stakeholders as are involved in the scientific assessment process.

understanding and trust of the assessments by the different interest groups. ... We suggest that contested assessment, despite their extra costs are highly valuable, as they provide a substantially improved standard of assessment.” Similarly, Annala has written, “one of the strengths of the New Zealand QMS is the completely open and transparent stock assessment and TAC setting process” (Annala, 1996: 50). Edwards (an MFish official) goes even farther, arguing that the process has helped change industry actions: “from consistent lobbying for increases and absolute opposition to any decrease – to a more responsible approach reflecting the husbandry incentive” (Edwards, 1999: 7). In summary, both the industry and government agree that the assessment process has improved the scientific process and has improved relations between the two groups.

In spite of this broadly positive assessment by the government and industry, there is a wide range of concerns surrounding this process. These range from concerns (common to administrative processes) that the process has taken a life of its own¹⁰⁶ to a more fundamental concern over equality of access to the stock assessment process.

Representatives from the Environment and Conservation Organization (ECO), other environmental groups, and recreational interests all agree on this:

- ◆ “For the most part those who attend are from the Ministry, the research provider or from industry – usually only one environmental non-governmental organization if any can attend. Recreation fishers and customary Maori fishers rarely attend – partially because of the enormous time commitment required. The non-industry stakeholders are for the most part employed in other occupations and as voluntary organizations cannot attend long meetings stretching into days and weeks. Such meetings are however a feature of New Zealand fisheries management (Wallace, 1998: 5)”¹⁰⁷

¹⁰⁶ For example, a fisheries scientist familiar with industry research noted: “the outcome isn’t as important as the process ... everything has to be in the final advice paper ... There were no major issues last year, but the final advice paper was still 800+ pages.”

¹⁰⁷ These comments were re-iterated in my interview with Wallace. Then she expanded “its an effect of fundamental economics. They have resources, but we’re a public good and chronically under funded. Its not just a matter of ‘getting more organized” (Wallace, 1999).

- ◆ “We have an input, yes, but it isn’t given the same weight ... We don’t have the money to go to meetings and hire biologists to tweak models. The meetings are held in Wellington, so we can’t afford to go (Environmental group spokesperson, 1999).”
- ◆ “My council survives on voluntary unpaid input. ... It is soul destroying to attend consultative meetings to be confronted with upward of 20 industry personnel, all funded to be there including qualified scientists, accountants, lawyers, etc. etc. etc. Then you have up to 20 Crown personnel funded to be there. Sitting on the other side of the table is myself and maybe one other recreational person. Sometimes one or two environmentalists. Infrequently, one or two others. And these are the official consultative meetings” (Hetherington, 1999: 2).

It may be tempting to dismiss these concerns as simple complaints by groups that have often found their agendas frustrated in the stock assessment process. But in 1998 it was reported “NZFIB [the predecessor to SeaFIC] participation in the stock assessment process costs approximately NZ\$1 million per year” (Starr et al., 1998: 533). This compares to one part-time volunteer and one full-time employee representing the two national environmental organizations based in Wellington.

Rennie raises a final concern about the incentive structure created by the stock assessment process. He notes that TACC is essentially the “residual tonnage” left after environmental, customary, and recreational demands are taken into account. So, if the demand from one of these sectors grows, there is less available for TACC. Thus, it should be in the industry’s interests to reduce scientific uncertainty and the accompanying “precautionary buffer.” However, Renee notes that the industry has traditionally acted to challenge science in an effort to delay TACC reductions. He concludes “The TACC setting process seems to have failed to provide the appropriate incentives to industry to adequately fund research ...” (Renee, 1998:8). This is echoed by McKoy who notes: “people in industry are willing to see higher level of MSY than the government and public. Quota holders have a range of incentives. One is long-term, but they also have others, like maintaining cash flow” (McKoy, 1999).

Thus, it is clear that under QMS, there is a stock assessment process that both industry and government agree has improved the research process as peer review was incorporated into the process and as collaboration between industry and government scientists increased. Furthermore, the formal stock assessment process itself is clearly well developed and has institutionalized the principle of consultation and providing well-defined opportunities for stakeholders to participate in the process. However, it appears that the process is (to a large degree) failing to provide an equal voice to all recognized fisheries stakeholders due to markedly different institutional capacities of the non-industry stakeholder groups (such as environmental, recreational, and customary Maori interests).

Sustainability

Even more important than the stock assessment process is the beguilingly simple question: "Does QMS result in stock conservation and sustainable fishing?" According to the 1996 Fisheries Act, "ensuring sustainability means (a) maintaining the potential of fisheries resources to meet the reasonably foreseeable needs of future generations; and (b) avoiding, remedying, or mitigating any adverse effects of fishing on the aquatic environment" (Fisheries Act 1996: II (8)(1)). This is a question on which even the fisheries scientists would be hesitant to give a definitive answer. Instead, my goal here is to offer a "best estimate" or consensus answer based on the multiple sources and perspective that influence fishery policy.

As was discussed in Chapter 2, lack of knowledge and uncertainty in stock assessment is an issue that plagues fisheries management and assessment of whether fish stocks are managed sustainably. This issue is indeed present in New Zealand's stock

assessments. This issue was discussed extensively during my interviews with three key participants.¹⁰⁸ They agreed that uncertainty and lack of information is an issue in stock assessment. For example, McKoy notes "There's a more explicit need to address uncertainty. Policy makers don't like uncertainty, for example, us telling them 5,000 to 10,000 tons" (McKoy, 1999). This theme was echoed in a Ministry of Research and Technology report, which noted:

To enable the sustainable harvesting of marine resources ... research must address the growing gap between the declining generation of stock information and the increasing demand for stock assessment. Scientific uncertainty has often been used as a reason for delaying management decisions or for taking limited action too late to prevent serious decline in many fisheries or in bycatch species (MoRST, 1996: 1).

But, the government and industry scientists argue, this uncertainty or lack of information is no more than in any other fisheries management systems. As noted by Annala (1999): "Uncertainty is always an issue. Fisheries research is uncertain by its very nature." Furthermore, some of the stock assessment done in New Zealand is the cutting-edge of fisheries research (Such as Starr and Hilborn's use of Bayesian models) and in general, "New Zealand's quality of research is high on a global standard" (Annala, 1999).

This assessment by the leading industry and government scientists is supported by the presence of a wide range of published fishery science articles (e.g., Cordue, 1998; Francis, 1998; Hewitt et al. 1998; Horn et al. 1998; Kawamura et al. 1998; Starr et al. 1997)¹⁰⁹ and a recent National Research Council (1998) report which recommended the adoption of techniques such as Bayesian methods, some of which are already being used

¹⁰⁸ Dr. John McKoy, Director of Fisheries Research, National Institute of Water & Atmospheric Research; Dr. John Annala, Manager Science Policy, Ministry of Fisheries; and a fisheries scientist familiar with industry research.

¹⁰⁹ A complete list of recent New Zealand publications in marine science is available in the *New Zealand Marine Science Society: Review 41* (Saunders, 1999). The citation list for academic publications runs 11 pages.

in some New Zealand fisheries. This report also recommended a similar approach to that New Zealand is taking regarding lack of data and uncertainty:

[O]rganizations responsible for fisheries management should support the development of new techniques that can better accommodate incomplete and variable data and can account for the effects of environmental fluctuations on fisheries (NRC, 1998: 5).

Together, the volume of published research and the NRC recommendations support the scientists' positive assessment of the fisheries research in terms of the quality of research produced compared to worldwide standards. However, it should also be noted that the scientists all agreed that uncertainty is an issue in fisheries science that policy-makers do not always deal with appropriately.

Furthermore, the fishing industry itself stresses the sustainability of New Zealand's fisheries as an integral part of its image and identity. For example:

- ◆ In the introduction to the 1999 SeaFIC annual conference, David Sharp (Chairman of the New Zealand Seafood Industry Council) noted "our commitment to the sustainable development of our marine resources" (Sharp, 1999: 1)
- ◆ Promotional material from Sealord (the largest fishing company) states: "The Quota Management System is Government policy and is actively supported by the New Zealand fishing industry. The legislation requires fisheries to be managed in a sustainable way. ... Hoki is an example of a fish stock that is in a good state thanks to the industry's concern about long term sustainability of the stock and prudent quota management" (Sealord, 1999: 4)
- ◆ SeaFIC's General Manager of Policy and Science commented in a press release that "Continuing research on hoki and rock lobster fish stocks are two examples of such and credible research contributions to the sustainable management of fish stocks" (Harte, 2001).
- ◆ In 2000, the second largest fishing company changed its name to "Sanford Sustainable Seafood" and began releasing "triple bottom line" annual reports that focused on "environmental sustainability, social sustainability, and economic sustainability" rather than the traditional annual economic annual report. (Sanford, 2000)

In addition to these published efforts similar sentiments were expressed in the Nationwide Company survey. This illustrates a belief on the part of the industry that they are working with the Ministry of Fisheries to create a sustainable fishing industry.

The environmental community disputes this assessment. For example: Wallace (1999) argues "Fisheries science is always a bit of guesstimating. For about 15% of the stock we know where the stock is relative to B_{msy} . Half the stocks are above and half are below. The remaining 85% we don't know. Yet if you listen to the rhetoric, you would think we have excellent information."¹¹⁰ This assessment is supported by Sissenwine and Mace who note:

There is little evidence of improvement in the condition of fisheries resources; but since stock assessment information is limited, it is difficult to know. ... There is evidence that some stocks have declined, most notably orange roughy, which has been found to be much less productive than previously believed.¹¹¹ ... To date, the track record of ITQ management with respect to conservation is not good (Sissenwine and Mace, 1993: 152)

Also, recent reports have again raised concerns over the condition of the orange roughy fishery (e.g., Gillespie, 1999; English, 1999; Weeber, 2000). Another concern raised by the environmental community (e.g., Bellingam, 1993; Thrush, 1998; Weeber, 1998) is that the focus on single-species stock assessment and management has resulted in neglect of broader environmental concerns (such as coral, seabeds, marine mammals, birds, etc).¹¹² The comments and analysis above suggests that whether enough information is available to make TAC setting decisions depends on who is being asked, and whether broader issues such as bycatch and ecosystems are addressed. Broadly speaking, the

¹¹⁰ Weeber (1999) made a similar analysis using almost exactly the same figures.

¹¹¹ A more detailed discussion of the orange roughy incident is available in Mace, 1993 and Mace et al 1990.

¹¹² A few members of the fishing industry (e.g., Norris, 1999) also expressed concern over the use of the single-species approach rather than the ecosystem approach.

Ministry, NIWA, and industry are comfortable with information availability and quality, while the environmental community has important reservations.

Turning to the fishing community, opinion there reflects the uncertainty seen in the scientific community. My industry survey research offers important insights. Participants in both the Auckland Region and National Company Survey¹¹³ were asked to respond using a Likert scale to the statement "ITQs conserve the fish stock I fish for." (1=strongly disagree, 4= strongly agree.) Results (summarized in Table 5-1) show that while percentages show a slight increase in the belief that ITQs conserve fish stock over time, each year, the mean opinion is not sufficiently different from a neutral score of 2.5 to be statistically significant. Similarly, paired t-tests¹¹⁴ show that changes in opinion over time on whether ITQs conserve fish stock are not statistically significant. Essentially, within the Auckland Region survey, support for the idea that ITQs conserve fish stock is lacking.

Table 5-1: Auckland Region Survey Response on Conservation over Time

	1987	1995	1999
Mean Likert scale response on conservation ^{1,2}	2.54	2.67	2.56
% Agreeing that ITQs conserve stocks	56%	68%	63%
% Mentioning ITQs conserve fish stocks	53%	50%	60%

¹ Single-sample t-tests show responses are not statistically significantly different from neutral (2.5) at the .05 level.

² Paired t-test shows that changes in mean opinion over time are not statistically significant at the .05 level.

Comparison of small-scale fishers from the Auckland Region survey and Companies (summarized in Table 5-2) shows that while both fishers and companies agree that ITQs

¹¹³ Details about the methodology of these surveys is available in Chapter 3.

¹¹⁴ Means tested in the paired t-test are slightly different than those reported in Table 1, since paired t-test only examine those who participate in both surveys tested. For example, the paired t-test on 1987 vs. 1999 tested means of 2.49 vs. 2.57 while Table 1 shows 2.54 and 2.56.

conserve fish stocks. there is a statistically significant difference (at <.01 level) between fishers and companies with the companies more strongly agreeing that ITQs conserve fish stocks.

Table 5-2: 1999 Comparison of Auckland Small-Scale and Nationwide Companies Response on Conservation

	N	Mean	Std. Dev.	Levene's F(sig)	t	df	Sig. (2-tailed)
Fishers	33	2.73	1.07				
Company	25	3.36	.70				
Test Results				6.135 (0.016) ¹	-2.718	54.992	.009

¹ Equal variance not assumed for independent sample t-test.

These results are confirmed by comments made during interviews. For example, while there are a few dissenting opinions, the majority of company respondents agreed that ITQs help conservation:

- ◆ "ITQs protect fish from the ravages of man. It does protect the stock (Company Survey #3)."
- ◆ "If there wasn't an ITQ system, we wouldn't have some of the fisheries like orange roughy. It conserves the fish (Company Survey #6)."
- ◆ "ITQs do nothing to conserve flatfish and red cod. It's set high to allow for annual fluctuations. On stressed stocks, it follows them down (Company Survey #16)."
- ◆ "ITQs give us a certain amount of sustainability, an assurance that primary species like orange roughy won't get decimated (Company Survey #22)."
- ◆ "Inshore fisheries used to be over-fished. ITQs stopped that and allowed rebuilding (Company Survey #23)."

In contrast, fishers in the Auckland Region survey express considerably more mixed opinions:

- ◆ "It depends on the species. Different species, yes. Mullet and flounder are still being hammered down (Auckland survey #4)
- ◆ "None of the species have recovered enough to increase TAC. Instead it reduces my catch (Auckland Survey #6)
- ◆ "Look how much snapper there is. Its has improved the stock (Auckland Survey #10)."
- ◆ "If everybody abided by the law and there were no amateurs it would [conserve fish stock]. But not under the current situation (Auckland Survey #18)."

- ◆ “Most of the fish stocks are improving. If I had been left to my own, I would have gotten greedy (Auckland Survey #19).”
- ◆ “Yes, it conserves all the fish stocks in our area. There’s more snapper than there’s ever been before. Its come back (Auckland Survey #36).”

Overall, results of both the Auckland and Company surveys show that within the larger companies there is strong support for the proposition that ITQs conserve fish stocks. However, within the Auckland community and the “on the water” fishers who dominate that survey, there is long-lasting ambivalence and disagreement on whether ITQs conserve fish stocks.

Another source of information for examining sustainability and the quality of stock assessments is analyses of research quality. A few of these have been produced in recent years. In an analysis based on 1994 data, Annala noted that the quality of stock assessment has improved from that described by Sissenwine and Mace (see above). Specifically, of the 149 active fish stocks, 8.7% are estimated to be above B_{msy} , 32.2% were estimated to be at or near B_{msy} , 8.7% are estimated to be below, and status could not be determined for the remaining 50.3% (Annala, 1996: 47). More recently, a report by the MoRST based on 1996 data provides a more detailed analysis (see Table 5-3). This shows that for active fishstocks under QMS current biomass and B_{msy} have been estimated for only 11% of fishstocks, stock status is unknown with respect to MSY for 59% of fishstocks, and the TACC can be described as “risky” for 56% of fishstocks (MoRST, 1996: 26).

Table 5-3: MoRST Analysis of 1996 Stock Assessment (MoRST, 1996: 26)

	QMS Species (all)	QMS Species (TACC >1000t)	Non-QMS species (mean catch >1000t)	Total
Number of species	30	21	10	40
Number of fishstocks	150	60	14	164
Percent of fishstocks for which:				
B_0 is estimated	17%	31%	43%	20%
$B_{current}$ and B_{msv} is estimated	11%	18%	43%	14%
MCY is estimated	67%	68%	43%	65%
Stock status unknown w/MSY	59%	53%	46%	59%
The TACC is "Risky" ¹	56%	53%	N/A	N/A

¹ "Risky" defined as "there being no MCY estimate available or current TACC at least twice the MCY (excluding fishstocks for which there are CAY estimates)

The most recent analysis of fish stock comes from Royal Forest and Bird (F&B -- a national environmental organization).¹¹⁵ Using the 1999 Ministry of Fisheries' "Report on the Stock Assessment plenary," they developed a detailed analysis of the orange roughy fishery (see Table 5-4). It showed all but three fisheries having declining fish stocks, and only a small percent of initial population is left ranging in most fisheries ranging from 3% to 22%, with one fishery estimated between 21% and 44%.¹¹⁶ F&B used this research to "call on the Government to close the Challenger orange roughy fishery after the latest research showed that it had plummeted to perilously low levels" and noted that "Deepwater fishing for orange roughy and other species is leaving a terrible legacy for the future" (Weeber, 2000: 1). Together, the Annala, MoRST and F&B results show a substantial lack of knowledge about the fish stocks. To re-iterate the MoRST findings, B_{msy} have been estimated for only 11% of fishstocks and for 59% of

¹¹⁵ Some may consider this assessment to be overly pessimistic. For example, "The head of the Orange Roughy Management Company said Forest and Bird spokesman Barry Weeber was an extremist who always took the most pessimistic position on environmental issues" (English, 1999: A11).

¹¹⁶ According to Royal Forest and Bird, "30% is the agreed minimum population size for NZ fisheries." (Weeber, 2000: 2)

fish stocks MSY is simply unknown. Given these findings, it is reasonable to question whether a scientific assessment of sustainability under QMS can be made.

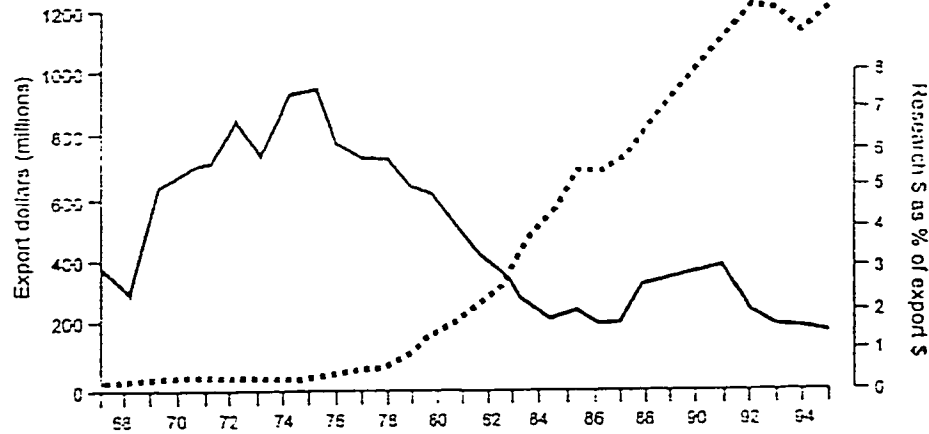
Table 5-4: Royal Forest and Bird Analysis of 1999 Orange Roughy Stock Assessment (Weeber, 2000: 2)

Fishery	% Initial pop. left ¹	Current trend	Current catch limit (TACC)	Estimated current annual yield (CAY)
Challenger	3%	Declining	1425	220
Northern	Unknown	Declining?	1190	Unknown
East Cape	14%	Declining	2000	130
East Coast North Island	10%	Declining	1261	770
NW Chatham Rise	21-44%	Declining	2250	930-2600
NE & E Chatham Rise	17-21	Unclear	4950 (w/ South Rise)	3499-4400
South Chatham Rise	Unknown	Declining catch	4950 (incl. NE & E Chatham Rise)	Unknown
Puysegur	7%	Unclear	Closed	90-340
Southern Areas	Unknown	Declining?	5000	Unknown
WC South Island	22%	Unknown	430	200

¹ 30% agreed minimum population size

Finally, spending on fisheries research can be examined. As is illustrated by Figure 5-1, when the amount of money spent on research is examined, after increasing spending as a proportion of exports from the introduction of QMS through the early 1990s, it has fallen so that by 1995, it was approximately 1.5% of exports (MoRST, 1996: 10). Concern about this limited spending and decline in spending are expressed by both the environmental and scientific communities. Wallace is most forceful when she notes “Research peaked in the early 1990s at \$22 million and has declined considerably. ...

**Figure 5-1: Research Spending Relative to Export Earnings
(MoRST 1996: 10)**



Dashed line = Export dollars (NZ million) earned from fishing.
Solid line = NZS spend on research as a percent of exports

Research has been savagely cut" (Wallace,1999). Similarly, a newspaper report on cuts in research spending noted that:

Royal Forest and Bird Protection Society spokesman Barry Weeber said that the announcement meant fisheries research funding faced a more than 50% cut in real terms since Mr. Kidd took office and a 36% cut in straight number terms over the past five years. Given that scientists admitted they know little about the sustainability of some fisheries, a further cut to \$14.5m in 1996-97 down from \$22.7m in 19992-3 was "horrendous," Mr. Weeber said.

In contrast, McKoy (1999) notes "The QMS creates a demand for information which has not been matched by appropriate research resources." Similarly a fisheries scientist familiar with industry research comments that "We don't spend a lot of money on fisheries research compared to other countries, and a little bit of judicial spending could help quite a bit. ... If I had a carte blanc, I would be hard pressed to double the research budget." Together, these comments and the MoRST report indicate a declining spending on research at a time when there was continuing or increased demand for research services.

With the scientists' assessment, the environmentalists' critique, industry survey results, stock assessment analyses, and spending trends presented, a broad assessment of sustainability can be made. This assessment is based on the preponderance of the evidence presented above. First, it is clear that the fisheries science in New Zealand is the best or close to the best science there is – especially for high profile fisheries. But, as is both the environmentalists' critique and the stock assessment analyses illustrate, there are enormous degrees of uncertainty that give non-scientists (such as myself) considerable reason to pause. In assessing whether QMS and the science behind it conserves the fish stock, it can only be noted that the scientific information to declare QMS either a success or a failure in conservation simply does not exist, and this uncertainty (or ambivalence) about sustainability is also seen in the Auckland Region survey.¹¹⁷

Turning to the question of whether the information is sufficient for QMS as a management approach, it seems reasonable to conclude that even though fisheries science in New Zealand is undoubtedly world class, given this high degree of uncertainty, the information necessary to run an ITQ system in a manner that ensures sustainability is not present.¹¹⁸ However, the information available would not be enough to ideally run any of the other dominant approaches. Adequate information to assess and ensure sustainability is an endemic problem, not restricted to ITQ management or to the New Zealand scientific or fishing community. Instead it is a reflection of a systematic problem seen throughout fisheries management, and the fisheries scientists must be commended for

¹¹⁷ Although companies are broadly positive about sustainability under QMS.

¹¹⁸ Indeed, the new Fisheries Minister in the Labour Government recently reached this conclusion, stating "We can't pretend that we have a good quota management system, because we haven't got a sufficient knowledge base" (Thomas, 2000: 2)

addressing the problem in the most direct and sophisticated manner possible. Indeed, it is worth noting that while globally 70% of the world's major marine fish stocks are over-fished (Thomas, 2000), with the exception of orange roughy, New Zealand has avoided the over fishing or recovered its fishstocks. This suggests that although the information is clearly insufficient for an ITQ management approach, it appears that from Lindbloom's (1959) "muddling through" perspective, the approach is doing adequately, if not well.

Perception of Efficiency

The two primary positive benefits attributed to ITQ management are conservation and increased efficiency in the fishery. These claims are frequently made for New Zealand where strong arguments supporting efficiency have been made, with little (if any) evidence to back them up. Examples include Crothers' statement that that QMS had "improved industry efficiency, competitiveness, and profitability" (Crothers, 1988: 12) and Clark's statement that QMS had "been successful in ... improving the economic performance of the commercial industry" (Clark, 1993: 341). Thus, it is important to examine claims of efficiency. However, given the limits of this dissertation (as described in Chapter 3), here I am limiting my examination to perception of efficiency within New Zealand's quota management system.

The existing literature on New Zealand's QMS is an important source of perceptions of efficiency – particularly perceptions among the academic and policy-making communities. Documented research on the efficiency of QMS is scarce. Early, unsubstantiated reports such as those above (e.g., Crothers, 1988; Clark et al, 1988; Clark, 1993) created an early impression of QMS increasing efficiency that it now

reflected in later secondary analyses (e.g., Buck, 1995; Batkin, 1996). However, later, more detailed analyses had difficulty documenting increased efficiency.

Annala (1996) presents the strongest evidence of increased efficiency with two pieces of evidence. First, he notes that an index of the seafood industry's competitiveness from 1988-1993 shows an increase of "about 20%" during that time period (Annala, 1996: 50). Also, "for the six years from 1986-87 to 1991-92, the return on assets (after interest, rentals, and tax) for the major quota holders in the survey was 11.1%, 10.2%, 10.8%, 6.6% and 11.5% respectively (Annala, 1996: 50). These results show a profitable industry – particularly among the larger companies (the "major quota holders), and one that is able to compete globally. But a profitable company does not necessarily mean an efficient company or an efficient sector. Similarly, international competitiveness can have many contributing factors – such as relatively low exchange rates or lower labor and input costs. Thus, while Annala's findings create and support a perception of increased efficiency, it is not necessarily direct evidence for increased efficiency.

Other analyses were more ambiguous. For example, Sissenwine & Mace (1992) commented, "At this stage, it is unclear what economic effects ITQ management has had. But, all other things being equal, it seems reasonable that ITQ management should have increased economic benefits. Unfortunately all other things are not equal." The authors then discuss how a drop in export prices and unfavorable exchange rates hurt industry profitability (Sissenwine & Mace, 1992: 153). Like Annala, there is a perception of efficiency, but little direct evidence. Finally, the most recent attempt at assessment came to the unsatisfactory conclusion that :

It is highly likely that the mechanism [QMS] is not economically efficient.
To achieve economic efficiency the mechanism must provide a basis for

pricing all rights. Without information on non-commercial benefits it is not possible to arrive at a conclusion. This result is, of course, common to many environmental management problems (Batstone & Sharp, 1999: 189).

Together, these more critical analyses suggest that there is a general belief that QMS has increased (or should increase) economic efficiency. But the proof of this increased efficiency is not yet available.

A strong and direct source of information on the perception of economic efficiency is this dissertation's survey data. Once again, the Auckland Region and Nationwide Company survey are used. Participants in both surveys were asked to respond using a Likert scale to the statement "The fishing industry is more efficient under ITQs." (1=strongly disagree, 4=strongly agree.) Unfortunately, this question was only asked in 1999, so historical changes in response to this question are unavailable. Results (summarized in Table 5-5) of the single-sample t-tests show that the small scale fisher's opinion is not significantly different from neutral, but that the companies agree that QMS makes the industry more efficient and the difference is significant at

Table 5-5: 1999 Comparison of Auckland Small-Scale Fishers and Nationwide Companies Response on Efficiency

	N	Mean	Std. Dev.	Levene's F(sig)	t	df	Sig. (2-tailed)
Fishers	28	2.54 ¹	1.00				
Company	24	3.25 ²	.68				
Test Results				4.783 (0.033) ³	-2.905	47.626	.006

¹ Not different from neutral (2.5) at the .05 level.

² Difference from neutral (2.5) is statistically significantly at <.001 level.

³ Equal variance not assumed for independent sample t-test.

the <.001 level. Furthermore, the difference in opinion between the small-scale fishers and the companies is significant at the .01 level. This indicates that while the fishers are essentially ambivalent (scale =2.57) about whether ITQs increase industry efficiency,

companies agree that they do increase efficiency (scale =3.25) considerably more than the fishers. An illustration of this difference is that while five fishers strongly disagreed that “the fishing industry is more efficient under ITQs.” not one company strongly disagreed, and only three companies disagreed.

This differentiation in opinion is confirmed by a comparison of fisher and company comments. For example, fishers opinion is quite mixed:

- ◆ “I imagine the deepwater is [more efficient] but inshore is not. There’s so much of the inshore quota that’s not caught each year (Auckland Survey #9).”
- ◆ “It’s more efficient because now people try to catch fish for the least cost at the shortest time. Less wastage and more quality. You used to cast your net straight through the middle of a school of fish. If you brought in rubbish you didn’t care. Now if you bring in rubbish, you don’t get paid and you use quota (Auckland Survey #19).”
- ◆ “Catch is more efficient, that’s for sure. There’s less boats and nets catching the same amount of fish (Auckland Survey #22).”
- ◆ “We’re more efficient at running businesses – made us better businessmen, but less efficient fishermen (Auckland Survey #24).”
- ◆ “Mfish is more efficient sending out invoices. I don’t know about the industry (Auckland Survey #34).”

Meanwhile, companies were nearly consistently positive about efficiency, with comments such as the following.¹¹⁹

- ◆ “QMS has stopped the race for the fish. It allowed us to stop fleet expansion and instead focus on quality and efficiency (Company Survey #2).”
- ◆ “For companies with strong catch histories, yes [ITQs improved efficiency]. But it’s difficult for companies to invest in quota today and be efficient (Company Survey #3).”
- ◆ “All those companies and fishers who were not efficient have died out of business because of the additional costs of ITQs. (Company Survey #15).”
- ◆ “Under ITQs we’ve become more focused on seasons – managing vessels, when to fish, its made us smarter fishers and smarter sellers (Company Survey #19).”

¹¹⁹ It is worth noting that among the companies, even the negative comments acknowledge that QMS increase efficiency, but they do not like the way in which it does.

Together, these sets of quotes show a broad (but not unanimous) agreement that QMS increases industry efficiency, with a split between the companies and the fishers, and the fishers more divided and cautious than the companies.

Finally, popular and industry publications in New Zealand support the broad perception of increased efficiency under QMS.¹²⁰ For example, the *New Zealand Herald* reported on a speech by the Minister of Fisheries and noted, "as a result of the Quota Management System, New Zealand has seen a healthy, profitable industry flourish in the last two decades. ... It employs more than 10,000 people and has a bright future, he said" (Horwood, 1999: A10). Industry leaders also support the impression of efficiency. A recent editorial in *Seafood New Zealand* (the industry trade magazine) argued "New Zealand's fishing operations and skilled operators are truly internationally competitive. ... The entire industry operates without subsidy. This is unique in the world." (Macfarlane, 2000: 4). Similarly, *Seafood New Zealand* reprinted a speech by the chairman of the Seafood Industry Council in which he stated "We are the fourth largest export earner in New Zealand ... We do not need to apologize to anyone for our activities and politicians, the media and the public should treat us with respect" (Sharp, 2000: 49). Finally, a recent posting on *Fishfolk* (the main international fishing policy list-serve) by a New Zealand fisheries consultant commented that "ITQs are a very efficient means of restricting outputs from fisheries and allowing market mechanisms to bring about optimization of the resulting fishery" (Howard, 1999). These quotes illustrate the broad perception that the fishing industry is more efficient compared to the past and compared

¹²⁰ These examples are relatively recent (1999-2000) but (as is illustrated by the quotes by Clake (1993) and Crothers (1988) at the start of this section) similar claims have been made for most of the time QMS has existed.

to other nations. They also show how the perception is maintained and spread through the industry and (to a lesser degree) the broader public.

Together, these source (from published studies, to Auckland and Company surveys, and more popular publications) broadly sound the same theme. Except for the small fishers who are more cautious, the theme is a strong belief (or perception) that QMS has increased the efficiency of the fishing industry. Even though the direct proof of increased efficiency is difficult to obtain, there is a strong perception among the industry and observers that QMS has indeed led to an increased efficiency within the fishing industry.

Industry Consolidation, Aggregation, and the Loss of Small Fishers¹²¹

Among opponents of ITQ management, industry consolidation and aggregation of quota are two of the primary critiques raised against ITQs. They argue that consolidation is a concern because it can be associated with the loss of small fishers, and a shift in power and potential management responsibility from the “on the water” fishers to the fishing companies. Similarly, loss of small fishers can be a concern because of the effects it can have in small, rural communities.¹²² However, it should also be noted (as discussed above) that one of the perceived advantages of QMS is that it increases efficiency. Since (especially in midwater and deepwater fisheries) large factory trawlers can catch a larger volume of fish more quickly than smaller fishers, both consolidation and loss of small fishers can be seen as negative “flip sides” of increased efficiency.

¹²¹ Consolidation and aggregation are important terms that are sometimes used interchangeably. For this analysis, these terms are used as follows: Industry consolidation refers to the process of reducing the number of quota owners and fishers with a fishery. Aggregation describes a shift in quota ownership (and thus power) from its initial distribution (usually a large number of small or middle-sized fishers) towards a small number of large companies with a small number of large fishing boats.

¹²² Young and McCay, 1995; and Palsson and Helgason, 1996 are examples of the above argument.

New Zealand, in particular, presents a challenging case for examining industry consolidation and aggregation of quota. This is because the historical context in which consolidation may or may not be taking place are different than other situations (such as Iceland). As is discussed in Chapter 4 (Appendix 4-2), in the responses to the inshore fisheries depletions of the late 1970s and early 1980s, in 1983, the New Zealand government removed all part-time fishers from commercial fishing. Part-time fishers were defined as those earning less than 80% of their income or less than \$5,000 from commercial fishing. While I could not locate exact figures for how many fishers were removed, between 1983 and 1984, the number of licensed fishing vessels dropped from 4,320 to 2,744 (Department of Statistics, 1985: 473). This represents a loss of 37% of the 1983 fishing fleet. This loss occurred before QMS was introduced in 1986, so this shift in harvesting and fishery participation away from the smallest of the fishers occurred before quota was distributed. Thus, when consolidation, aggregation, and loss of small fishers in New Zealand's QMS is examined, we are in effect looking at a truncated set of data in which a large proportion of the small fishers are already removed.

Multiple sources are available to examine industry consolidation, aggregation, and loss of small fishers. One direct source is the historic quota ownership data.¹²³ This data set contains records of the number of quota owners and the amount of quota they own. I conduct my own analysis of changes in the number of quota owners, and report on other published analyses that examine changes in ownership patterns. Another source is the Auckland Region and Nationwide Company surveys that examine perception of quota ownership problems and issues. Finally, government reports and published articles in the popular press also provide insights into consolidation and the small fishers.

¹²³ See Chapter 3 for a detailed description of this data set.

Historical quota ownership is the most direct source of information about trends in quota ownership. Consolidation and aggregation are usually assessed by examining the proportion of quota owned by the largest players (e.g., changes in the percent of quota owned by the largest players). Typically this is tested using Gini coefficients and Lorenz curves (e.g., Liew, 1999; Connor, 1999; Palsson & Helgason, 1995; Smith, 1990). However, this approach is problematic in New Zealand because there are incentives for both companies and small fishers to split their holding among multiple legal entities. For example, multiple holding companies can be used to circumvent aggregation rules. Or, for the smaller fishers, there can be both tax and compliance penalty avoidance advantages placing portions of quota in family trusts. This leads to data analysis problems since (as happened in the 1998 ORH7A stock) where a single company used three holding and allied companies containing 24 tonnes, 22 tonnes, and 171 tonnes. This can artificially reduce Gini coefficients and thus the appearance of consolidation. To address this problem, my analysis focused on change in the number of quota owners over time. Since there is no reason to expect a change in the use of holding companies and family trusts over time, this reduces the susceptibility of the analysis to this use of these legal entities. Specifically, I compiled the number of quota owners in active fish stocks¹²⁴ in 1986 and 1996 (the extreme years that data is available) and noted whether

¹²⁴ Active fish stocks means species that are actively fished and administered. One oddity of New Zealand's QMS is that administrative fishstock classifications are often created (and small amounts of quota distributed) for species that are not actively fished in that region. These species are known as "paper fish." Most species in quota management area 10 are set at a nominal 10 tonnes, and have 0% or only a few percent of the quota caught. For example, in 1995/96 TAR10 quota was set at 10 tonnes, of which 0.7% was recorded as caught. Similarly, in TRE3 quota was set at 21.6 tonnes of which 0% were caught. "Paper fish" were identified using data presented in *New Zealand's Commercial Fisheries: The Atlas of Area Codes and TACCs 1997/98* (Clement, 1997). Removing "paper fish" excluded 13 fishstocks from this dataset and analysis.

the species in inshore or deepwater fisheries.¹²⁵ Changes in number of quota owners over time and between inshore and deepwater fisheries were then compared using a two-way ANOVA test. This provides a method to examine the degree to which consolidation is occurring, and whether there is a difference in the degree to which it occurs in the inshore versus deepwater fisheries.

Results of this analysis (Tables 5-6 and 5-7) provide clear evidence that consolidation is occurring, particularly in the inshore fisheries. Beginning with the within-subject effects, if we ignore the difference between inshore and deepwater fisheries, the change between 1987 and 1998 is statistically significant ($p < .001$) and explains 15% of variance. Also, the interaction between location of fishery and time shows that the way in which the number of fishers changes depends to some extent on whether the fishery is inshore or deepwater ($p = .003$, 8% of variance explained). Finally, the analysis of the between-subject effect shows that if we ignore time, there are more quota owners in the inshore than deepwater fisheries. Together, these results are best understood by examining Figure 5-2, which illustrates the difference between the deepwater and inshore fisheries. This shows that the deepwater fisheries dropped from an average of 40 quota owners to an average of 35 quota owners, a drop of 13%; while the inshore fisheries dropped from an average of 95 quota owners to an average of 67 quota owners, a drop of 30%.

¹²⁵ Species were classified as inshore or deepwater based on the description of the species provided in *Common New Zealand Marine Fishes* (Paulin, 1998), and *Report from the Fishery Assessment Plenary, April 1999: stock assessments and yield estimates* (Annala et al, 1999)

Table 5-6: Descriptive Measures of Inshore and Deepwater Quota Ownership 1987 to 1998

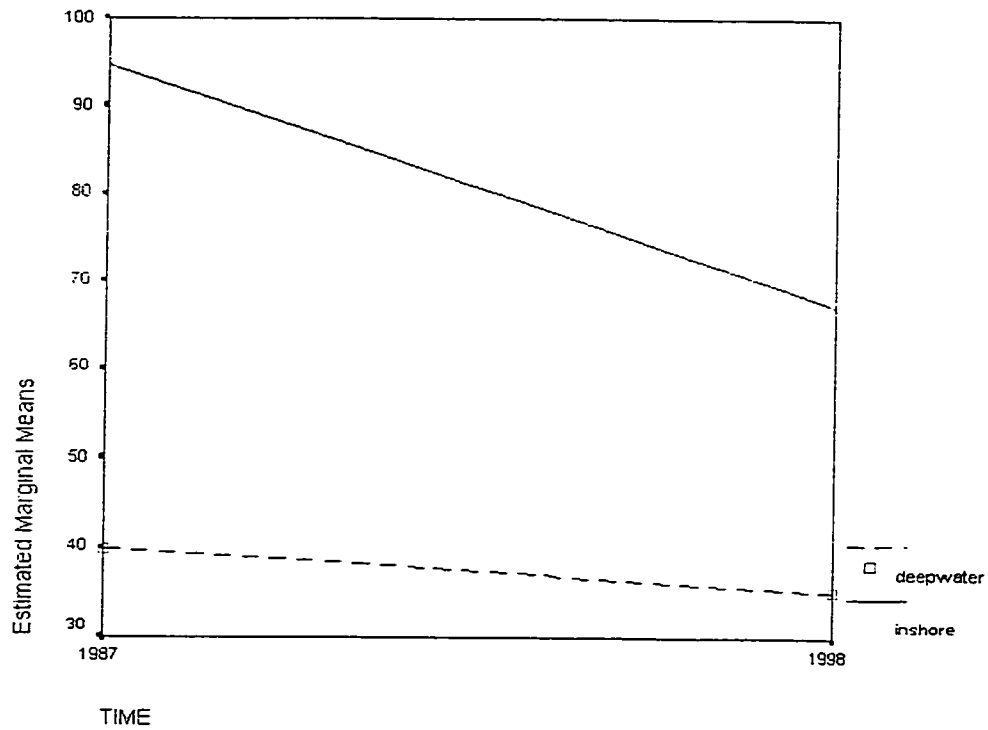
	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Number of Deepwater Quota Owners 1987	39.931	12.471	15.211	64.651
Number of Deepwater Quota Owners 1987	35.138	6.858	21.544	48.732
Number of Inshore Quota Owners 1987	94.568	7.462	79.777	109.359
Number of Inshore Quota Owners 1998	67.296	4.104	59.162	75.430

Table 5-7: Two Way ANOVA Analysis of Changes in Number of Quota Owners over time Between Inshore and Deepwater Fisheries

	Sum of Squares	df	Mean Square	F	Sig.	Eta Squared
Within-Subject Effects ¹						
Time	10977.790	1	10977.790	18.782	<.001	.148
Time*Location	5395.045	1	5395.045	9.231	.003	.079
Between-Subject Effect						
Location	80436.298	1	80436.298	15.205	<.001	.123

¹ Reported results using sphericity assumed test.

Figure 5-2: Marginal Measures of Change in the Number of Deepwater and Inshore Quota Owners



My analysis shows that consolidation in the number of quota owners has occurred in both the inshore and deepwater fisheries, but it occurred more rapidly in the inshore fisheries. These results, particularly the difference between the inshore and deepwater fisheries certainly makes sense in the historical context of the New Zealand fishing industry. As is documented in Chapter 4, the inshore fishery was historically dominated by smaller inshore fishermen, and thus would be open to dramatic consolidation. Also, when QMS was introduced, the inshore fishery was overcapitalized and one of the many goals of QMS was to reduce fishing effort and catch. This analysis shows that QMS was dramatically effective in removing quota owners from the fishery. In contrast, the deepwater fishing industry only began to develop (under a large company model) in the early 1980s, and for much of QMS, the deepwater industry has been growing and

developing new fisheries. Thus, with few quota owners to begin with, and an expanding rather than contracting sector, it is indeed reasonable that the rate of consolidation is less for the deepwater industry.

In addition to my analysis, there are two analyses of quota ownership using historical quota ownership data. These analyses focus on changes in the amounts of quota owned, and thus provide direct evidence regarding aggregation of quota ownership.¹²⁶ First, in 1996, the Fishing Industry Association commissioned a report on changes in quota ownership during the first ten years of QMS. This report analyzed changes in patterns of quota ownership, and while drawing no conclusions about aggregation or consolidation, it observed that “forty-one percent of ITQ are currently owned as a result of initial allocations to these quota owners and 59% are owned through subsequent purchase” and that “seventy-five percent of ITQ are currently owned by the ten largest companies, all of whom have purchased between 46% and 100% of their quota” (Clement, 1996: 1). Also, the report’s more detailed analysis of the top companies combined (Table 5-8) shows the top companies steadily increasing their proportion of quota ownership.

Table 5-8: Quota Ownership 1986 vs. 1996 (Clement, 1996: 15)

Quota Owners	December 1986		August 1996	
	Tonnes	Percent	Tonnes	Percent
Sealord Products	55796	10.7%	145433	25.5%
Sanford	49412	9.5%	115298	20.2%
Amaltal	25204	4.8%	56118	9.8%
Independent Fisheries	13622	2.6%	27815	4.9%
United Fisheries	1149	0.2%	19397	3.4%
Southfish Co-Operative	4101	0.8%	8836	1.5%
Crown (Government)	204132	39.2%	874	0.2%
Others	63927	12.3%	76566	13.4%
Treaty of Waitangi Fisheries			566246	9.9%

¹²⁶ They are, however, vulnerable to the concerns mentioned above. Clement (1996) addresses this concern in their large owner analysis by identifying the largest owners’ holding companies and aggregating them together. However, this exercise was not conducted for all quota owners. Conner (1999) had not addressed the holding company issue.

Commission (Te Ohu Kai Moana)				
Vella Quota Number One			278636	4.9%
Talleys Fisheries	83	0.0%	119506	2.1%
Ceebay Holdings			107516	1.9%
Moana Pacific			7189	1.3%
Simunovich Fisheries			6553.2	1.1%
Fletchers Fishing	56675	10.9%		
Skeggs Investments	19432	3.7%		
Wanganui Seafoods	12273	2.4%		
Watties Fishing	8887	1.7%		
South Island Deepwater Fisheries	6207	1.2%		
TOTAL	520901	100%	571289	100%

The most dramatic of these are Sealord's change from 10.7% to 25.5%, and Sanford's increase from 9.5% to 20.2% (Clement, 1996:15). Together, these findings illustrate that an aggregation process is underway, largely through the purchase of quota by the larger companies.

Conner (1999) presented another analysis of aggregation and consolidation within the New Zealand fishing industry. He focused on both quota ownership patterns (using both Gini coefficients and the Herfindahl-Hirschman Index) and changes in the composition of the fishing fleet. He finds that trends of quota ownership "show slow but steady reduction in the numbers of quota holders in each sector except the deep-water" (Connor, 1999: 9). Again, this provides evidence of consolidation and aggregation – particularly within the inshore fishery. Regarding composition of the fishing fleet, Connor finds that boats smaller than 10m "have been disappearing," while numbers of 20-25 meter boats remain stable, and both 25-43m vessels and 60-70m vessels are both increasing (Connor, 1999: 10). This again, illustrates aggregation. But more particularly, it illustrates a shift away from the smaller fishers towards a larger more industrialized fishery. Connor concludes, "QMS appears to be living up to the promise of rationalization, albeit at a somewhat more sedate pace in aggregation than some might have imagined in enthusiasm for the concept" (Connor, 1999: 10). The "sedate pace"

Connor refers to may be due to the earlier (1983) removal of the smallest (part-time) fishers from the industry.

To summarize, all available analyses of changes in quota ownership provide direct evidence that industry consolidation and aggregation of quota ownership has occurred in the New Zealand fishing industry. My analysis shows that consolidation – a significant decrease in the number of quota owners – occurred between 1987 and 1998, and that the rate of consolidation was dramatically higher for the inshore fishery than the deepwater fishery. Other analyses that examined patterns of ownership – or the aggregation of quota ownership to a smaller number of large players – provide support for the argument that aggregation of quota ownership is underway. Furthermore, these patterns, when combined with Connor's (1999) findings about changes in boat sizes support the argument that the number and proportion of small fishers is being reduced.

Another source of information of consolidation, aggregation, and loss of small fishers is the Auckland Region and Nationwide Company surveys.¹²⁷ Originally, I planned to use these surveys as direct evidence of changing characteristics in the fishing industry, but the degree of variation in the characteristics of respondents makes such an analysis impossible. Instead, these surveys are used here to examine the views of industry members concerning loss of small fishers and industry consolidation. Analysis of the Auckland Region survey (Table 5-9) provides evidence supporting consolidation and the loss of small fishers. First, there is consistent agreement over time that QMS has made it

¹²⁷ See Chapter 3 for a discussion of limitations of these surveys and interpretation of their results. For this analysis, the most important limitation is that the Auckland region has faced stresses somewhat more severe than other inshore fisheries, so these results cannot be interpreted as representative of ALL small scale or inshore fisheries.

Table 5-9: Auckland Region Survey Responses on Small Fisher Issues Over Time

	Mean	N	Std. Dev.	t ¹	df	Sig. (2-tailed)
“ITQs make it difficult for young people to start fishing” (4=SA 1=SD)						
1987	3.54	39	.60			
1999	3.46	39	.79			
Test Results				.40	38	.637
“Current level of commitment to fishing business” (4=increase 1=getting out)						
1987	3.04	26	.66			
1999	2.58	26	.90			
Test Results				2.484	25	0.020

difficult for the young (the next generation of small fishers) to enter the fishing industry. The finding provides even more direct evidence that among the respondents to the Auckland Region survey who are still involved on the industry, the level of commitment has fallen from (on a four point scale) a mean of 3.04 to a mean of 2.58. This reduction in commitment, which is significant at <.05 level, can be interpreted as an indication that the small fishers (who dominate the Auckland Region survey) are losing their commitment to the industry, and thus the trend of loss of small fishers and aggregation will continue in the future.

A comparison of the small fishers in the Auckland Region survey and the respondents to the Nationwide Company survey show a strong difference in the outlook of the companies and small fishers, with the companies consistently more optimistic than the small fishers.¹²⁸ (See Table 5-10 for summary of all relevant results.) For example companies are generally increasing their financial commitment to the fishing industry, while the fishers are either maintaining or reducing their financial commitment ($p < .001$). Similarly, fishers express nearly perfect neutrality (mean = 2.55) on whether the industry

¹²⁸ The only exception to this is that both companies and fishers agree that QMS make it difficult for young people to enter the fishing industry.

is better off, while companies broadly agree that the industry is better off under QMS (p=.001). Finally when asked to describe their

Table 5-10: Comparison of Outlook of Auckland Small-Scale Fishers and Nationwide Companies

	N	Mean	t	df	Sig. (2-tailed)
"My Economic Condition has improved under QMS" (4=SA, 1=SD)					
Fishers	34	2.32			
Company	20	3.40			
Test Results			-4.342	52	<.001
"ITQs make it difficult for young people to start fishing" (4=SA, 1=SD)					
Fishers	36	3.44			
Company	26	3.35			
Test Results			0.475	60	.636
"The fishing industry is better off under ITQs" (4=SA, 1=SD)					
Fishers	33	2.55			
Company	26	3.35			
Test Results			-3.473	57	.001
"ITQs make it difficult for small fishers" (4=SA, 1=SD)					
Fishers	35	3.26			
Company	25	2.72			
Test Results			2.362	58	.022
"Current level of commitment" (4=increase, 1=getting out)					
Fishers	23	2.48			
Company	25	3.84			
Test Results ¹			-6.753	28.914	<.001
"My/my company's economic condition today" (1=worst, 10=best)					
Fishers	27	4.19			
Company	26	6.69			
Test Results ¹			-4.418	42.418	<.001
"My/my company's economic condition before ITQs" (1=worst, 10=best)					
Fishers	34	7.41			
Company	16	5.13			
Test Results			3.624	48	.001
"My/my company's economic condition in the future" (1=worst, 10=best)					
Fishers	20	4.00			
Company	25	7.74			
Test Results ¹			-5.580	28.637	<.001

¹ Reported results using sphericity assumed test.

economic condition today (1=worst, 10=best) companies are generally optimistic (mean =6.69) while small fishers (mean = 4.19) are somewhat pessimistic (p <.001). As with

the change in commitment over time discussed in the previous paragraph. the difference in opinion between the two groups suggests that large companies have succeeded under QMS, while small fishers have experienced considerable difficulties. This difference (as well as the lack of optimism among small fishers) also suggests that increased consolidation and loss of small fishers can be expected in the future.

Examining these aggregate survey responses might suggest that there is a fundamental lack of understanding between the small fishers and the companies, with the companies being unaware of the turmoil or problems in the inshore fishery, and the small fishers not considering the growth in the deepwater fishery. A review of commentary by both fishers and companies, however, shows this is not the case. Some companies believe that the small fishers had "their chance" to grow. But others watch the inshore situation with concern and worry about its implications for the industry's futures:

- ◆ "They system has hurt small fishers and that shouldn't be. There were early capital problems and complete misunderstanding by small fishers who sold all their quota to free-hold their boats ... Its fundamental, the industry needs small fishers and fishing communities for the system to work. Industry will eventually end up with industrial action problems." (Company Survey #4)
- ◆ "The reality is that here's been a restructuring in the industry. Since 1986, quota in fewer hands, fewer registered vessels. There's pain in the smaller communities. But there's also more value added now either on the ships or on shore. (Company Survey #5)
- ◆ "Big companies are monopolizing the fishery by controlling the quota. The aggregation limits are not working." (Company Survey #13)
- ◆ "Smaller fishers had their chance. They were allocated quota. Where small fishers went wrong was selling quota with an agreement to continue catching. They sold themselves out for cash. (Company Survey #15)
- ◆ "I've been able to grow my company from one 42 foot longliner making \$150,000/yr to a company turning over in excess of \$10,000,000/yr." (Company Survey #16)
- ◆ "Larger companies are on a spending spree buying fishers' individual quotas. Sons are not coming in. With levies and cost structures and the costs of buying quota it cannot be done." (Company Survey #20)

Opinion among the small fishers, is also considerably more mixed than might be expected from the aggregate responses. While some see small fishers as victims of QMS, others focus on choice, and decisions to stay in the industry for the lifestyle¹²⁹:

- ◆ “They [small fishers] have done alright, depending on how hard you want to work. If you’re willing to work, you can do all right. Fishing is a pretty luxury job.” (Auckland Survey #12)
- ◆ “I don’t think they [the government] wants us, the little guys, in the system, we’re a pain in the arse. They want big companies they can control.” (Auckland Survey #18)¹³⁰
- ◆ “[Small fishers and owner-operators] with quota are surviving. Those who don’t are falling by the wayside.” (Auckland Survey #7)
- ◆ “My son tried to get into fishing three times and each time he’s gone bust – its too expensive to buy or lease quota. Virtually no young people are coming up. ... I can see a time when ... nobody will be left to catch. The skill is going out of the industry.” (Auckland Survey #19)
- ◆ “The large companies were positioning themselves and drove the quota prices through the roof. Combined with cuts, the small fishers couldn’t get the money to compete. ... The guy leasing quota to me makes five times more than me. It pushes the small fishers to the wall.” (Auckland Survey #19)
- ◆ “ITQs are like a bad accident on the road. I couldn’t sell or get rid of quota. It used to be worth \$12,000/tonne, with levy costs quota is now a liability.
- ◆ “Conditions are quite shocking. Only reason people are in it is the lifestyle. You don’t like to leave it. People nearly go broke before they get out. We’re fishing for our pride.” (Auckland Survey #39)
- ◆ “They [small fishers] have done alright – you have to go for the higher quality and get better prices.” (Auckland Survey #35)

When the comments of survey respondents are examined as well as the aggregate responses, they reinforce the degree of complexity surrounding the issues of consolidation, aggregation, and small fishers. In spite of some dissenters, there is broad agreement that QMS has increased pressure on the small fishers – and many expressed awareness and concern about consolidation and aggregation issues.

¹²⁹ This last observation is consistent with Gatewood and McCay’s (1990) findings that individual fishers often will stay in the fishery beyond the point that it is economically rational because of the value placed on non-monetary rewards, such as the lifestyle.

¹³⁰ This “conspiracy theory” was expressed multiple times by Auckland Survey.

The rate at aggregation is occurring can also be gauged by examining the granting of exemptions to the aggregation limits. Under the 1996 (and earlier) laws, quota ownership is limited to 35% of the quota for any fishstock, with the following exceptions: 1) 10% of rock lobster quota 2) 20% of paua quota. 3) 20% of bluenose. 4) 45% of any species brought in under the 5th schedule. If a person or company is found to be above these aggregation limits, quota in excess of the limit is forfeited. The Minister of Fisheries can grant exemptions to these aggregation limits. (Fisheries Act 1996 IV(59-61))

These aggregation limits have long been controversial in the fishing industry, with opinions split largely by the size of the quota holders, and whether they are bumping up against the aggregation limits. For example, a 1994 survey of industry leaders summarized industry opinion as follows:

“there are really just two camps. Those who regard aggregation limits as unwarranted interference in their legitimate commercial aspirations, and those who see the limits as a way of safeguarding their own access to quota. Unfortunately, even those who want limits retained admit that the aggregation provisions may not have had much effects... (Billington, 1994: 4)”

There are two main reasons aggregation limits are perceived as ineffective. The first is the level at which limits are set. As stated by one respondent, “the limits allow three players in the deepwater and five inshore. If the object was to keep the quota in the hands of small players it couldn’t do that anyway.” (Billington, 1994: 10) The second reason was difficulty in enforcement. The report quoted Dave Wood (Deputy Manager, Fishing Compliance) as admitting: “some entities have gone to extraordinary lengths by way of shelf companies and other mechanisms to avoid the intent of the legislation. ... legal opinion has confirmed little can be done. Detection of breaches is difficult unless the

holder is one legal identity” (Billington, 1994: 11).¹³¹ Both this report and a later report (FIB, 1995) recommended fundamental change or abolition of aggregation limits was necessary. As summarized by the FIB: “The current aggregation limits are not working, and are inappropriate.

Such open discussion of the difficulty in enforcing aggregation limits suggests that a considerable degree of unreported aggregation beyond the legal limits is occurring. Another indication of large-scale aggregation is the number of quota aggregation limit exemptions approved. I requested a list and description of all exemptions approved from the start of QMS through 1999. A summary of these exemptions is presented in Appendix 5-2. Analysis of these exemptions shows that there is a sizeable amount of authorized beyond-limit aggregation occurring with 38 exemptions recorded between 1988 and June 1999. The rate at which aggregation exemptions has changed over time, beginning slowing during the early years of QMS, then peaking in 1997 and 1998. Often these exemptions covered multiple species (e.g., the 14 August 1997 exemption for Talley's Group covered 26 different species). These exemptions are also substantially more than the limits described above. Exemptions of 35% or 45% of a fishstock are common, and in some situations, exemptions of up to 100% of a fishstock were granted. In some cases, two different companies are given exemptions for 45% of the same fishstock (e.g., in 1997, 45% of the fishstock for alfonso and barracuda -- among other species -- was granted to both TOKM and Talley's Group). The extensive use of these exemptions (to the point that they appear to have become routine) appears to have created a situation where it is indeed reasonable to question whether aggregation limits on quota

¹³¹ These same sentiments were expressed to me during the Auckland Region and Nationwide Company surveys.

for some species exists at all. Indeed, for species such as alfonsino, barracuda, hoki, orange roughy and red cod, it appears that the aggregation limits are not only failing to protect smaller fishers, but may be failing to protect both producers and consumers from the formation of oligopolies.

In addition to direct information sources such as those used above, articles in both industry and popular presses also extensively illustrate the presence of problems surrounding consolidation, aggregation, and small fishers. Industry publications, such as *Seafood New Zealand (SFNZ)* -- the industry trade journal -- provide a forum to discuss these issues. Recently, *SFNZ* published a series of articles profiling various ports throughout the country and describing the changes seen since the introduction of QMS. Table 5-11 summarizes these articles. The articles illustrate that since QMS, there has been a major restructuring in the fishing industry throughout the country, with small fishers leaving the industry, and many rural communities no longer supporting traditional small fishing ports. At the same time, a few ports (such as Timaru and Nelson) have seen expansion. They grew in their ability to support and do processing for the deepwater fisheries.

Table 5-11: Changes in Ports since QMS -- As described by Peter Stevens¹³² (Stevens 2000a, 2000b, 2000c, 2000d, 1999a, 1999b, 1999d, 1999e, 1999f, 1999h, 1999i)

Port/Region	Description	Fleet
Far North (1999a)	Scalloping suffers under high levies and low profits, but lobster potting thrives. Finfishing dominated by company-owned boat based further south that discharge in northland. The local trawlers depend on leased quota.	19-20 lobstermen 20 company-owned trawlers 5-6 locally owned trawlers Local fleet smaller than pre-QMS.
Napier (1999d)	Previously Napier was a "busy bustling fishing port" but while fishing industry is still active, it no longer dominates. Similarly, owner-operators have less of a	Lost 12 vessels in last 18 months. Rock lobster fleet down to 4 vessels in Napier and 13 in the region. Three quays one filled with small and

¹³² Ports are arranged in rough geographic order from north to south.

	role than companies. But Napier continues to thrive as a fishing port for both the domestic and export market.	mid-sized vessels are partially filled.
Gisborne (1999e)	Before the 1960s, Gisborne was a small fishing port. that during 1960s – 1980s grew into a bustling port both inshore and deepwater. Now, it is described as a “boutique,” serving both the domestic and export markets. Fleet is considered stabilized.	Trawling fleet (now 8-9 vessels) is half the number and tonnage of the boom years. 11 longliners No set netters 25 rock lobster vessels in the region
Bay of Plenty (2000c)	This region has both an inshore fishery and a seasonal tuna industry headquartered in Tauranga, which is the primary port in the region. Many fishers went from quota species to non-quota tuna. Lobster gone from 128 to 48 boats, trawling declined to 7 vessels. Longlining is dominant, other methods also used. Rationalization in longlining expected, and recreational pleasure boats compete for port space and some species.	Tauranga – 7 trawlers, 5 purse seiners, 5 danish seiners, 60 tuna longliners, 7 bottom longliners, some crab & setnetters. Whitianga – shifting from working to pleasure boats, 8 lobster, 13 longliners, 1 danish seiner Whangamata – 3-4 scallop dredgers Whakatane – once commercial port, now 4 commercial and 28 charter
Taranaki (2000d)	There are two ports in region. One has stabilized, the other is no longer in commercial operation. Inshore and mid-depth species fished. Steady long-term outlook.	Wanganui – was major port in 1950s now one part-time fisherman. New Plymouth – fewer vessels than earlier, 2 trawlers 2 longlining, 4 lobster
Wellington (1999i)	Less processing occurs here, instead, this port primarily served the local market. Deepwater trawlers often visit. Small and medium vessels are disappearing, some charter and recreational fishing development. Lack of investment in capital has hurt port’s ability to compete.	Was mostly mid-sized boats, now larger deepwater vessels also. Island Bay – was fleet of 20+ now 2 vessels. Ngwi – 20 lobster boats Others – down to 2-4 vessels
Nelson (2000b)	The largest fishing center in terms of tonnage landed and processed, but much of this is from the deepwater fisheries, or shipped in from other ports. Three of the dominant companies are based in the region. Nearly 25% of the region works directly or indirectly for the industry. The inshore fishery is small and continues to lose small fishers, but scallop fishing is growing. Aquaculture increasingly important to region.	Nelson – large active port expanded for large vessels. Much processing. Five small ports -- no longer active. Westhaven – down to 3 lobster boats Waitapu – lost most fishers Tarakohe – 6 boats . could expand to deepwater Motueka – most use by Talleys for processing, 12 small boat do oyster and scallop catching, inshore trawl.
Marlborough (1999b)	Traditional small finfishers are squeezed by rising quota costs. Deepwater fishing is based elsewhere. Few processing facilities available. Rock lobster, scallops, and paua continue to be caught, but main growth is in aquaculture (Greenshell mussels) and recreation/tourism.	Picton – no trawlers, 23 cray/line boats (slight reduction from QMS) Pt. Underwood – 2 trawlers, 5 cray boats Kaikoura – Trawlers dropped from 4 to 2, set netters from 36 to 6
Lyttelton/ Christchurch (1999h)	A large port, multiple processing facilities (7 companies) as well as easy access to an international airport, this area	Inshore fleet has declined to 28 vessels (mainly trawlers) further declines anticipated.

	is well set-up for the international and domestic markets. Also, the port is close to the deepwater fisheries.	Foreign charter fleet heavily uses port Other deepwater vessels discharge
Timaru (1999f)	This is the second-largest fishing port in the country. Industry seen as primary economic engine of Timaru. On-shore facilities to support the deepwater industry are expanding. Loss of small fishers has occurred.	During late 70s early 80s there were 40-50 set netter. Now there are 3 or 4. Also 20 local inshore trawlers. Some large deepwater trawlers and squid jiggers use port.
Otago (2000a)	Inshore fishermen described as "despondent" and there are concerns for local processors. Some fishers who want to leave are unable to sell boat, house, or quota. Deepwater fishery is growing well in both catching and processing. While small towns and ports shrink. Dunedin has seen rapid growth in fishing and processing.	Omaru – was large port now 4 small trawlers Moeraki – 12 vessels (down from 28) Karitane – 5 vessels (down from 16) Port Chalmers – 9 vessels (was 30+) Dunedin – Sealord added 200+ jobs onshore and at sea. Others also grow Taieri Mouth – 10 vessels (was 13 a year ago)

SFNZ also provides a forum for discussing the changes in the industry – particularly in the inshore fishery and among smaller fishers. Following is some of the commentary recently published by the journal.

- ◆ "Sustainability of fish stocks promoted by the QMS has not translated into economic sustainability for independent fishermen. Its not as if they have done anything wrong ... its rather that the world is passing them by ... They are victims of change whereby beneficence has been replaced by profit and self-responsibility. Or as some would have it, the dog-eat-dog world of economic survival." (Stevens 1999c)
- ◆ "I thoroughly enjoyed my fishing. It was simple. You went to sea, caught your fish, delivered it to the market, and got a cheque for it. How could things have changed so much and have become so detrimental to that simple act? Today, to do exactly the same job, there are 426 pages of fisheries legislation ... in a language that only a lawyer, a scientist, or a paid official can decode. On top of that we have the Minister of Fisheries, who is a farmer, telling us how to fish ... a host of white collar professionals who would not be seen dead in a smelly fisherman's bar, and a rash of highly paid whiz kids in the large companies ... all trying to run the industry by numbers like a business corporation. Theory never could hold a candle to practicality." (Beggs, 1998: 54)
- ◆ "The real decline in the number of owner operators in the New Zealand fishing fleet started with the commencement of the Quota Management System. Many of the industry thought that the initial planned for and anticipated decline would flatten out and finally stabilize at a new level, but it hasn't. The decline continues and to all intents and purposes the owner operator seems destined for extinction." (Stevens, 1999g)
- ◆ "One of the principle flag bearers [for small fishermen in 1986] was Taffy Martin ... he told all of us ... 'if you sell your quota you sell your power.' That is exactly what

- has happened. The small fisher ... sold off at a good price – almost always to the companies – and now has the gall to complain at what the companies do in terms of screwing them.” (Ashby, 2000: 6)
- ◆ “In my father and grandfather’s days, serf was a fair description of small operators struggling to support families on the meager prices paid by the merchants who controlled the fishing industry ... For a brief golden age, the QMS delivered power into the hands of the catching sector ... However, the inherent weakness of the system – the practical inability to raise loan capital on quota – caused drift of ownership to merchants. Now, as I see young men fishing and diving on leased quota which they will never own, I realize that the catching sector has gone back to its original status – sea going serfs struggling to support families on the meager prices paid by the merchants (Clough, 2000: 7)

Together, these comments illustrate the frustration felt by much of the inshore sector, and their attribution of the problems to both QMS and the secondary problems associated with QMS (such as inability to raise capital, high management costs and levies, and early selling-out of small fishers).

Popular newspapers, magazines, and books also confirm the existence of consolidation and small fisher issues on a nation-wide scale. In the newspapers, reporting dramatizes the difficulties facing small fishers, and the loss of small fishers from the industry (e.g., Christian, 1998; Nixon, 1997a; Nixon 1997b). These reporting documents that the complaints expressed in the Auckland Region survey (on issues such as management fees, difficulty obtaining quota, and costs of leasing quota) occur to varying degrees in other regions (such as the east coast of the South Island, and the southwest coast of the South Island).

Magazines and popular (non-academic) books offer similar, but more detailed and empathetic descriptions of consolidation problems – particularly as they affect the small fishers. Hargreaves’ *On The Next Tide* documents problems including low fish prices, high costs of quota and management costs, as well as quota availability problems among small fishers in Oamaru, South Westland, Wellington, Northland, and the Chatham Islands

(Hargreaves, 1998: 21,32,52,85,87). These accounts also indicate that the problems expressed in the Auckland Region survey are occurring nation-wide. Hargreaves also draws his own conclusion about the fate of the small fishers:

There's a dark storm moving in from out the horizon and its headed straight for the small-time fisherman. Livelihoods have been hit hard over the last ten years since the introduction of the quota system. Increasing government rules and levies, as well as increasing competition from larger companies, are forcing many operators out of the industry ... The end of an era is looming for many fishing families: the next generation will no longer have a birthright to an income in taking on the family boat. In all the fishing communities nestled around our coastline, behind a mist of contentment lurks an atmosphere thick with worry. In many areas a fishing income is no longer enough to support a family. In many ways, I view *On The Next Tide* as a celebration of one of New Zealand's unique cultures but also, sadly, as a monument to a way of living that is steadily fading away (Hargreaves, 1998: 12)

Magazine reports on the inshore fishery (such as Cranna, 1997: and Hyde, 1996) usually echo these concerns, but occasionally, they go beyond to provide insights the issue of consolidation and loss of small fishers not seen elsewhere. Cranna's (1997) article is the only source directly addressing the governments awareness of and response to inshore fisheries problems. Cranna quotes Jane Willing (then acting policy director at the Ministry of Fisheries) as saying: "Many nations subsidize traditional communities to preserve their way of life and values ... But our government has made a call that because this kind of assistance hasn't been extended to other primary industries like sheep farming, it won't happen in fishing either" (Cranna, 1997: 92) Thus, it appears the Ministry was aware that consolidation and loss of small fishers was a probable side effect of QMS, and made a policy decision not to intervene. If this is the case, it would be consistent with the market-oriented policy orientation of the time (see Chapter 4 for

discussion of the political and policy atmosphere during the passage and initial implementation of QMS.)

Together, these multiple data sources (from direct analysis of quota ownership data and aggregation limit exemptions, to survey results, to reporting in both the industry and popular presses) all indicate that within the inshore fishery, consolidation and aggregation of quota ownership is clearly occurring. In the inshore fishery, this rapid rate of consolidation is coupled with that is a dramatic loss of small fishers. Quota costs, lack of quota availability, and the related management fees are removing these small fishers. In the deepwater fishery, the rate at which consolidation occurs is much slower (in part due to continued growth in the sector). But consolidation appears to be underway there as well. Furthermore, aggregation of quota into the hands of a few large owners is another issue that QMS has apparently had difficulty addressing – particularly in the deepwater fishery where two or three owners can control a fishery. These results suggest that the negative outcomes discussed by critics of ITQ management are indeed present and having effects within New Zealand's Quota Management System.

However, these findings must also be looked at in the context in which QMS was introduced. In the inshore fishery, there were severe concerns about the potential collapse of multiple fishstocks. There was agreement that the level of effort in the fishery needed to be reduced, and that QMS was the most efficient method to accomplish this goal. In many ways, the pain so vividly described in the inshore fishery is at least in part a result of the need to reduce pressure on the inshore fishery. This pain also would have been felt if other more traditional regulatory mechanisms (such as shorter seasons, license reductions, gear restrictions, etc.) were used. Nonetheless, there can be little or no doubt

that the pressures created by QMS have increased the pressure on small fishers, and led to consolidation and aggregation problems.

Compliance

Compliance with the law is a vital part of any public policy. In regards to ITQ management, compliance is also a controversial issue. Critics argue that the approach does not eliminate or reduce the incentives to cheat. Instead, they say, it creates different forms of cheating behavior such as high-grading their catch and other forms of quota busting (e.g., Schlager 1990; Palsson and Helgason 1996; Halliday and Pinhorn 1997; Turner 1997).¹³³ However, proponents argue that ITQs create a property right that gives the owners a long-term incentive to manage the resource, and thus ITQs can reduce compliance problems. Within New Zealand's QMS, compliance is also an important and complex issue.

When QMS was introduced, compliance and enforcement strategies changed dramatically. As described by McClurg, "in pre-ITQ fisheries, most enforcement resources were engaged in physical surveillance of fishing activities in order to detect unlicensed fishers, the use of illegal gear, and season or area transgressions. The visibility of such surveillance was in itself a form of deterrence. (McClurg, 1994: 135)" Essentially, enforcement took a classic input oriented approach. However, when QMS began, enforcement shifted from the water and towards a more audit-based approach. "The new role of enforcement authorities was no so much policing fishermen as

¹³³ High grading refers to the practice of sorting fish at sea and throwing back the smaller or less valuable fish so that the maximum revenue per ton of quota is generated. Other forms of quota busting include: false reporting of catch information; dumping bycatch so that the quota is not used up; mislabeling fish once it is processed on board; trans-shipping or "trucking" fish (catching fish in one quota area, but reporting it caught in another) or, attempting to divert catch to ports outside of the monitoring system so that it does not count against a quota.

monitoring, following product flow... Enforcement activities now take place more on land than at sea ... and is carried out by people who are more auditors than game wardens” (Clark et al. 1988: 334).

Further details on current enforcement strategies were provided in an interview with Dave Wood, Deputy Compliance Manager with the Ministry of Fisheries. He confirmed the emphasis on monitoring the product flow from the water to the processors to final sale, noting that all steps have reporting requirements, but since the information is necessary for tax purposes anyway, he believes that it does not create a heavy reporting burden. Wood also noted that MFish has adopted a regime with “low levels of monitoring and surveillance coupled with high penalties” (Wood, 1999a). The reason is that the regime is based on two ideas necessary to maintain an optimal level of compliance. First, there needs to be voluntary compliance brought about through good legislation and the incentives of the quota owners for long-term preservation of their resource. This is coupled with maintaining an effective deterrence. “The chances of getting caught are not great, but when we get someone they pay heavy penalties” (Wood, 1999a). Possible penalties under this regime are very high, including (per offence) a fine of NZ\$ 250,000 , forfeiture of property used to commit offence (e.g., vessels, gear, trucks, etc) and forfeiture of catch and quota” (Crothers, 1999: 13). Monitoring and enforcement measures used by MFish include audits, direct monitoring, dobbing in,¹³⁴ comparison of “usual” reporting with reporting when scientific monitors are present, and the VMS satellite monitoring system (Wood, 1999a). While the paper trail described by

¹³⁴ “Dobbing in” is when one fisher turns in another fisher. Although a somewhat pejorative term, it is the only word used to describe this activity.

Clark et al is a centerpiece of enforcement. QMS relies on a much wider array of compliance tools.

Academic analyses of QMS reached mixed conclusions over the success of compliance in QMS. Only two analyses have exclusively focused on enforcement. The first report in 1994 was quite critical, noting (among other points) that some rules were virtually unenforceable, since they required knowing the fishers state of mind when the offence occurred (i.e., what species was being targeted) and that “penalty structures which are not sensitively customized to the severity of the offence also undermine compliance” (McClurg, 1994: 131). However, a more recent analysis was broadly positive about enforcement under QMS. It argued that “the New Zealand experience has been that a system based on outputs constraints supported by a paper based trail of records and documents has significantly improved their ability to detect and prosecute illegal fishing activities by doing away with the need to be present at the commission of the offense” (Sullivan & Nielander, 1999)

Several published article also addressed compliance issues as part of larger analyses of QMS. They reach a variety of conclusion. In a relatively early analysis, Sissenwine and Mace noted many potential problems with ITQ enforcement, but argued that (outside of the documented existence of highgrading) they could not assess QMS enforcement (Sissenwine & Mace, 1992: 256). The existence of highgrading and bycatch dumping as an ongoing problem was documented as early as 1989 (Annala & Sullivan, 1989: 2, Annala, 1996: 54). Quota “busting” or poaching is also cited as an extensive problem (e.g., Annala, 1996; Duncan, 1993), for example: “quota busting is known to occur in some fisheries, especially those for high-value species such as rock lobster, paua,

snapper and orange roughy ... In previous years the estimates of illegal catch from individual fishstocks were as high as 68% (Annala, 1996: 53-54).

Wallace (1998) shifts from the biological aspects to enforcement process when she critiques the audit process. She notes that based on the audit rate in 1997, the odds are that a company would be audited once every 50-100 years and that a 1997 regulation shifts audit responsibility from the Ministry to company hired auditors (Wallace, 1998: 648).¹³⁵ In contrast, an early article in support of QMS observed "New Zealand's geographic isolation, industry structure, fish markets, and single management jurisdiction have proved to be natural advantages in developing a cost-effective enforcement program (Crothers, 1988: 12). More recently, Edwards emphasized the ability of property rights to enhance compliance. He notes "ITQs can have benefits in degree of self compliance because fishers have an enhanced long-term interest in the resource. Compliance in the regime will be enhanced by fairness and equity and involving affected stakeholders in program design (Edwards, 1999: 9).

In the face of contradictory published reports, an excellent way to examine the state of compliance is the perception of those directly involved in the industry. The surveys of the Auckland Region and the Nationwide Company surveys are one such source. In 1995 and 1999, Auckland Region participants were asked whether they thought cheating had declined, increased or stayed the same. Results (shown in Table 5-12) show that over time opinion has changed from a moderate inclination towards QMS reducing cheating towards respondents being neutral

¹³⁵ While Wallace is somewhat critical of the use of private auditors, it should be noted that this is a fairly common practice. (For example, the US Securities and Exchange Commission – SEC -- requires that all publicly traded companies pay for independent audits, rather than the SEC doing the audits themselves.)

**Table 5-12: Change in Auckland Region Opinions about Cheating Over Time
(1= declined 2=same 3=increased)**

	N	Mean	Std. Dev.	T ²	df	Sig. (2-tailed)
1995	28	1.50 ¹	.79			
1999	28	2.07	.94			
Test Results				-2.925	27	.007

¹ Single sample t-tests shows different from "same" at <.001 level

² Paired t-test

or slighted inclined towards cheating having increased. This difference is significant at the .01 level. Also, in 1999, Auckland Region participants were asked to what extent dobbing in occurs (1=not at all to 4=frequently). Of the 16 respondents who were willing to answer this question, the mean response was 1.56, indicating that fishers almost never turn other fishers into the authorities.¹³⁶ These results indicate that over time, the perception of the degree to which cheating occurs in the Auckland region is increasing, and that very few fishers are willing to "dob" others in. This last result is important because it contradicts the argument that with the property rights ITQs represent, fishers are more likely to turn cheaters into the authorities.

Comparison of the small-scale fishers in the 1999 Auckland Region and the companies in the 1999 Nationwide Company survey (Tables 5-13 and 5-14) shows a difference in the perceptions of small fishers and companies, with small fishers leaning towards cheating getting worse, while companies lean towards cheating improving. This difference is significant at the .05 level. Also, an analysis of the number of times small fishers and companies mention problems involving cheating and enforcement issues shows that that small fishers mention these problems more often than the companies.

¹³⁶ Statistical testing is not reported on this question because the number of respondents is so low.

These differences are significant at the .01 level using both chi-square and proportion tests.

**Table 5-13: 1999 Comparison of Auckland Small-Scale Fishers and Nationwide Companies Response on Changes in Cheating
(1= declined 2=same 3=increased)**

	N	Mean	Std. Dev.	Levene's F(sig)	t	df	Sig. (2-tailed)
Fishers	32	2.16	.92				
Company	22	1.64	.90				
Test Results				.127 (0.723) ¹	2.057	52	.045

¹Equal variance assumed for independent sample t-test.

Table 5-14: 1999 Comparison of Auckland Small-Scale Fishers and Nationwide Companies Mentioning Cheating or Enforcement as Negative Effects of QMS

	Number (%) mentioning	Number (%) not mentioning	Chi square	Proportion Test Z score
Fisher	15 (41.67%)	21 (58.33%)		
Company	3 (11.54%)	23 (88.46%)		
Test Results			6.651 ¹	2.916 ¹

¹Significant at .01 level

These differences in opinions are also evident in the fishers and the company representatives' commentary.

- ◆ "Cheating has gotten more hidden and more underground. You had to make a living, and if you went above board between taxes and quota you couldn't make any money. ... When its 3AM and you're freezing cold you don't want to spend 30 minutes on the dock filling in your quota book But if the inspector pulls you over, you can forfeit your boat, catch, quota, everything." (Auckland Survey #4)
- ◆ "ITQs have taught fishermen to be more cunning. Before there was no need to cheat. A need to cheat the IRD on taxes, but no cheating on fishing because there was no limit on catch. Now there is highgrading and black market. ... Supposedly on the big trawlers they mislabel the fish. It's a rumor heard fairly frequently." (Auckland Survey #6)
- ◆ "Before you didn't have to cheat, only the tax man. Under the new system, when it became uneconomical it encourages the black market ... I think they've given up trying to stop the black market." (Auckland Survey #9)
- ◆ "Its getting harder to cheat. If you're fishing for a company you can't. Also people want to get their GST back [get a business tax refund] But there's still some going on depending on how gutsy you are." (Auckland Survey #12)
- ◆ "There's less now. Policed more, more severe penalties. You have to keep your nose clean, especially when working on somebody else's boat. (Auckland Survey #15)

- ◆ “Cheating levels went up then down. A lot did it until they saw people get hit and realized its not worth the penalties and the risk..” (Auckland Survey #35)

Here, most fishers express concerns mixed opinions over cheating within QMS. In contrast, as is illustrated by the quotes below, opinions of the companies mainly focus on reduction in cheating and many emphasize how the influence of ITQs as a property right has reduced cheating.

- ◆ “Cheating is reduced under ITQs. Once people have ownership they have a drive to protect it. Owners are the best patrollers. There’s peer pressure. Its very unfashionable to be a pirate in the industry.” (Company Survey #2)
- ◆ “Cheating has gone down. I’ve talked to the skippers. They don’t do what they used to do. It’s the penalty structure and the belief that they’re stealing from themselves. They don’t want to tell their kids what they did in the past.” (Company Survey #5)
- ◆ “Cheating has dramatically reduced. The penalties are so draconian, we could lose our quota over inadvertently filling out the forms wrong.” (Company Survey #11)
- ◆ “Cheating has increased massively ... falsifying catch volumes and species reporting, poaching, black market, and target species for deemed value.” (Company Survey #15)
- ◆ “There’s less cheating. The industry policies itself to a large extent ... We protect our property rights – informal communication, and selecting who catches fish in for us.” (Company Survey #17)
- ◆ “Cheating has gone up under ITQs. Poaching of some species is much more lucrative. Misreporting has probably gone up and deemed value is so expensive it encourages cheating. (Company Survey #20)

Overall, the results in the fisher and the companies’ commentary shows mixed opinion on the degree to which cheating occurs and whether it is a significant problem. Fishers are divided in their opinions: while company are more unified in their opinion that cheating is reduced.

In addition to the survey results presented above, insights can be gained by examining the results of a survey about cheating commissioned by the Ministry of Fisheries (1998). This survey examined attitudes towards cheating in three high-profile fisheries: snapper, rock lobster, and orange roughy. In broad terms, the survey results

showed that skippers and quota owners do not believe that cheating occurs very often, and:

just as skipper/quota owners believe illegal acts do not occur very often, they also believe that the chances of being caught are not very high. For only a few activities ... do skippers/quota owners feel there is a reasonable likelihood of being caught (MFish, 1998: 10).

Furthermore, the respondents believe that they have the lowest chance being caught for activities that occur at sea. However, if they were caught, the respondents believe that there is a high probability they would be prosecuted. The survey also asked respondents to estimate how often fishers comply with or break the rules. (See Table 5-15.) These results show that, depending on fishery, between 86% and 73% of commercials always comply with the rules, and between 9% and 16% of commercial fishers always break the rules. Levels of cheating were perceived as highest in the deepwater orange roughy fishery, which is surprising, since this is a sector controlled by the companies, who (in the survey above) consistently argued that there was little cheating in the sector – particularly on company owned or controlled boats.

Table 5-15: Estimates of Commercial Fishers Level of Compliance (MFish 1998: 12)

	Always Comply (%)	Sometimes Break Rules (%)	Always Break Rules (%)
Rock Lobster	86%	14%	9%
Snapper	85%	13%	7%
Orange Roughy	73%	20%	16%

Finally, both the popular and industry presses provide insights into perceptions of compliance and enforcement. Unlike some of the earlier analyses, the popular press and industry presses have very different outlooks on this issue. Not surprisingly, newspaper and television reports focus on large-scale dramatic successes in enforcement, often in the deepwater fisheries or customary Maori rights (e.g., Robson, 1999; Christchurch

Press, 1999; OneNews 1999; Bingham, 1998; Herald, 1999). In contrast, as is illustrated by the quotes below, industry commentary expresses frustration with the enforcement and compliance.

In one instance, after a dramatic (and televised) enforcement action on a squid jigger, a tense confrontation played itself out in the pages of *Seafood New Zealand*. This exchange is illustrative of the tensions between the industry and the Ministry surrounding enforcement issues. It began when the lead editorial in *Seafood New Zealand* was titled “Is Public Flogging a Useful Compliance Tool?” and asked (among other questions) “Is [the Ministry] embarking on a policy of high profile, maximum publicity arrests as part of its compliance policy? And is this the best use that can be made of the \$9 million the fishing industry contributes for criminal compliance enforcement through annual cost recovery charges?” (Macfarlane, 1999: 4). The next month, the Ministry fired off a response, which in part read:

By having media present we were able to effectively demonstrate our commitment to the protection of fisheries and our capacity to enforce the obligations of fishing in New Zealand waters. A contribution to MFish’s strategic aim to maximize voluntary compliance and to create an effective deterrent was made effortlessly and cost-effectively through the high public profile we gave this enforcement operation. It served to demonstrate our willingness to act against illegal activities and also sent a clear message to those who may have contemplated non-compliant activity” (Wood, 1999b: 6)

The “last word” in this dispute was had the following month by a paua fisher who wrote “Dave’s letter clearly illuminates the huge void between what MOF compliance is delivering and what the levied-to-near-death industry rightly expects from them. As a PAU2 fisher, paying \$700 per tonne ... I expect more than a willingness to perform ...” (Arron, 1999: 9). The tensions evident in this exchange over enforcement priorities, cost recovery, and the methods of enforcement are echoed and elaborated upon elsewhere in

seafood industry publications. Other issues of concern are the inability to comply due to the degree of complexity within QMS (e.g., Howard, 1998; Sharp 2000) and efforts of the parts of the small fishers to embrace “common sense” management and overcome collective action problems (e.g., Stevens 2000e; Sykes 2000). Together, these articles and letters illustrate concern and frustration with the enforcement process, but also a recognition that enforcement is a vital part of regulating and maintaining the industry. Instead, the question debated is the most appropriate way to attain compliance.

Overall, published academic analyses, surveys of the fishing industry (both my own and the survey commissioned by MFish), and reporting in the popular and industry presses show mixed opinion over compliance within QMS. Clearly, there is some degree of cheating going on within QMS, as is acknowledged by all sources used in this analysis. Differences between the industry and Ministry are not over whether enforcement should take place, but how it should take place. When survey results are examined, they show the smaller fishers more concerned about cheating, and these concerns increasing over time. In contrast, commentary by companies shows an optimistic outlook about compliance. These differences may be due in part to the smaller fishers’ exposure to poaching by recreational fishers and amateurs – issues that the companies do not face to the same extent. The lower compliance rates self-reported by the orange roughy captains, however, show that cheating is also deepwater issue. Thus, while QMS has not eliminated cheating, and ITQ-specific forms of cheating (such as highgrading and bycatch dumping) are reported, it is probable that to some degree compliance has increased under QMS.

Conclusion

This chapter examines four effects attributed to ITQ management by both the proponents and critics of ITQ management. These effects are: sustainability of the resource; improved efficiency: consolidation (as well as aggregation of quota and loss of small fishers): and compliance with fishing rules. Each effect is examined using multiple data sources and methods including: surveys of industry participants: expert interviews. review of academic reports and analyses. analysis of popular and industry publication. and (in the case of consolidation) direct analysis of quota ownership patterns.

Results of this analysis reveal a pattern of complexity and subtlety not often discussed in the literature surrounding ITQ (or more broadly market-based) regulation. For example, sustainability encompasses two related issues – the process of how TACC is set, and the extent to which fisheries are sustainable under QMS. Analysis of the process shows that there is a well-developed and institutionalized consultation process that encourages rigorous scientific analysis and provides opportunities for stakeholders to participate in the process. However, it also appears that the process is failing to provide an equal voice to all recognized stakeholders due to markedly different institutional capacities of the non-industry stakeholder groups. The more scientific issue of the sustainability of the stock also illustrates this complexity. Fishery science in New Zealand is clearly world-class, but it is still plagued by very high levels of uncertainty. The outlook for many fish stocks is simply unknown. Thus, one could conclude that the information necessary to run an ITQ system is not present. However, this information would not be present in any other management system used in large industrial fisheries. Further, New Zealand has suffered far fewer stock collapses than most other nations.

indicating that on an operational level, the management system is doing better at preserving fishstocks than other methods.

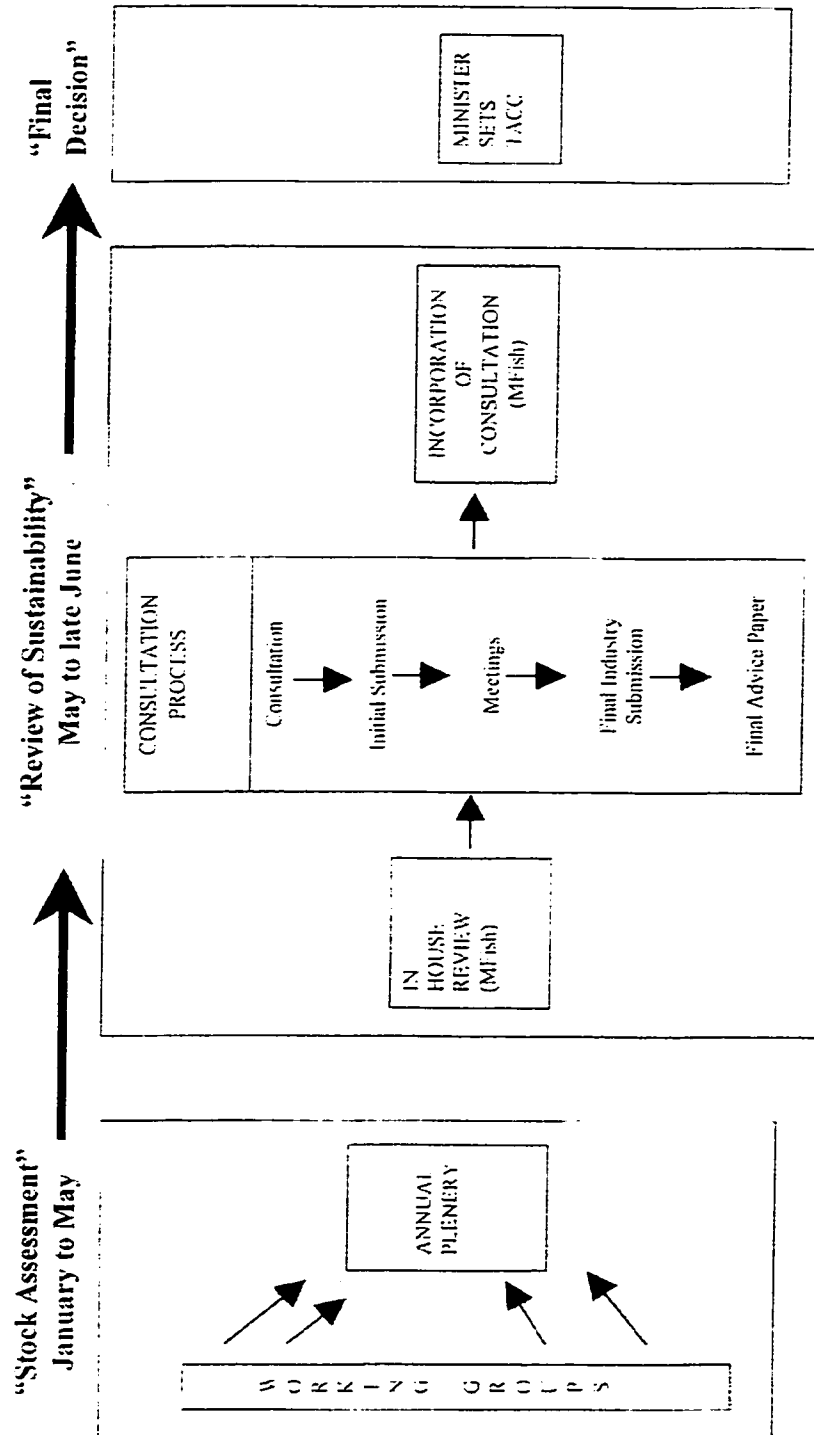
Regarding perceptions of increased efficiency, the results show that except for the small fishers, who are more doubtful, there is a strong belief (or perception) that QMS has increased the efficiency of the fishing industry. Even though all the analysts agree that direct proof for increased efficiency was scanty or not available, there is a strong perception among the industry and observers that QMS has led to an increased efficiency within the industry.

On the contentious issue of consolidation, my analysis shows that within the inshore fishery consolidation and aggregation of quota ownership is clearly occurring and is coupled with a dramatic loss of small fishers. In the deepwater fishery, the rate at which consolidation occurs is much slower (due in part to continued growth in the sector). But consolidation appears to be underway there as well. Furthermore, QMS appears to be having difficulty addressing aggregation of quota ownership – particularly in the deepwater fishery where two or three owners can control a fish stock. However, these findings must be looked at in context. When QMS was introduced, it was with the goal of reducing participation in the inshore fishery. Thus the loss of small fishers would have occurred under other regulatory approaches, but it may have occurred slower or to a lesser degree.

Finally, results of the analysis of compliance were mixed. All data sources agreed that some degree of cheating is occurring. However, different sectors of the industry and the government disagree on the degree to which it is a problem and what is the most appropriate response to the issue. Perhaps the best interpretation is that while QMS has

not stopped cheating (and has created new forms of cheating) the over-all impression is that QMS has increased compliance to some degree.

Appendix 5-1: TACC Setting Process (Annala, 1999)



Appendix 5-2: Summary of Aggregation Limit Exemptions Approved between the start of QMS and June 1999

Date	Organization Receiving Exemption	Exemption Details	
		Fishstock	Amount (%)
29 September 1988	Barclays Bank New Zealand	Central Paua	40
Unknown	Wilson Neil Skeggs	No details provided by MFish	
12 September 1991	Moana Pacific Fisheries Aotearoa Fisheries Maori Fisheries	BNS 1	23.23
		BNS2	41.68
		BYX 2	51.43
		GUR 2	29.41
		JDO 1	22.94
		SNA 2	26.52
		SPO 2	23.38
		STA2	28.44
		TAR1	33.20
		TRE 1	23.13
15 October 1992	Donker Marine	TRE2	22.60
15 October 1992	Donker Marine	BYX 3	38.73
23 December 1992	Treaty of Waitangi Fisheries Commission ¹³⁷ (TOWFC) also known as Te Ohu Kai Moana (TOKM): Consisting of the following: Maori Fisheries Commission Sealord Products Brierly Investments	Hake	45
		Hoki	47
		Ling	45
		Orange Roughy	45
		Oreo Dorey	45
		Squid	41
		CRA 1	31
		CRA 10	15
		CRA 2	21
		CRA 3	23
		CRA 4	16
		CRA 5	18
		CRA 6	12
		CRA 7	12
		CRA 8	19
		CRA 9	12
		BAR4	30
		BAR 5	38
		BAR 7	37
		BNS 1	40
		BNS 2	45
		BNS 3	29
		BNS 7	28
		BYX 1	23
		BYX 2	51
		BYX 3	28
FLA 2	22		
GUR 1	25		
GUR 2	34		
HPB 1	32		
HPB 2	26		
HPB 5	44		

¹³⁷ This massive series of exemptions was due to the Treaty of Waitangi settlement.

		JDO 1	30
		JDO 2	29
		JDO 7	30
		JMA 7	28
		PAU 1C	51
		PAU 4	23
		PAU 7C	26
		RCO 3	22
		RCO 7	21
		SCH 1	22
		SCH 2	25
		SCH 4	29
		SKI 1	27
		SKI 2	32
		SKI 3	40
		SKI 7	50
		SNA 1	27
		SNA 2	31
		SNA 8	25
		SPO 1	22
		SPO 2	26
		STA 2	33
		TAR 1	42
		TAR 2	34
		TAR 5	33
		TAR 7	23
		TAR 8	32
		TRE 1	28
		TRE 2	28
		TRE 7	27
		WAR 1	20
		WAR 2	22
		WAR 3	32
		WAR 7	21
26 May 1994	Sanford Limited Wanganui Seafood	BAR 1	26.11
		BAR 4	34.29
		BAR 5	24.98
		BAR 7	23.84
		WAR 3	24.40
		WAR 7	21.60
		SKI 3	24.64
		SKI 7	32.51
		JMA 7	28.71
		SNA 8	51.10
		STA 5	21.58
		TAR 4	28.09
		TRE 7	47.04
8 August 1994	Challenger Scallop Enhancement Company	Southern Scallop	23
1 September 1994	Talleys Group. consisting of the following: Talleys Fisheries McDonald & Brown	Southern Scallop	25.2
8 December 1994	Chatham Islands Enterprise Trust	BCO 4	24.01
		HPB 4	53.57
		SCH 4	57.15

		TAR 4	27.14
15 December 1994	Sanford Limited	WAR 1 SKI 1 GUR 1 JDO 1 TAR 1 TRE 1	26.66 58.90 29.88 22.40 22.42 33.35
24 August 1995	Paua Supplies	PAU 5	22.5
24 August 1995	Burkhart Fisheries	CRA 5	16.38
22 February 1996	TOWFC TOKM	CRA 6 PAU 4 SCH 4 PAU 1C to PAU 1 PAU 7C to PAU 7 HPB 4 PAU 2 PAU 5 STA 4 TAR 4	20.37 27.29 36.45 no change no change 29.39 25.76 26.65 20.84 37.57
22 February 1996	Ngai Tahu Fisheries	CRA 8	13.92
2 May 1996	TOWFC TOKM	CRA 4	22.96
23 May 1996	Sanford Wanganui Trawlers	May 1994 exemption extended to 30 June 1996	
27 June 1996	Talleys Group	Southern Scallop	28.6
27 June 1996	Sanford Wanganui Trawlers	May 1994 exemption extended to 30 June 1997	
26 September 1996	Talleys Group	RCO 7 STA 7 TAR 7	23.36 25.41 29.11
3 October 1996	Challenger Scallop Enhancement Company	Southern Scallop	51.38
27 March 1997	Talleys Group	Barracuda Elephant fish Flatfish Gurnard Snapper Rig Blue Warehouse School Shark	35 35 35 35 35 35 35 35
27 March 1997	TOKM	Alfonsino Barracouta Ling Orange Roughy Blue Warehouse Gemfish Hake Hoki Jack Mackerel Oreo Dorries PK Rock Lobster Red Cod Silver Warehouse Squid	45% combined TACC 45% combined TACC 45% combined TACC 45% combined TACC 45% combined TACC 45% combined TACC 45% combined TACC 45% combined TACC 45% combined TACC 45% combined TACC 45% combined TACC 45% combined TACC 45% combined TACC 45% combined TACC

		Paua	20% TACC any area
		Bluenose	20% combined TACC
		Trevally	40% combined TACC
		All other species	35% combined TACC
10 April 1997	TOKM	Hake	45
		Hoki	47
		Ling	45
		Orange Roughy	45
		Oreo Dories	45
		Silver Warehou	45
		Squid	45
		CRA 1	31
		CRA 10	15
		CRA 2	21
		CRA 3	23
		CRA 4	22.96
		CRA 5	18
		CRA 6	20.37
		CRA 7	12
		CRA 8	19
		CRA 9	12
		Alfonsino	45
		Barracouta	45
		Bluenose	38.61
		Jack Mackerel	45
		Red Cod	45
		Gemfish	45
		Blue Warehou	45
		PK Rock Lobster	45
		PAU 1	51
		PAU 2	25.76
		PAU 4	27.29
		PAU 5A	26.65
		PAU 5B	26.56
		PAU 5D	26.65
		PAU 7	26
		All other species	35% combined TACC
14 August 1997	Talleys Group	Alfonsino	45% combined TACC
		Barracouta	45% combined TACC
		Blue Warehou	45% combined TACC
		Gemfish	45% combined TACC
		Hake	45% combined TACC
		Hoki	45% combined TACC
		Jack Mackerel	45% combined TACC
		Ling	45% combined TACC
		Orange Roughy	45% combined TACC
		Oreo Dories	45% combined TACC
		PK Lobster	45% combined TACC
		Red Cod	45% combined TACC
		Silver Warehou	45% combined TACC
		Squid	45% combined TACC
		Blue Cod	35% combined TACC
		Elephant Fish	35% combined TACC
		Flatfish	35% combined TACC
		Gurnard	35% combined TACC
		Hapuku/Bass	35% combined TACC

		Orange Roughy	45% combined TACC
		Oreo Dories	45% combined TACC
		PK Lobsters	45% combined TACC
		Red Cod	45% combined TACC
		Silver Warehou	45% combined TACC
		Squid	45% combined TACC
		Paua	20% of any one area
		Bluenose	35% combined TACC
		CRA 1	31
		CRA 2	21
		CRA 3	23
		CRA 4	22.96
		CRA 9	12
		All other species	35% combined TACC
10 June 1999	Mr. D.L Jones Serene Fishing	Sea Perch 3	32.5

Chapter 6: Evolution in the Perceptions of ITQs as a Property Right

With ITQs, our whole mindset changed from rape and pillage to planning. You do look after things better when you have an interest.

-- Company Survey #1

Introduction

So far, this dissertation has focused on New Zealand's Quota Management System (QMS) as a policy. In Chapter 4, I described the historic background leading up to the adoption of QMS, and analyzed why a policy as innovative as QMS was adopted in 1986. Chapter 5 examined the effects that QMS had as a policy, focusing on sustainability, industry efficiency, industry consolidation (including aggregation and loss of small fishers), and compliance. This chapter continues the examination of QMS, but shifts the focus from QMS as a policy to the Individual Tradable Quotas (ITQs). Specifically, I examine the tool that QMS uses – the ITQs. While on one level, ITQs are simply a policy tool, a method to determine who catches what amount of fish when, on a deeper level, ITQs represent a property right, and the perception of what rights ITQs represents changes and grows over time.¹³⁸

Property Rights

Property rights and the theory surrounding the role of property rights in common – pool resources are discussed extensively in Chapter 2. Property rights can be defined as: “an 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 changes in

¹³⁸ Previous research illustrates how property rights held by groups can grow and change over time. See Ostrom, 1990; Blomquist, 1992; and Scott, 1993 for examples.

property rights come explicit or implicit responsibilities. The property rights literature primarily focuses on property rights as they relate to the balance of rights between stakeholders. Ostrom and Schlager offer a specific scale of property rights focusing on bundles of rights and responsibilities (See Table 6-1).¹³⁹ As these rights vary, the

**Table 6-1: Bundles of Rights Associated with Positions
(Ostrom and Schlager, 1996: 137)**

	Owner	Proprietor	Claimant	Authorized User	Authorized Entrant
Access	X	X	X	X	X
Withdrawal	X	X	X	X	
Management	X	X	X		
Exclusion	X	X			
Alienation	X				

interests of parties (be they individuals, firms, or governments) change. Thus, systems of property rights are important because:

... the security that enforced property rights gives ... will be recognized in the future by potential competitors for these rights. With such assurance, individuals can make credible commitments to one another to develop long-term plans for investing in and harvesting from a common-pool resource in a sustainable manner (Ostrom and Schlager, 1996: 137).

Research has shown that at a minimum having claimant status (access, withdrawal, and management) are necessary if local users are to have sufficient interest to manage a resource sustainably, although having proprietor status is preferable (Schlager and Ostrom, 1993; Agrawal and Ostrom, 1999). Thus, there is presumed to be a clear link between property rights and the success of the management regimes for common pool resources, such as fisheries.

¹³⁹ Under this typology, property rights are not always as they might first appear. For example, ITQs are often (though somewhat inaccurately) described as "privatizing" a fishery. However, ITQ owners, are not owners. Instead, they are merely authorized users because they only have the rights of access and withdrawal. The government retains the remaining property rights (management, exclusion, and alienation).

Linked to the complexity of property rights is the potential for shifts among management approaches. Anthony Scott (1993, 1999) is perhaps the most prominent writer exploring this point. He argues that ITQs encourage the development of co-management and self-management regimes by solving the question of who has the right to what proportion of the catch:

[W]hen the fishery administrators arrange to set up an ITQ regime, they have already taken two giant steps toward exclusive membership closed to outsiders (no free riding); and fixed permanent sharing of the catch in ITQ percentages, untouchable by the day-to-day decisions of the organization (Scott, 1999: 19).

Scott goes on to note that once ITQ regimes are set up, self-governing or co-management organizations are likely to succeed, as ITQs remove quota owners' fear that their share of the resource will be diminished. However, McCay et al (1998) caution that the successful development of these regimes is dependent not only on the allocation of ITQs, but also on community created by ITQs. They also raise important equity and management concerns, noting that quota owners have the power and the incentive to chose the narrower interests of the quota owners over the broader issues of all fishers or the fishing community.

In the preceding paragraphs, I briefly discuss the basic concepts of property rights. Its importance as it relates to this dissertation, is multifaceted. First, this literature provides a useful lens for analyzing rights and responsibilities in the New Zealand fishery. The predictions and warnings developed by Scott (1993) and McCay et al (1998) also resonate with the New Zealand case, as a co-management regime is presently forming from the basis of an ITQ system.

In this chapter I argue that over time, the property right ITQs represent has changed, growing to represent a more extensive bundle of rights. This progressive extension of the perception of what property rights was drive by both external political and social forces, as well as internal changes in the attitudes and actions of the fishing industry. This chapter traces these changes over time, analyzing how and why these changes occurred.¹⁴⁰ It shows that ITQs started as a clearly constrained set of property rights. But over time, a progressive series of changes (the introduction proportionally-based ITQs, use of ITQs in the Treaty of Waitangi Settlement, cost recovery, and the 1999 Fisheries Act) slowly extended the perception of what property rights ITQs represent. These perceived rights grew to include a larger bundle of rights, which at least partially included responsibilities previously held by the Government. This increase in property rights encouraged ITQ owners to become more involved in the QMS management process, and resulted in the 1999 Fisheries Amendment Act, which provides a framework for quota owners to co-manage fisheries through ITQ-based stakeholder groups.

In the Beginning: ITQs in 1986¹⁴¹

When New Zealand's Quota Management System was introduced, it was a subject of great controversy, and occurred after extensive consultation. While the basic workings of QMS are described in Chapter 4, it is important to review the initial characteristics of ITQs as a property right. According to the 1986 Fisheries Amendment Act, ITQs represent the right (in perpetuity) to "take in total within the quota

¹⁴⁰ For a broader discussion of the history of New Zealand's Quota Management System, see Chapter 4.

¹⁴¹ As is noted in Chapter 4, a form of non-transferable quota was used in the deepwater fisheries as early as 1983, but the national (inshore and deepwater) and transferable quota system did not begin until 1986.

management area concerned in any year fish of the species or class shown in the quota up to the tonnage shown in the quota” (Fisheries Amendment Act 1986 Part II A(28)(O)(4)). Changes in amount of catch occurred by the government buying back existing or selling new ITQs. ITQs could be leased or sold. As part owning ITQs, quota holders were required to pay the government resource rentals to the government as payment for their catching rights (ITQs). Quota owners were liable for resource rental fees regardless of whether the fish were caught.

This sparse legal definition was elaborated upon by a series of commentaries leading up to and following the passage of the 1986 Act. Since the Act’s definition are so sparse, this commentary is an important means of determining how ITQs were perceived as a property right by both fishers and the Ministry. One important commentary is the “Inshore Finfish Fisheries Propose Policy for Future Management (more commonly known as the “Blue Book”), which was used as a discussion document to introduce the concept of QMS to the inshore fishermen. This document describes ITQs as follows:

An ITQ is the right to catch a certain quantity of fish each year within a certain area. These quotas will be allocated in perpetuity and, in most instances, for one fisheries management area. They can be bought and sold in the same way as any other asset. Once a fisherman has obtained his ITQs, his incentive will be to catch his quotas at the least possible cost and to obtain the best prices for his fish. (MAF 1984: 10)

Both in the quote above and subsequent discussion within this document, the Ministry emphasizes ITQs as a property right and an asset. For example: “each fisherman has his share of the total catch as an individual allocation. This secures his equity in the resource, which in effect grants him a property right of ownership” (MAF 1984: 10)

Similarly, “individual quotas provide a greater responsibility for the fisherman to manage his share of the resource” and “a fisherman can retire from fishing on sale of his assets

(ITQs and/or fishing vessel and gear)” (MAF 1984: 11). This emphasis on ITQs as a form of ownership is tempered, however, by the Blue Book’s discussion of resource rentals. It notes, “the industry will be expected to pay for its privileged access to harvest the resource commercially” (MAF 1984: 14). The expectation for payment on the part of the government (and the use of the term “resource rental”) indicates that the government did not see ITQs as synonymous with full ownership, but rather as a more limited harvest right.

This more limited vision of the type of property rights associated with ITQs is also apparent in later commentary on fisheries management and the role of ITQs. For example, in 1987, Colin Moyle (then Minister of Fisheries) commented “I think its worth reminding the industry that resource rentals are a return to the nation as a whole for the right to seas access, a right to a public resource, that needs to be remembered ...” (Reade, 1987: 16). Similarly, published commentary emphasized this limitation:

- ◆ “ITQ represents the right to harvest a set tonnage of a species of fish in a set area ... ITQs are property rights providing security of tenure in the fishing industry. Holders of ITQs pay fixed property rental fees of ‘resource rentals’ to the Government” (FIB, 198x: 24).
- ◆ “The ITQ is a transferable property right allocated to fishers in the form of a right to harvest the surplus production from stocks” (Clark et al. 1988: 329)
- ◆ “In essence, ITQs are a method of allocating to individuals a transferable or tradable right to harvest a specific quantity of the surplus stock production. From a constitutional and legal standpoint, it is important to understand that the transferable right is a harvesting right, not a property right” (Crothers, 1988: 10-11)

Unlike the earlier language of the Blue Book, which emphasized ITQs as an asset and a form of ownership, this commentary focuses on ITQs as a limited right to harvest. While using the language of ownership when promoting the policy, the set of rights associated with ITQs in 1986 were (using Ostrom and Schlager’s terminology) those of an authorized user rather than a property owner.

Security of ITQs as Collateral for Loans

One continuing issue in defining ITQs as a type of property right is the security of ITQs as an asset. This issue has usually involves the ability of ITQ owners (or potential owners) to use ITQs as collateral for loans. When ITQs were introduced, they were widely discussed as an “asset” or “ownership.” But this issue was not explicitly addressed in the 1986 legislation and the Blue Book contained no discussion about the use of quota as collateral. Similarly, the issue was never raised during the extensive debates over ITQs that occurred between 1984 and 1987 during the Federation of Commercial Fishermen’s annual meetings (NZFCF, 1984, 1985, 1986, 1987). It appears that in the face of more immediately pressing concerns, the issue of ITQs as collateral received little or no attention.

However, as the cost of quota rose and the industry became more professionalized, the inability to use ITQs as collateral gained attention. Discussions of the problems surrounding ITQs as security for loans began in the early 1990s. One of the first to identify this issue was Pearse who linked the issue to quality of property rights:

Quota-holders seeking to borrow money face formidable obstacles in using quota rights as collateral. ... [T]he registry system does not provide for registerable interests against quota rights, nor protection of collateral in the event that quota is forfeited as a result of an offence by its holder and the prohibition against foreign holders means that quota is meager security for foreign-owned banks. These impediments significantly lower the value of quota rights, impair the financial security of quota holders, and aggravate tendency towards [aggregation]. Obstacles ... also make it difficult to take on management responsibilities. ... The ability of quota owners to invest in resource development and enhancement depends on their access to capital. (Pearse, 1991: 12-13)

Similarly, Gordon Duncan’s economic analysis of the deepwater fishery reaches a similar conclusion. While praising the concept of ITQs as a property right, he cautions “An ITQ

has the legal character of a choice in action. There is presently no provision for lenders to register an interest in quota. This limits the usefulness of quota as security for loans" (G. Duncan, 1992: 2). The burden small fishers faced is also documented: "small commercial operators ... say larger operators with diverse assets (such as onshore processing plants) can obtain loan finance secured on such assets and this has driven the price of quota beyond the level most fishers can afford" (Bridgeport Group, 1992: 25)

This issue was partially addressed by the 1996 Fisheries Amendment Act. This act created a central registry for ITQ ownership, and specifically enabled the use of ITQs as collateral for loans (Gaffney, 1997: 103). But these measures were adopted late in the development of QMS (10 years after the introduction of QMS) and may not have been enough to encourage a sufficient capital market in the fishing industry. For example, Takiari found that in 1999 lenders were still hesitant to lend based on quota. Instead, lenders were likely to emphasize sustainable earnings, or encourage borrowers to sell quota in favor of more traditional assets (Takiari, 1999: 89). Takiari concludes that "quota is not seen as a safe commercial asset by the financial sector due to the possibility of government forfeiture and sharp changes in prices and values" (Takiari, 1999: 98).

Takiari's finding that ITQs remain a weak asset (or property right) from a banking security perspective, even after the 1996 legislation was passed, is confirmed by my Nationwide Company and Auckland Region surveys. In their survey responses, most companies and many individual fishers mentioned problem in obtaining loans or raising the funds necessary to buy quota. The following comments are typical:

- ◆ "It's hard for small companies to borrow and invest in the quota system. Imagine what would happen to the real estate market if you could only get a mortgage for 20% of the value of your house. It would collapse!" (Company Survey #3)

- ◆ “Banks are scared to lend to us because boats and quotas can be taken from us for violations.” (Company Survey #6)
- ◆ “It’s hard to get started in the industry. You have to raise capital to buy quota. We’ve had 3 or 4 young fishers start up north and do well, but it’s difficult with the banks, particularly if you want to start in an urban area.” (Company Survey #11)
- ◆ “Who has the capital to buy quota? If I were to retire, who is going to buy it? It’s nearly \$500,000 to get started.” (Auckland Survey #7)
- ◆ “You have to pay up to \$5 million for snapper quota, whose got that?” (Auckland Survey #21)
- ◆ “We lease because we’re still paying off the new boat. When that’s done we’ll buy quota. You can borrow against your boat, but not against quota.” (Auckland Survey #24)
- ◆ “By the time you buy a boat and gear its \$20,000 then you have to buy quota that you can’t even get a loan on because the government can cut it back at any time.” (Auckland Survey #34)

While the 1996 legislation addressed a long-term administrative difficulty by providing a mechanism for recording liens on ITQs, the legislation has not resolved the difficulties surrounding the use of ITQs and loan collateral. Even as ITQs gained strength as a property right in other arenas, the difficulty to use ITQs as security continues to undermine the perception of ITQs as a property right.

Switch from Tonnage Allocation to Proportional Allocation

As is described above, when QMS was introduced, ITQs were issued as tonnes, with the understanding that if reductions in the Total Allowable Catch (TAC) of a particular species was necessary, the Government would enter the ITQ market and buy back the requisite number of tonnes. Similarly, if the TAC were increased, the Government would sell the new tonnes of ITQ on the open market. As envisioned by the QMS designers, this would maintain a pure market, in which the allocation of ITQs would be based on economic efficiency. It would also provide the industry with the security of having a

known maximum harvest level each year, thus making it easier for them to plan long-term business strategy.

However, problems in the Orange Roughy fishery in the late 1980s led to a change in this policy. As described by Crothers (1999): "The Government would not entertain the idea of paying several hundred million dollars to reduce the Orange Roughy TAC in the late 1980s when it found the stock size and productivity were not as great as first thought." So, an agreement was negotiated, resulting in the 1990 Fisheries Amendment Act, under which ITQs for all species would be changed from a straight tonnage to a proportion of the TAC.¹⁴² The tonnage that this proportion represented could be changed annually. Thus, one year an ITQ may represent a greater tonnage of fish, while the next year it may represent the right to harvest fewer tons of fish. This allows the government to reduce the TAC without having to "buy back" ITQs, but it also imposes greater uncertainty about future catches on the commercial fishing community.

This change represented a fundamental shift in what ITQs represent, and may be the most important change in the perception of ITQs as a property right. Before, ITQs represented a set amount that ITQ owners were allowed to catch. The consequences (both positive and negative) of changes in fish stock were borne by the government. Under this structure, the incentive for ITQ owners to undertake activities that would enhance or preserve fish stocks is reduced since the government reaps the potential gains and absorbs the potential losses for the ITQ owners. Under this arrangement the short-

¹⁴² As part of this negotiation, it was agreed that for the following five years the proceeds from resource rentals would be used to ease the transition: "Since 1990, a greater share of resource risk has been borne by quota holders. The transfer of this risk has been cushioned and to some extent deferred, by a temporary arrangement offering compensation to quota holders when TACCs are reduced. This compensation mechanism was negotiated between the Crown and the industry as part of the transition to percentage ITQs. The compensation available to quota holders is funded by the payment of resource rentals into a compensation fund. The arrangement expires in 1995" (Gordon, 1992: 4). Annala (1996) also provides an excellent summary of the terms of the transition from tonnage to proportional quota allocation.

term market is purer, but the incentives associated with a fuller set of property rights is truncated.

But under proportionality, the incentive structure shifts. Now, the quota owners bear the “pain” of a TAC reduction (in the form of smaller catches) and benefit from healthier fish stocks. Thus, it would be expected that under proportionally allocated ITQs, ITQ owners would respond to these new incentives and take a greater interest in management of the fish stock. However, as Pearse noted in 1992, the arrangement created by proportionality introduced a new set of problems:

Percentage quota ... has two significant disadvantages ... One is that it is much less certain and secure: hence it a less valuable property right. The second is that it puts the responsibility for making adjustments to allowable catches on the government, while the costs and benefits of adjustments are borne by quota holders. This division of responsibilities inevitably creates conflict. (Pearse, 1992: 12)

Pearse goes on to recommend that this conflict be resolved by embracing the positive aspects of proportional quota: “by assigning quota-holders defined shares not only in the current catch but also in all potential yields, percentage quota gives them strong incentives to support good management, research and enhancement” (Pearse, 1992: 12). Thus, Pearse argues that the new incentive structure should be used to encourage better management by quota owners.

Evidence from New Zealand shows that among the larger quota owners, the long-term trend has been to embrace the potential management responsibilities associated with proportionality. Furthermore, this trend seems to have begun relatively soon after the introduction of proportionality:

- ◆ The QMS provides a potential for cooperative action between holders of quota rights where productivity gains may be achieved that are to the benefit of all of the cooperating quota holders. (Sharp & Roberts, 1991:8)

- ◆ Commercial fishers expressed a variety of views on [Quota Holder Associations -- QHAs]. Some see no need for QHAs, saying present arrangements ... provide adequate user representation. Others support the formation of QHAs, especially for the deepwater fisheries. (Bridgeport Group, 1992: 29-30)
- ◆ The proportional nature of the QMS has enhanced the conservation value of the system. This is because quota holders now have incentives to implement harvest strategies to ensure the proper conservation and management of the fisheries to sustain the value to their quota. (NZFIB, 1993: 9-10)

These three quotes illustrate a fairly rapid transition in the thinking of the fishing industry from cautious recognition of the possibilities of a role in management to a more enthusiastic embrace of the concept of taking on increased management responsibility as a means of increasing their returns.

Interviews with experts also support the importance of proportionality in encouraging quota owners' interest in management responsibly. Tony Craig (Business Policy Manager of the Seafood Industry Council) note that:

"Proportionality achieves a number of things. It shifts the risks of fish stock fluctuations away from the government to the users, it forces responsibility for sound management practices onto the rights holders and it disciplines government to rethink its historical 'interventionist' approach. Such an approach also challenges fisheries managers to confront property rights implications and wider 'sector based' property rights applications." (Craig, 1999)

Stan Crothers (Deputy Chief Executive, Ministry of Fisheries) echoes this sentiment. "It transferred the risks from the Government to the fishing industry for TAC increases and decreases. It also provided some incentives for quota owners to act more responsibly and collectively." (Crothers, 1999).

However, the shift to proportionality was not universally accepted. Many small fishers continue to be unhappy about the loss of security that tonnage allocation provided. Furthermore, many see this change as a betrayal of the promises made in the Blue Book.

- ◆ They never lived up to promises – quota was going to be worth something, it was going to be used as collateral. They cut quota after saying it was ours for life. (Auckland Survey #4)
- ◆ The Government killed the small fishers and quota holders by uncompensated cuts. (Auckland Survey #13)
- ◆ The biggest problem was change from ITQ to proportional quota. (Auckland Survey #16)
- ◆ The government should step into the market and buy quota. No other industry would put up with this. (Auckland Survey #21)

Dave Blanshard (former reporter for the Bay of Plenty Times) summarizes this sentiment: “Unilateral cuts [proportional quota] came in without compensation. That was when fishermen started to feel betrayed” (Blanshard, 1999).

Concern is also expressed that in spite of the incentives created by proportionality, quota owners are still engaging in activity that is not good management practice. For example, Leith Duncan argues “...the bigger companies [are] more driven by this year’s balance sheet, return on investment, and pressure from shareholders than by concern for the longer-term state of the marine ecosystem” (L. Duncan, 1993: 3). Similarly, Wallace pointed to continued pressure by the fishing industry to maintain or increase TAC as evidence that “industry discount rates are high – higher than that of other ... users of fishery resources” (Wallace, 1998: 7). This concern is not limited to critics of the fishing industry. Daryl Sykes (Executive Officer of the New Zealand Rock Lobster Industry Council) cautions “we have companies arguing that they shouldn’t reduce quota because it will wipe out \$1 million in assets off the book. Quota reductions are responded to as an asset, not a fishing issue” (Sykes, 1999).

The switch from tonnage to proportional allocation of TAC represented a fundamental change in the nature of property right ITQs symbolize. By bearing the gains and losses of changes in TAC, quota owners were given an incentive to better

manage the fishery resources, and thus can be seen as a step towards an expanded property right. However, this change was not universally accepted. Many small fishers were dismayed by the loss of security associated with fixed tonnage quota, and there are also concerns that the incentives provided by the change in the property rights structures are not enough to overcome more fundamental profit incentives.

Treaty of Waitangi Settlement¹⁴³

Soon after the introduction of QMS, the Maori community became concerned because “a key presumption in the introduction and use of the ITQ system in New Zealand was initial Crown ownership of the fishery resource” (Memon & Cullen, 1992: 159). Essentially, by introducing QMS the Government affirmatively claimed ownership, thus giving the Maori an opportunity to re-assert property rights claims under the Treaty of Waitangi (Levine, 1989). Thus, after the introduction of QMS, several Maori tribes (or iwi) in the North Island (the Muriwhenua tribes) filed claims with the Waitangi Tribunal that their rights under the Treaty of Waitangi were violated by the creation of ITQs. As summarized by Dewees, the argument focused on whether iwi property rights guaranteed in the Treaty of Waitangi were undermined by QMS:

This Tribunal was set up to hear claims related to the Treaty of Waitangi signed in 1840 by the British and most Maori Chiefs. The English version of the Treaty guarantees Maori “... the full exclusive and undisturbed possession of their ... fisheries and other properties which they may collectively or individually possess so long as it is their wish and desire to retain the same in their possession ...” The Tribunal ruled that the tribes still retained traditional (customary) and commercial fishing rights. Soon afterwards, court rulings supported these findings and led to

¹⁴³ This analysis examines on the issue of fisheries and the Treaty of Waitangi focusing on property rights. For a more complete analysis of the Treaty of Waitangi settlement as it pertains to fisheries, see: Moon, 1999; Memon & Cullen, 1992; Christie, 1997; Levine, 1989;

the suspension of expansion of the ITQ system to other species until Maori grievances were settled. (Deweese, 1996: 7-8)
When the injunction against further ITQ expansion was issued in 1987, negotiations over settlement of the treaty claims began, and lasted until the passage of the Maori Fisheries Act 1989 and the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992.

Between 1986 and 1992, considerable political maneuvering and negotiation preceded both the 1989 and 1992 acts. Positioning around these events – particularly positioning by the fishing industry – reveals a growing awareness of the importance and power of property rights. As Fairgray (1986) shows, the Maori quickly recognized the importance of ITQs as a form of property rights:

[Northland Maori] feel there is a fundamental incongruity about a system which will confer on individuals ... ownership of the right to catch fish commercially ... They draw uncomfortable parallel with the history of Maori tribal lands where ... conferment of individual ownership was a major part of a process of alienation. ITQs run contrary to the concept of communal guardianship (not ownership) of and access to the fish resources. (Fairgray, 1986: 44)

The leadership of the fishing industry was slower to recognize the power of ITQs as property rights. But over time, their awareness of the power of property rights grew.

This evolution is illustrated in the following statements made over several years:

- ◆ The High Court at Wellington has stopped the Government from continuing to implement its national fisheries quota system. ... We are very concerned about the implication for the wider area of fisheries management ... because of the necessity to conserve our resources and ensure that the fish stocks are rejuvenated. The quota system made this possible. (NZFIB 1987: 1)
- ◆ The Maori rights under the Treaty are therefore rights to guardianship of specific areas of the sea such as particular shellfish beds. In these areas, all New Zealanders may fish, as they have done since 1840. But they must fish in accordance with the cultural preferences of the Maori tribe concerned. (NZFIB, 1988a: 1)
- ◆ It is the industry's very strong view that resource rentals cannot be used ... to pay directly or indirectly for any remedy implemented by the Crown to meet its Treaty obligations. ... The industry also rejects the notion of reversion of quota. The industry takes the view that quota allocated in perpetuity confers an inalienable right which cannot be changed for any reason. (NZFIB 1988b: 1)

- ◆ The existing commercial industry is of the view that settling Maori fishing rights issues should never be at the expense of the commercial sector or at the cost of the existing quota holders. Existing property rights must be respected. (Sharp & Roberts, 1991: 19)

This series shows an evolution from (in 1987) a minimal awareness of quota as property rights (instead NZFIB emphasizes the effectiveness of quota as a conservation tool): to an effort to diminish the importance of the Maori property rights while emphasize the importance of long-term quota security. Finally, in 1991, there is an explicit assertion of ITQs as a form of property rights with equal or greater importance than Maori rights under the Treaty of Waitangi.¹⁴⁴

Negotiations over the settlement of Treaty claims ended in 1992 with the passage of the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992.¹⁴⁵ This act permanently settled the Maori commercial (but no customary) claims under the Treaty of Waitangi in exchange for the following¹⁴⁶: Creation of the Treaty of Waitangi Fisheries Commission (Te Ohu kai Moana – TOKM) to manage the resources provided by the settlement until agreement is reached on how the settlement is distributed to the iwi. Purchase of a 50% share of Sealord Products Inc (the largest fishing and processing company – and owner of 25% of quota) at a cost of NZ \$ 150 million. Maori will receive 20% of the TAC for all species brought into QMS after 1992. Recognition and regulation of customary fishing rights. In addition, under the 1989 Maori Fisheries Act, 10% of existing quota was purchased for Maori. Analla estimates that the settlement effectively transferred NZ \$ 500 million in assets or 40% of the commercial fishery to Maori (Analla, 1996: 55).

¹⁴⁴ Although, even at this stage, the NZFIB sill does not discuss the exact nature of property rights associated with ITQs.

¹⁴⁵ This final deal is also referred to as “the Sealord Deal.”

¹⁴⁶ See Moon, 1999 and Annala, 1996 for explanation of the settlement.

By ending the threat of lawsuits, or quota cuts to settle Maori claims, the settlement also increased the long-term security of the fishing industry. But over time, the effect of the Treaty of Waitangi settlement spread beyond these specific items. By 1999, among industry and Ministry leaders, as well as companies, the settlement was seen as strengthening ITQs as property rights.

- ◆ “The Waitangi Settlement has been good. It’s pulled another interest group perspective into property ownership.” (Craig, 1999)
- ◆ “The Maori started out opposed to QMS. It is somewhat ironic that it was the establishment of transferable property rights by way of QMS that allowed Maori to claim their Article 2 treaty rights that had been enshrined in fisheries law for more than a century. Before QMS, fisheries had been considered and managed as a common property resource – something that Maori found very difficult to get their hands on. It is also ironic that the fishing industry who fought Maori claims to the fisheries now have Maori to thank for the continued strength or value of the QMS and thus their individual property rights.” (Crothers, 1999)
- ◆ “ITQs are a well defined property right, that unlike the rights in the treaty cannot be eroded away. So there may be some aspects of property rights allocation that allow the issue [of treaty rights] to be dealt with [by using ITQs].” (Boyd, 1999)
- ◆ “The Waitangi Settlement is probably the only reason we still have the ITQ system. Otherwise politics would have taken it away. Thank God for the Maori, its particularly difficult to take quota away from them.” (Company Survey #1)
- ◆ “I think the Waitangi Settlement improved QMS. Now the ITQ system is locked in because otherwise Government would be accused of devaluing the Maori settlement.” (Company Survey #2)

Essentially, by explicitly using ITQs as a form of “currency” for settling the Treaty claims, the Government strengthened the status of ITQs as a form of property rights. It did this by both elevating their status to a right worthy of settling the very serious Maori claims, and by effectively aligning the political and rhetorical strength of the Maori movement behind the quota owners. The settlement of the Treaty of Waitangi put the industry through many years of uncertainty, but the process and the outcome increased

awareness of ITQs and property rights, and strengthened the perception of ITQs as a strong property right.¹⁴⁷

Shift from Resource Rentals to Cost Recovery¹⁴⁸

As is described earlier in this chapter, when QMS was introduced, a key characteristic of the system was the payment of “resource rentals” to the government for their ITQs. The 1986 Fisheries Act described these fees as: “an annual resource rental for each tonne or part of a tonne of quota at the appropriate rate according to the species or class of fish ...” (Fisheries Amendment Act 1986 Part II A(28)(ZC)(1)). The key point of these resource rentals was that they represented recognition that the government retains full “ownership” of the fishery (on behalf of the people of New Zealand). As owner, the Government has the right to capture some of the profits from commercial fishing “as a means to provide a return to the nation as owner of the resource” (Sharp & Roberts, 1991: 30). Thus, with the Government as owner, ITQs represented a more limited property right. The purpose of the resource rentals was to be compensation for “alienation to private use of a public resource” (NZMAF, 1986). As described by Clark,

“What is being allocated is the right to harvest in a sustainable way the surplus production. The ownership of stock is not an issue. In New Zealand, the government effectively retains ‘ownership’ of stocks and leases out the rights to catch a specific amount of fish ... as determined by the government” (Clark, 1993: 341).

Thus, under resource rentals, there was a constant explicit reminder that ITQs represented a limited set of property rights, which explicitly did not include ownership.

¹⁴⁷ A related issue is the difference in fisher and company perception of the Waitangi settlement. The on-the-water fishermen were more opposed to the settlement, and saw the issue in terms of fairness and racial tension rather than property rights. This difference in perception of the settlement is discussed in greater detail in Chapter 4.

¹⁴⁸ See Gaffney, 1997 for an extensive treatment of the effects of the switch from resource rentals.

In 1994, payments to the government switched from “resource rentals” to “cost recovery.” Reasons for this change are discussed in Chapter 4. For the purposes of discussing property rights one key reason for this change was the argument by Maori leadership that paying resource rentals diminished their ownership rights as outlined in the Treaty of Waitangi. As stated by Kelly, “it was when the Maori fisheries settlement came in that Maori said: ‘We’re not going to pay resource rentals to ourselves. Therefore, we will have it changed’ ” (Kelly, 1999).¹⁴⁹ By making this change, the government (to a degree) acknowledged the Maori claims and reduced the perceived legitimacy of its own claims of ownership of the fishery resources. This left a vacuum in which the perceived rights associated with ITQ ownership expanded.

In addition to Maori treaty claims, other observers and interests used the property rights argument to exert pressure for making the switch from resource rentals to cost recovery. For example, in 1991 Pearse noted “notwithstanding legal niceties, the quota management system has effectively transferred property interests in the fisheries from the Crown to quota holders, thus weakening the Crown’s claim for a return to the owner” (Pearse, 1991: 14). Pearse then goes on to recommend that the Government abandon the claims associated with resource rentals, and instead move towards the cost recovery approach. By 1992 (when Treaty of Waitangi Settlement Act was passed) the transition was being discussed, and the fishing industry positioned itself to gain the right to participate in management responsibilities as part of cost recovery. The following quotes illustrate this progressive effort to link cost recovery with management responsibility:¹⁵⁰

¹⁴⁹ The importance of the Maori argument is confirmed by interviews with Norris (1999) and Horton, 1994: 8.

¹⁵⁰ Before 1992, there was some discussion of cost recovery. In these discussions, industry expressed opposition to the principle, and instead advocated reform within the Ministry and cost reductions. The

- ◆ “The likely shift ... represents a significant risk of higher costs ... The ability of quota holders to manage this risk depends on the scope they will have under arrangements for cost recovery to seek the contestable supply of management and research services and input into the range and nature of those services.” (G. Duncan, 1992: 6)
- ◆ “Industry has consistently stated that it is willing to pay its share of fisheries management costs. Industry has also consistently stated that cost recovery must be accompanied by contestability, accountability and transparency for efficiency and equity reasons. Industry should not be required to pay for fisheries management services that are of a public good character ... Full cost recovery must be accompanied with the guiding principle of ‘user pays, user says.’” (NZFIB, 1993: 21-22)
- ◆ “Industry and the [Treaty of Waitangi Fisheries] Commission accept the principle of cost recovery to meet reasonable attributable costs, so long as it is pitched at a sensible level in commercial terms, is phased in over three years, is accompanied by reforms aimed at more efficient delivery of services and simplification of QMS administration, and is not accompanied by access fees. (Horton, 1994: 5)

Between 1992 and 1994, the industry worked to link the switch from resource rentals to cost recovery to increased property rights in the form of access to fisheries management information and decision-making. When the 1994 Fisheries Amendment Act was passed, it became clear that these efforts were indeed successful.

Under the 1994 Fisheries Amendment Act’s cost recovery arrangement, the commercial fishing sector is responsible for reimbursing the costs the government occurs in regulating the fishing industry. (Costs of regulating the recreational sector remained the responsibility of the Government.) Under the authorizing legislation, the Ministry is required to consult with stakeholders on the “nature and extent of fisheries services and costs of those services for a given fishing year. This stage includes discussion of particular projects and activities and their costs” (Gaffney, 1997: 90). This gave the

following 1990 quote is illustrative: “It would be wrong of the industry to ignore the threat of user pays principles being extended to the management of fisheries. ... The initiative can only be described as financial mischief.” (FIA, 1991: 3)

industry unprecedented access to the information.¹⁵¹ The consultation process also gave the industry a significant role in making decisions surrounding management of the fisheries. In 1999, one critic described the role as follows: "They were able to link control of the activities to the fees paid for them" (Wallace, 1999).

The change from a broad payment from use of a resource to specific charges for costs of management also changed perceptions and attitudes within the industry. While before resource rentals were an abstract generalized cost, now there were specific levies and charges¹⁵² that could be analyzed and contested, with the objective of improving the bottom line. Indeed, this change in attitude was one of the goals of the change. In 1994, the Minister of Fisheries stated, "cost recovery will encourage effective management and greater industry responsibility" (Kidd, 1994). Crothers (1999) goes farther, stating "the implementation of cost recovery had a number of efficiency-based objectives, one of which was encouraging collective action by quota owners in respect of taking responsibilities for some fisheries management functions".¹⁵³

As the following quotes illustrate, the fishing industry responded as anticipated, and began to demand a more active say in what fisheries management activates the money they paid in cost recovery would be used to finance, and how those management activities would be administered:

¹⁵¹ For example, the document outlining the "Proposed Nature and Extent of Fisheries Services" for 1999/2000 was 325 pages long, and contained detailed information about costs and programs broken down individual research projects (e.g., "Stock assessment of alfoncino in BXY 2" or "Commercial eel fishery CPUE analysis) and detailed information on planned enforcement and prosecution activities (such as NZ\$ 1.35 million would be spent monitoring commercial inshore activities, compared to NZ\$ 507,000 for monitoring poaching and black market activities). (MFish, 1999).

¹⁵² For example, in Region 2, Paua quota owners paid levies of NZ\$1,537/tonne for the 1998/99 fishing year; and Ling quota owners Region 4 paid NZ\$28.32 in annual levies and an additional NZ\$23.76 in conservation service levies (Clement & Associates, 1998)

¹⁵³ See Chapter 7 for an extended discussion.

- ◆ “The acceptance of the principle of cost recovery on an attributable basis by the Industry was reliant entirely on the understanding that its implementation would be contemporaneous with that of institutional reform. The Industry expected ... the delivery of contestable fisheries management services. There is no doubt on the Industry’s part that implementing this policy to full effect will lead to more efficient services for substantially less cost.” (NZFIA, 1995: 27)
- ◆ “The corollary of cost recovery must be an empowerment of users, through consultation and contestability, to influence the means by which fisheries services are provided.” (anon., 1996: 19)
- ◆ “Industry acceptance of this transition [to cost recovery], in spite of substantially increased annual payments, on the basis that it was meeting the direct costs of protecting and enhancing its resource base.” (NZFIA, 1997: 12)
- ◆ “Quota owners pay for the full costs of management and enforcement of their fisheries. ... Their objective is the same as the Government’s – sustainable fisheries.” (Clement, 1999)

Interviews with industry experts show this same sentiment:

- ◆ Tony Craig, Business Policy Manager, SeaFIC: “Over time, industry restructured as quota ownership changed. Quota ownership, while providing a secured right to the resource, also means paying money in levies and fees. Industry got fed up with others (Government and the Ministry) making the decisions on what would be delivered, when, and by whom, when quota owners were footing the bill.” (Craig, 1999)
- ◆ Rick Boyd, Senior Consultant, Kingett Mitchell & Associated: “Devolution has to do with the industry’s response to cost recovery. They think ‘If we have to pay for it, we should have more of a say.’” (Boyd, 1999)
- ◆ Donal Boyle, Fisheries Analyst, Clement & Associates: “The industry point of view is that the government is ripping us off, and that we’re big enough to do the job ourselves. We’re paying the money so we want a say.” (Boyle, 1999)

Within the industry leadership, there was a clear connection between paying cost recovery charges and gaining a larger voice in the management of fisheries management. Indeed, as these quotes illustrate, this connection was one of the major drivers in the industry pressure for cost recovery.

But this response to cost recovery was not universal. In contrast to the industry leadership’s acceptance and eventual embrace of cost recovery, smaller fishers were distressed by the switch from resource rentals to cost recovery:

- ◆ “I had a shoulder injury and was out on ACC [disability insurance] for \$170 a week, and I had to put \$120 a week into [cost recovery].” (Auckland Survey #18)
- ◆ “I was winding down to retire [and sell my quota]. Then we got hit with the charges and lost a lot of money that I was counting on for retirement when the quota prices dropped. (Auckland Survey #10)
- ◆ “It’s a bad accident on the road. You couldn’t sell or get rid of quota. It used to be worth \$12,000 a ton, with levy costs quota is now a liability. (Auckland Survey #8)

Unlike the leadership, the on-the-water fishers saw cost recovery as increasing the fees they paid, and thus made their livelihood in fishing more precarious, and the security of quota as an asset as decreased.

However, this view of the smaller fishers was not widely acknowledged or acted upon within the fishing industry leadership. Instead, the change in attitude and action described above dominated the policy debate. This change represents a step towards undertaking management activities – one of the key characteristics in “moving up” Ostrom and Schlager’s property rights typology. It is also interesting to note the increased realization of the importance of this linkage as the years progress and the industry became more familiar with the cost recovery system. In the first quote, the industry is focused almost solely on cost reduction. But even in the second quote, the industry is referring to “its resource base,” and by 1999 quotes focus on the industry paying the cost for “their fishery” and being “fed up with others making the decisions when owners were paying”.

1996 Fisheries Amendment Act¹⁵⁴

The Fisheries Amendment Act was passed in 1996. Unlike other amendment acts, which introduced significant changes in the perceptions of ITQs as a form of

¹⁵⁴ See Gaffney, 1997, Quin, 1997, and MFish 1996 for a more detailed description of the 1996 Fisheries Act.

property rights, this act was primarily administrative. It was designed to clarify and streamline administration of the Quota Management System, but also had some peripheral influence on property rights. Chapter 4 describes these changes and discussion surrounding the effects of the Act, but key administrative changes include: changes in catch balancing regimes, providing a conflict resolution mechanism, application of labor laws to all vessels, and an expansion of offenses for which quota can be forfeited.

Issues concerning property rights include the following. ITQs were explicitly defined in considerably more detail than the 1986 Fisheries Amendment Act (1996 Fisheries Amendment Act: Part IV, Section 27). Key points of this definition include: ITQs being allocated in perpetuity, expressed as a proportion of TACC, and able to be traded, secured, and caveated. It also creates “Annual Catch Entitlements” (ACE) which represent the annual tonnage associated with ITQs, and thus simplified leasing and increased the security of quota if an offense was committed by someone leasing ACE. The 1996 created a registry for recording quota ownership and liens on ITQs – addressing a long-term issue with ITQ property rights (see above). These were the issues clearly related to property rights. But they are more clarifications or amplifications of the visions of ITQs as property rights that was building prior to the 1996 Fisheries Amendment Act, rather than a dramatic change.

1999 Fisheries Amendment Act¹⁵⁵

By the 1998/1999, the shift in perception of property rights was evident. In 1986, ITQs were seen as a limited catching right (authorized user), but by 1999 they were seen

¹⁵⁵ The history surrounding the rise of the stakeholder groups and passage of the 1999 Fisheries Amendment Act is discussed extensively in Chapter 7.

as representing an expanded set of right, which (in some minds) included management and ownership responsibilities. The following quotes from reports and academic presentation illustrate this expanded perception of the property rights associated with ITQs was present among the fishing industry leadership.

- ◆ “The government, and not users hold de jure rights in respect to most of the functions associated with management of the fisheries. Increasingly, however, examples can be found where de facto management rights have evolved such as in the Nelson scallop fisheries and the Ngai Tahu customary fisheries. Their evolution and effectiveness is informally recognized and encouraged by the government.” (Clarke & Clough, 1998: 24)
- ◆ “Responding to the productive incentive structures of the quota management system, New Zealand’s quota owners/leasees are increasingly following the example of the southern scallop fishery and organizing themselves into management associations.” (Harte, 1999: 4)
- ◆ “Quota owners, more than any other stakeholder in the fishery, have a need to know the conservation limits of the fishery. It is in their interests to ensure sustainable management more than any other stakeholder. Their whole investment is underpinned by resource access and sustainable management.” (Clement, 1999)
- ◆ “ITQ owners and marine farmers face increasingly strong incentives to manage their own affairs but lack the legitimacy to make rules, collect funds, and purchase management services except on a totally voluntary basis.” (Bess and Harte, 2000: 336)
- ◆ “At the very heart of the quota management system is this concept of an ownership stake in the fishery and its future, shown now to be absolutely fundamental to securing the commitment of all participants to sustainable management.” (Kidd, 1999)

This expanded perception of what ITQs represent in terms of both rights and responsibility is not restricted to formal reports. The company owners and managers who participated in my Nationwide Company survey expressed similar sentiments.

- ◆ “With rights come responsibilities, we want to exercise them. ... That was the reason for management groups.” (Commercial Survey #1)
- ◆ “Cheaters steal from us [quota owners], not the government. Its better when the owners police themselves.” (Commercial Survey #14)
- ◆ “Under ITQs, we’re doing our best to manage a wild invisible stock. Previously it was rape and pillage. We’re trying to farm something we can’t see.” (Commercial Survey #17)

Similarly, the smaller scale fishers also appear to have an expanded vision of the responsibilities associated with quota ownership. This sentiment did not show up in the Auckland Region survey. But it was expressed during a meeting of the Whitianga and Coromandel Peninsula Commercial Fishermen's Association. The Danish seiners in the association met to discuss whether to adopt a logbook program, which would provide systematic data on catches. During the debate, emphasis was placed on the link between management and ownership. A leader of the organization (P.Clough) talked about how "we've got to improve scientific data in order to protect our quota ... This research is a way to safeguard your assets." Later another person commented, "Data collection is part of ownership, regular maintenance that needs to be done, like painting the house." At the end of the meeting, there was general agreement to implement the logbook program – subject to revision of logbook format (Seiners Scientific Research Meeting, 1999). Discussion at this meeting and agreement to implement the logbook program (which would require them to measure up to 100 fish a day) illustrate both the strength of the expanded perception of ownership and the willingness of even the "on the water" fishers to take on management responsibilities

When compared with the perception of ITQs and division of responsibility expressed in 1986,¹⁵⁶ the vision of what ITQs represent expands from a simple limited catching right to a broader property right. Under this broader vision, quota owners responded to the changing incentives (such as proportionality and cost recovery) to voluntarily take on management responsibilities – both individually and in the form of management groups. As these patterns changed, so did political pressure for the government to recognize and support these management activities and groups. (Chapter 7 discusses the long-term

¹⁵⁶ See pp 4-5 of this chapter

development of the stakeholder group and devolution movement in detail.) It was this changed political and management environment that led to the introduction and passage of the 1999 Fisheries Amendment Act.

The 1999 Fisheries Amendment Act represents another fundamental change in QMS. When it was passed in September 1999, it recognized the growing movement towards ITQ owners taking over management responsibilities by allowing the “transfer responsibility for certain fisheries services to quota over-based organizations ...” (Fisheries Act 1996 Amendment Act 1999). More specifically, the 1999 Fisheries Amendment Act created a mechanism under which quota owner associations (stakeholder groups) develop management plans for a specific fishery. If the Ministry of Fisheries approves that management plan, the stakeholder group can then take over the routine management tasks while the Ministry maintains compliance responsibilities and audits the stakeholder group’s progress. These management responsibilities could include direct purchase of the scientific research that forms the basis of TACC, as well as more routine management tasks.

Providing this legal mechanism for stakeholder group management represents a formal acknowledgement of the interests of ITQ owners in fisheries management, and thus the expansion of ITQ property rights to include significant participation in management of the resource. This was acknowledged during the debate over the legislation with statements such as this from Jim Sutton (NZ Labour): “I believe that a change of culture has been occurring in the fishing industry since the introduction of [QMS]. Fishers now have excellent reason to manage the fishery sustainably and are becoming a little more like farmers and a little less like hunter-gatherers” (Debate:

19305) Indeed, much of the debate over passage of the 1999 Fisheries Amendment Act focused on whether this transition in property rights and accompanying interest in management had taken place.¹⁵⁷ So, the decision to adopt stakeholder group management can clearly be seen as taking place within the discussion over what type of property rights ITQs represent, and its adoption an affirmation of the expanded bundle of property rights associated with ITQs.

2000 Moratorium

The 1999 Fisheries Amendment Act provided a mechanism for quota owners to formally engage in fisheries management, but it did not mean that groups would automatically be able to take on these management responsibilities. One of the most controversial aspects of this legislation was the section enabling the direct purchase of scientific research by stakeholder groups rather than the government. Several environmental and scientific groups expressed concerns. Dr. John McCoy (Director of Fisheries Research, National Institute of Water and Atmospheric) explained:

“We run the risk of loss of objectivity for scientists in research. It can't be protected through mythical standards. In a resource squeeze, MFish monitoring of research will be the first thing to go. It's better to have transparent contracts with government. Otherwise there's a danger of 'consultants disease.' If you want good honest advice, you don't get it by having it purchased by those with vested interests.” (McKoy, 1999)

Essentially, the scientific and environmental communities were concerned that direct purchase would reduce the quality and independence of the scientific advice on which stock management decisions were made.

¹⁵⁷ See Chapter 7, pages 7-9.

Soon after the 1999 legislation was passed elections took the center-right wing National government (which passed the 1999 Act) out of power, and brought in a center-left wing alliance that was headed by the Labour party with the Alliance as a junior partner.¹⁵⁸ While fishing was not an issue in the election, during parliamentary debate, Labour representatives had expressed concern over the 1999 legislation (see page 230) and the rate at which responsibilities would be devolved to stakeholder groups. Furthermore, during the election, Labour signaled strong environmental interests when they announced that they would go against their traditional timbering supporters by backing a ban on the harvest of old growth timber on the West Coast of the South Island. So, it was not surprising when, as part of the transition, the new government changed policy about the direct purchase of scientific research.

In a speech to the Seafood Industry Council in May 2000, the Minister of Fisheries Pete Hodgson confirmed that he was shelving plans to allow stakeholder groups to directly purchase fisheries assessment research. This effectively placed a moratorium on the ITQ owners taking on one important aspect of fisheries management. In discussing this policy, Hodgson noted:

You know I've shelved the direct purchase of research for at least a year because I think we need to do some hard thinking before we go down that road. There are real questions here about whether industry-purchased research gets the incentives right. These are also questions about whether we can design standards and specifications robust enough to deal with potential conflicts of interest. It may be that the next step in some fisheries is direct purchasing of research. I'm not ruling that out. I'm not ruling it in either. I'm cautious. I'm saying you're going to have to persuade me, as an industry, that your management structures are sufficiently mature to handle that step. (Hodgson, 2000a: 7-8)

¹⁵⁸ In 1999, the Green Party was part of Alliance, but for the election that brought Labour to power, they ran as an independent party. Subsequently, Labour chose not to include them in the coalition government.

In an August speech to the New Zealand Marine Science Society, Hodgson confirmed this policy position and reasoning (Hodgson, 2000b: 2)

This moratorium or “shelving” of plans to allow direct purchase of research represents a subtle change in the policy and thus the perception of property rights. The fundamental principle of ITQs representing an expanded bundle of property rights remains intact. But the change signals a lower degree of confidence in which the government holds the ITQ owners. It also illustrates that unlike the perpetual catching rights, the management rights are subject to change as government leadership or policy changes. Thus, the rights created or recognized by the 1999 Act are to some degree reduced by the 2000 decision.

Conclusion

When QMS was introduced in 1986, ITQs represented a simple right to extract a specified tonnage of fish from the national fisheries. Over time, as QMS changed, so did the nature of the property rights ITQs represent. (See Table 6-2 for summary.) Among the most important changes, the switch from tonnage to proportionality placed the costs and benefits of stock changes on the quota owners, thus giving them an incentive to better manage the fish stocks. Next, the use of ITQs to settle the Treaty of Waitangi strengthened the perception (and political reality) of ITQs as a perpetual ownership right. The switch from resource rentals to cost recovery 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. Finally (although somewhat weakened by the 2000 moratorium) the legalization of stakeholder group management recognized the management rights of quota owners.

Table 6-2: Timeline of Events Influencing ITQs as Property Rights: 1986 – 2000

Event	Description	Influence on Perception of ITQs as Property Rights
1986 Fisheries Amendment Act	Quota Management System 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 collateral	ITQs not fully accepted as loan collateral. 1996 legislation provided registry to record liens, but banks are still hesitant to lend.	Perception of ITQs as strong property right (or as an ownership right) is undermined by difficulty in obtaining loan financing.
1989/90 Switch from Tonnage to Proportional Allocation	Government stops entering market to raise or lower TAC. Instead, amount ITQ owners catch changes with TAC.	ITQ owners bear the risks and benefits of changes in TAC. Large companies and industry leaders saw as improving property rights, small fishers saw as weakening rights.
1992 -- Treaty of Waitangi Settlement	Maori granted 10% of quota: half of Sealord Products (NZ\$150 million); 20% of all stocks brought into QMS.	Debate on settlement increased awareness of ITQs as property right. 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 and 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 enables Ministry of Fisheries to delegate some management powers to stakeholder groups.	Explicitly recognizes ITQ owners as having a legitimate fisheries management interest that can be exercised through stakeholder groups.
2000 – Moratorium	Ability of stakeholder groups to directly purchase scientific research is shelved.	Limits placed on the management responsibilities granted under the 1999 Fisheries Amendment Act.

These changes in policy and perception of property rights are sequentially linked, with one round of policy change creating the incentives and pressures for the following round of changes. This was particularly evident with the switch to proportionality and the switch to cost recovery both creating incentives which led to the informal and then formal adoption of increasing management responsibilities on the part of the ITQ owners. In 1999, this culminated with the adoption of a new co-management regime based on groups of ITQ owners. Researchers such as Anthony Scott (1993, 1999) argue that ITQs encourage the development of co-management and self-management regimes. This case, with its evolution from a simple restricted ITQ management approach to a system of co-management layered over New Zealand's QMS, illustrates that this theorized development can indeed take place.

Chapter 7: Evolution of a Stakeholder Group Managed Fishery

Cheaters steal from us, not the government. It is better when owners police themselves.

-- Company Interview #14

Introduction

New Zealand's Quota Management System (QMS), with its emphasis on tradable quotas, removal of subsidy and promotion of international export is viewed as a long-standing example of the market-based approach to fishery management. However, during the mid to late 1990s, what is referred to as a "devolution movement" within the New Zealand commercial fishing industry¹⁵⁹ first began to attract public attention. The goal of the devolution movement is to shift management responsibility from the Ministry of Fisheries (MFish) to "stakeholder groups". Such a shift would not replace the QMS. Instead, the stakeholder groups with management responsibility would be layered on top of the existing QMS. In September 1999, this movement was recognized when the 1999 Fisheries Amendment Act was passed, allowing the "transfer responsibility for certain fisheries services to quota owner-based organizations ..." (Fisheries Act 1996 Amendment Act 1999)

While this move towards stakeholder management may appear to be a straightforward transition towards the type of co-management described in the literature¹⁶⁰; the facts surrounding the fishing industry and the transition show that this case raises questions not fully addressed by the literature. The characteristics and

¹⁵⁹ NOTE: Pomeroy & Berkes would disagree with calling this process "devolution" – they define devolution as the permanent transfer of power from a central government to local government, while they would describe what is going on in New Zealand as "privatization" in which power is transferred from the government to a non-governmental organization. While their terminology is more accurate, I will continue using the term "devolution" since it is used by the participants.

¹⁶⁰ See Chapter 2.

history of the New Zealand fishing industry are discussed in detail in Chapter 4. however, two key points should be emphasized here.

First, the structure of the fishing industry is very different from the one typified in the co-management literature because the industry is divided into two very different sectors. The deepwater industry (species such as orange roughy, dories, and hoki) which is dominated by a small number of large vertically integrated trawling and processing companies; and the inshore industry (species such as snapper, flounder, crayfish, and gurnard) is fished by a mixture of relatively small-scale fishers (1-3 man operations) who primarily sell to the vertically integrated companies, and boats owned by the vertically integrated companies. This commercial environment has resulted in an industry that (with the exception of a few sector and species¹⁶¹), at middle levels and leadership levels, has relatively limited grounding in the local communities in which the industry operates. This industrial structure means that the dominant participants are large-scale corporations, rather than the small-scale entrepreneurial harvesters who often characterize the co-management literature. Similarly, these industry participants are partnering with a national government, rather than the more localized state or regional governments.

Second, the history of the fishing industry in New Zealand is very different than that of many nations. The deepwater industry is relatively young, dating back to 1983, when New Zealand declared its EEZ and began offering incentives for the (then nascent) domestic deepwater industry to replace the foreign fleets that had been fishing within the 200 mile limit. There is a longer (100+ year) history of fishing and governmental fishing regulation in the inshore industry, and some towns (e.g., Bluff, Timaru, and Tauranga) have their origins as fishing towns. But the documentation of historically strong

¹⁶¹ Stewart Island and Chatham Island Crayfish/Rock Lobster would be an exception to this.

community-based regulation that is seen in other similar fisheries (e.g., McCay's et al 1998) is lacking. The main exception to this is the native Maori, for whom fishing was an integral part of the traditional community and lifestyle. While there are some strong (primarily nationally-based) groups representing the fishing industry (e.g., SeaFIC, Federation of Commercial Fishermen), the strong local institutions that are usually associated with successful co-management are not apparent in the case of New Zealand.

Research Questions

Since New Zealand's fishing industry does not closely match the social and fishery conditions described in much of the co-management literature, New Zealand's effort to "devolve" its quota-based fisheries management to a stakeholder group based system offers an important opportunity to examine the relevance of the co-management literature and its policy prescriptions to a challenging case. Since New Zealand's foray into QMS is still a relatively young institutional arrangement, I cannot at this stage use it to test the extent to which the lessons of the co-management literature can be extended to large industrial fisheries. This is, however, a direction I hope to take my research in the future. For the purposes of this dissertation, the following questions are important and reasonable lines of inquiry:

- ◆ What are the characteristics and origins of New Zealand's co-management approach?
- ◆ How likely is this approach to succeed?

Characteristics of Stakeholder Group Management Approach

As envisioned in the enabling legislation, (Fisheries Act 1996 Amendment Act 1999, and Fisheries Act 1996 Amendment Act (No.2) 1999¹⁶²) stakeholder group management is not a replacement of QMS but rather a supplement to it. Perhaps the best way to think of it is as another layer of institutions to which powers currently residing in the Ministry of Fisheries (MFish) can be transferred to a new institutional layer. This layer is commonly called "stakeholder groups," while the legislation calls them "Approved Service Delivery Organizations." The Government describes the goal of this co-management approach as follows:

Co-management of fisheries resources will enable those with a fishing interest in a resource to collectively manage the resource in concert with the Crown, which will set standards and rules for the continued sustainable utilization of the resource. In order for co-management to be a realistic option for those with a fishing interest, the rights of recreational fishers and aquaculturists need better definition in the law. (Fisheries Act 1996 Amendment Bill 1999: ii)

At the center of this approach is the Ministry transferring "responsibility for certain fisheries to quota owner-based organizations ... the chief executive ... will no longer be responsible for delivery of those fishery services but take on a role of monitoring and auditing the performance of the approved service delivery organization in accordance with standards and specifications set by the Minister." (Fisheries Act 1996 Amendment Bill 1999: ii)

¹⁶² NOTE: when I left New Zealand, a copy of the Act (which was passed just before I left) was not available. However, based on the news coverage at the time, there were no substantive changes from the bill to the Act. Also, I conducted some spot checks on Web-published Act between the Act and the Bill and could not find substantive differences on the co-management topic. Furthermore, my analysis is based on the explanatory notes contained in the bills. I found this is more valuable than the actual legislation; because it often explicitly spells out the intent and policy of the legislation, while the web-based version of the Acts contain no such background.

As described above, these stakeholder groups are restricted to quota owner-based organizations. Thus, these groups are solely comprised of members of the commercial fishing industry who own quota. These organizations are delegated considerable powers. As described in the 1999 Supplemental Order on Fisheries Act 1996 Amendment Bill 1999, "fisheries services" includes a wide variety of activities including: maintaining quota registries, management of resources, enforcement, and research related to stock assessment and the effect of fishing on the environment. A subsequent section of the Fisheries Act 1996 Amendment Bill 1999, however, states "the chief executive cannot contract out ... powers that relate to the exercise enforcement functions under the Act." (Fisheries Act 1996 Amendment Bill 1999: x) The Ministry expanded upon this brief description in a speech a few months prior to the Act's passage:

It will be our responsibility [to] set the standards for fisheries services, such as research. We will monitor and audit these services and evaluate performance against fisheries plans. We will deliver criminal law enforcement and prosecution services. ... In the years ahead, we envisage fisheries rights owners will begin shaping their own fisheries plans. Of course any such plans will need to meet government's environmental goals and standards. ... When such plans have gained government approval, fisheries rights owners will implement them. Fishers will then be able to purchase research services, monitor fishing activity, provide information and education services, enforce non-critical rules and collect management levies. (Crothers, 1999a: 3)

Essentially, stakeholder groups are authorized to carry out routine management activities, including research, while the Ministry maintains the role of setting management standards (including the final say on setting annual catch entitlements), enforcement, and auditing stakeholder group activities.

The legislation also sets up a procedure for transferring power to a stakeholder group and (if necessary) transfer power from a stakeholder group back to the Ministry if a

group fails to perform. The transfer of power to a stakeholder group must be approved by an Order in Council¹⁶³ upon the recommendation of the Minister. When the transfer takes place, the stakeholder group must put up a bond “sufficient to meet the costs to the Crown of transferring specified functions, duties, and powers back” to the Ministry. Transferring power back to the Ministry requires an Order in Council, based on the recommendation of the Minister after consultation with the stakeholder group. If this occurs the bond is forfeited. At such a time, the Ministry may also take any physical equipment owned by the stakeholder group necessary to manage, but the stakeholder groups must be compensated at full market value. Stakeholder groups are also subject to (as yet undefined) reporting and public disclosure requirements, as well as audits. They are also subject to NZ\$200,000 fines per incident for failure to comply with the rules surrounding stakeholder group functions. (Fisheries Act 1996 Amendment Bill 1999: x)

In addition to the powers directly granted to stakeholder groups in the main section of the Act, other sections of the 1999 Amendments substantially influence the powers and resources available to the stakeholder groups. Perhaps the most important of these is the ability to levy service fees for “functions, duties and powers performed or exercised by the organizations. (Fisheries Act 1996 Amendment Bill 1999: xii) This means that the stakeholder groups can levy additional management fees with the same force of law that the Ministry currently holds.

Another power is the existence of a dispute resolution process, under which the Ministry provides a structure for stakeholder groups resolving disputes (MFish Currents: Nov 1999). According to the 1996 Fisheries Amendment Act, the Ministry must provide

¹⁶³ Which I believe means Cabinet approval.

a service between two active fishing interests (such as stakeholder groups) in which the dispute is essentially submitted to the binding arbitration of a Fisheries Dispute Commissioner who can take testimony and make final recommendations to the Minister for settling the dispute (Clement, 1997: 13; Fisheries Amendment Act 1996: Part 7, Sections 114-123). At least one case has been settled using this process (MFish Currents: Nov 1999).

Other sections of the Act potentially limit the ability of stakeholder groups. Perhaps the most important of these is the amendment, which removes the ability for individuals or groups to engage in private prosecutions. Under the new legislation, “prosecutions may only be commenced by the chief executive ... or a fishery officer, or by the Fish and Game Council in any district in which an offence has been committed or an offender found.” (Fisheries Act 1996 Amendment Bill 1999: vii) While this amendment supports the intention of the Act to retain primary enforcement powers within the Ministry, the removal of private prosecutions may close the door on the possibility of stakeholder groups engaging in supplemental enforcement activities. Instead, internal group mechanisms, turning offenders over for governmental prosecution, and possibly civil suits are available as enforcement mechanisms.¹⁶⁴

Another change that may hurt the integrity of enforcement is that for the most severe penalties to be applied, prosecutors must prove that the crime was carried out and that there was intent to break the law. Furthermore, corporate and employer liability is limited “if they can demonstrate that they have taken all reasonable steps and exercised

¹⁶⁴ Thus, the stakeholder groups are left without direct access to the criminal justice system (through private prosecutions) as a means of enforcement of fisheries laws.

due diligence to control the activities of their agent and employees.” (Fisheries Act 1996 Amendment Bill 1999: ix)

In summary, the 1999 legislation¹⁶⁵ empowers stakeholder groups, which are defined as quota owner associations, to take over key fisheries management responsibilities. These responsibilities include: managing fishery resources, scientific research, and registry services. The Ministry must approve stakeholder groups, and the Ministry maintains the role of setting management standards (including setting annual catch entitlements), enforcement, and auditing stakeholder group activities.

Reactions to the Stakeholder Group Approach

Perhaps not surprisingly, responses to this dramatic change in approach were varied. This diversity is evident in the parliamentary debate over the 1999 Amendment Acts.

- ◆ Jim Sutton (NZ Labour): “I believe that a change of culture has been occurring in the fishing industry since the introduction of [QMS]. Fishers now have excellent reason to manage the fishery sustainably and are becoming a little more like farmers and a little less like hunter-gatherers ... But we are not at the point yet where we can give the fishing industry the freedom of self-management that we give freehold landowners. It is important that we do not move too fast in this, because it would take only one scandalous episode of mismanagement for the credibility of the scheme to be destroyed.” (Debate: 19305)
- ◆ Jeanette Fitzsimons (Green Party): The stories we heard about the Louisville Ridge and various other parts of the high seas where New Zealand fishers have been involved in what amounts to the fishing equivalent of systematic clear felling – if one was talking about forestry – indicates that that new sense of responsibility and the new culture in the fishing industry is still fairly skin-deep. It is really important that the Government continues to be vigilant and in control of what the fishing industry is doing...” (Debate: 19306)
- ◆ Rodney Hide (ACT): “Very often the Government listens too much to the civil servants, too much to the fishery managers, and not enough to the fishermen and fishing industry. It needs to listen to the people whose lives are spent on the water finding the fish, catching the fish, and investing in the technology that we need to harvest the sea, and indeed, exploring those markets and developing those markets

¹⁶⁵ Fisheries Act 1996 Amendment Act 1999 and Fisheries Act 1996 Amendment Act (No.2) 1999

that the fish – the resource – all the value that it has. ... What we need to do though is to understand the vital significance of property rights that capture the value. We need to allow certainty for the fishing industry, and to give it the power to make the decisions and to carry the costs of those decisions.” (Debate: 19308-9)

- ◆ Graham Kelly (NZ Labour): “[I]n the past the Crown conducted and managed this process and there was a balance between the competing interests of the commercial industry, the public good, the interests of Maori, and the recreational people. There is a risk that this devolution will lose that balance, if not immediately then subsequently.” (Debate: 19310)

The themes voiced in the parliamentary debate are similar to those heard in wider debate over the adoption of the stakeholder group approach.

The fishing industry, which (as is illustrated in the next section) had a substantial role in developing the stakeholder group approach, was primarily positive.

- ◆ “If industry can successfully take control of our management structure and get rid of bureaucracy it will cost us less in the long run but more now. We will start producing again and start going after new species.” Peter Jones, President New Zealand Federation of Commercial Fishermen (Jones, 1999)
- ◆ “With rights come responsibilities, and we want to exercise them. But a lot of greenie groups are suspicious. They think we’ll over-use the resource. But that’s not in our long-term interests. That was the reason for the management groups – mainly property rights, but the driver was cost. We were getting billed plenty, but we weren’t getting any management for it.” North Island Company Owner (Company Survey #99-01)
- ◆ Over time, industry restructured as quota ownership changed. Quota ownership, while providing a secured right to the resource, also means paying money in levies and fees. Industry got fed up with others (Government and the Ministry) making the decisions on what would be delivered, when, and by whom, when quota owners were footing the bill. The point is to remove government interference in the day to day management of fisheries resources and to stick to ‘outcome’ based policy determinations.” Tony Craig, Business Policy Manager, SeaFIC (Craig, 1999)
- ◆ “Government is good at policy and enforcing – not administering. The industry point of view is that the government is ripping us off and we’re big enough to do the job ourselves. We’re paying the money, so we want a say. Donal Boyle, Consultant, Clement & Associates (Boyle, 1999)
- ◆ “Their [stakeholder groups] aim ... is to be pro-active in the development and management of their own fisheries. As quota owners they have the biggest incentives to ensure their fishery continues to be a strong, sustainable economic success. As fishermen and processors they have the greatest knowledge of the resource they harvest and it surely makes sense for this knowledge to be used when developing management plans for the resource.” Dave Sharp, Chairman SeaFIC (Stevens, 1999b: 39)

Here, the focus is on the belief that the introduction of QMS encouraged responsible behavior and long-term thinking on the part of the industry. When combined with what the industry saw as excessive management fees by the Ministry, they argue that quota owners are in a better position than the Ministry to manage the fisheries.

Meanwhile, other groups (particular the scientific and environmental communities) raised concerns over the way the stakeholder group approach would be implemented.

- ◆ “Whilst we appreciate the value, and understand the concept, of devolving responsibility for managing a resource to the community closest to the resource, we also caution against only requiring representatives of the extracting community to be part of Quota Holder Associations. ... We would recommend the Minister to require by statute that the Quota Holder Associations have representatives of the recreational, environmental and Maori communities that are nominated by the local communities.” World Wildlife Fund New Zealand. Submission to Parliamentary Select Committee (Short, 1999: 2)
- ◆ “The ‘approved service delivery organizations’ will be responsibility to the Minister and we question where are the provisions necessary to enable public scrutiny of the process and reports of these organizations without the veil of ‘commercial sensitivity’ being used to prevent access?” World Wildlife Fund New Zealand. Submission to Parliamentary Select Committee (Short, 1999: 3)
- ◆ “NZMSS is concerned that the Fisheries Amendment Bill, if passed, in its present form will result in the Government stepping back from its role of providing independent marine stewardship ... [This] may place both the Ministry of Fisheries and the research providers in an untenable position with respect to their capability to effectively retain the objectivity, quality, and integrity of their science. This would also place the QMS at risk. These potential risks raise questions as to the appropriateness of the devolution of research services.” New Zealand Marine Science Society. Submission to Parliamentary Select Committee (NZMSS, 1999:1.5)
- ◆ “Genuine community management for selected stocks could work well. The way industry is pressing it will not work well. It will contaminate research and consolidate industry power over others, particularly environmentalists. It won’t stop high discount rates. Will be cooperative destruction rather than cooperative management.” Catherine Wallace, Spokesperson, ECO (Wallace, 1999)
- ◆ “We run the risk of loss of objectivity for scientists in research. It can’t be protected through mythical standards. In a resource squeeze, MFish monitoring of research will be the first thing to go. It’s better to have transparent contracts with government. Otherwise there’s a danger of ‘consultants disease.’ If you want good honest advice, you don’t get it by having it delivered to those with vested interests.” Dr. John McKoy, Director of Fisheries Research, National Institute of Water and Atmospheric (McKoy, 1999)

These concerns focus on issues that can be best described as transparency and representation: how stakeholder groups will address the concerns of all interests, whether there would be conflict of interest, and how the government will be able to ensure stakeholder groups follow through on these responsibilities appropriately.

Not surprisingly (for an important policy) opinions on the stakeholder group approach were quite divergent – both within the government and the wider community. While the industry stressed their responsibility and ability to take over management responsibility, opponents expressed concern over accountability and whether groups represented all fishery interests.

Development of Stakeholder Group Approach

According to the co-management literature, co-management regimes can come into being in a two different ways. Many are long-lived institutions (e.g. traditional management regimes) that are either supported by or interacting with existing central or regional governments or subject to benign neglect by these governments (e.g., Ostrom 1990). Other co-management systems are more recent. For these, the 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 (Pinkerton, 1989; Pomeroy and Berkes 1997).¹⁶⁶

What is the most surprising about the development of the stakeholder group approach is that it does not bear the trademark characteristics of a crisis-driven change described above. Instead, the development appears to be part of a long-term and well-planned effort of the part of both the Ministry and the upper levels of industry interests.

¹⁶⁶ See Chapter 2 for a more in-depth discussion of development of co-management regimes.

While concerns and frustration are expressed about the high price of cost recovery and lack of control the industry has over levies, these certainly do not appear to reach the level of crisis. Neither in elite interviews nor in documentation was there discussion of companies in danger of going out of business due to cost recovery; and there certainly was no perceived crisis of a fishery collapse driving the need for a new management approach. Instead, three longer-term and cumulative forces were the drivers behind the move to co-management. These forces are: the national political and public management environment; the international academic discussion of property rights and co-management; and most importantly the evolution of quota owners' responses to the changing incentives created by QMS.

Political and Public Management Context¹⁶⁷

First, from a broader perspective, devolution can be seen as fitting into a larger national movement. (Much like the adoption of QMS in 1986 fit into Lange's economic reforms.) New Zealand has devolving natural resource management away from central government, and towards local and regional government bodies (Kerr, 1998). Similar efforts to shift management responsibilities from central government to regional levels of government or the private sector occurred in health (Hawkins, 1995), broadcasting, tertiary education, and basic scientific research (Easton, 1997).

Fisheries management is the first time this pattern is extended to privatizing regulatory efforts. (The earlier reforms primarily focused of service provision, rather than co-management between private organizations and the government.) But the

¹⁶⁷ Additional information about New Zealand's environmental policy can be found in Buhrs and Bartlett, 1993; Gilbert, 1994; Furuseth and Cocklin, 1995. Easton's *The Commercialization of New Zealand* and the Summer 1997 issue of the *Journal of Policy Analysis and Management* (Scott et al, 1997; Boston and Pallot, 1997; Schwartz, 1997; Campos and Pradhan, 1997, and Kettl, 1997) provide a comprehensive and contrasting analysis of New Zealand's public sector reforms.

adoption of co-management does fit within a broader governmental effort to shed many of the management responsibilities. Observers within the fishing industry noted this connection. For example, Tony Craig, Business Policy Manager, SeaFIC explained “Government is willing to hand over power because of the pressure under cost recovery ‘disciplines’ ... and more generally there is a movement for government to get out of business and focus just on governance and strategic outcomes – it’s a general move throughout government.” (Craig, 1999). Similarly Rick Boyd, Senior Consultant, Kingett Mitchell and Associates, noted “the Government doesn’t believe it is qualified to manage resources compared to stakeholders” (Boyd, 1999). Other (such as Barry Torkington, Director, Aquis) put a more jaundiced interpretation on this explanation, arguing that devolution is

“a hospital pass¹⁶⁸ on the part of the government. QMS is so unwieldy and so expensive that the government wants out. The government historically doesn’t have the ability to regulate a well-capitalized and well-organized industry ... There has been and will be a slow erosion of government power.” (Torkington, 1999)

Regardless of the interpretation of how malevolent or benign the motives, there is a clear recognition that on the part of the government, the move to devolve management responsibility to a co-management arrangement is part of a larger political and public management movement taking place nationwide.

Academic Contexts

In addition to the national political and public management context, the devolution movement was also influenced by the larger academic debate over natural resource and fisheries management. Within recent history, New Zealand public

¹⁶⁸ “Hospital pass” is a rugby term, referring to the practice of passing the ball to a teammate—just in time to avoid being tackled yourself, but resulting in the teammate being subjected to a tackle hard enough to put him in the hospital. Essentially, it means saving yourself at the expense of another.

management in general has been influenced by current (primarily economic) literature. Scott et al. describe the role of economic theory to the broader economic and public management reforms of the 1980s and early 1990s:

[T]he body of advice that was developed by professional policy advisors in the government, especially those in the Treasury, was based on substantial elements of the literature on institutional economics and contemporary macro- and microeconomic theory. ... The designers of the New Zealand reforms based much of their advice on an interpretation of contemporary institutional economics as developed, for the most part, by American theorists. (Scott et al. 1997: 359)

Thus, Government and Treasury,¹⁶⁹ leadership created an environment in which the government and policy community accepted and respected academic advice.

With academic literature accepted in the Treasury it is not surprising that the fishing industry and Ministry of Fisheries also used academic policy advice extensively. As is documented in Chapter 4, there is evidence of 'outside academics' advocacy of market-based regulation playing a role in the initial adoption of QMS. For example, in 1982, the Fishing Industry Board brought Lee Anderson (a leading academic advocate of ITQs) to New Zealand for a series of seminars with industry and government leadership (FIB, 1982: 15). Similarly, once QMS was in place, government employees published several academic articles describing and assessing New Zealand's experience with ITQ management (e.g., Boyd & Dewees, 1992; Clark, 1993; Clark et al. 1988; McClurg et al. 1994).

This linking of the academic and policy communities also occurred in the devolution movement and the adoption of co-management. For example, in 1991 the Ministry hired Peter Pearse (a well-known academic fisheries policy researcher) to conduct an independent review of fisheries policy. As is discussed below, this document (which

¹⁶⁹ Treasury is a traditional source of policy advice, and its role was particularly strong during the mid to late 1980s. (Easton, 1997; Dalziel, 1991; Macilree, 1992: 17-22).

advocated greater property rights and responsibilities for ITQ owners) set the tone for the fisheries management debates of the 1990s. Similarly, another influential policy document (Clarke and Clough, 1998) extensively draws upon the property rights and co-management literature to make a primarily theoretical argument for devolution.

Industry and Ministry leadership also are taking an increasingly active role in academic conferences and publications. For example, both groups (as well as New Zealand academics) had a significant presence in the 1999 FishRights conference (e.g., Clement, 1999; Crothers, 1999; Harte, 1999; Kidd, 1999; McMurrin, 1999) and the 2000 IIFET conference (e.g., Arbuckle, 2000; Craig, 2000; Harte 2000; and Wyatt, 2000). They are also publishing in academic outlets (e.g., Hughley et al. 2000; Harte, 1998). Thus, there is considerable evidence that the New Zealand public management tradition of using academic policy advice is continuing, and being expanded upon by both industry and government leaders also contributing to the academic literature.

Industry Context

Within the broader political and academic environment presented above, the most important influence driving the devolution movement was the incentives and property rights created by the existing ITQ management regime. Chapter 6 provides extensive documentation of how over time, as QMS changed, so did the nature of property rights ITQs represent. Important events include:

- ◆ The switch from tonnage to proportionality, which placed the costs and benefits of stock changes on the quota owners, thus giving them an incentive to better manage the fish stocks.
- ◆ The use of ITQs to settle the Treaty of Waitangi strengthened the perception (and political reality) of ITQs as a perpetual ownership right.
- ◆ The switch from resource rentals to cost recovery 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.
- ◆ The legalization of stakeholder group management recognized the management rights of quota owners

How these changes came about and the effects they had on incentives and perception of property rights is described in detail in Chapter 6, and summarized in Table 6-2. These changes in policy and the associated perception of property rights are sequentially linked, with one round of policy changes creating the incentives and pressures for the following round of changes.

Chapter Six describes this evolution in terms of a pattern of changing property rights and incentives. In addition to this broad pattern, historical policy documents also show this pattern. The evidence does show a long-term pattern of the Ministry and the large industry interests (in the form of the Fishing Industry Board or SeaFIC) working together to support the concept of stakeholder group management, without evidence of a biological or economic crisis.

Documentation of the long-term movement towards stakeholder management is summarized in Table 7-1. A more detailed narrative explanation follows. As in Chapter 6, documentation shows a steady and methodical building of support within the fishery policy community for stakeholder group management. This chain of documents begins in 1991 (after the introduction of proportional quota, but before the Treaty of Waitangi settlement and cost recovery) and illustrates a refining of the concept until it coalesced in the passed in the 1999 legislation. Throughout this eight-year process, the documentation shows no discussion of crisis either in the fishery or in the administration. Indeed, some of the reports specifically note the success of the QMS approach, and the need to build upon it.

Table 7-1: Summary of Documents Concerning Stakeholder Group Management

Date	Name	Description
July 1991	Pearse: "Building on Progress"	Independent report commissioned by Ministry. concludes that QMS is working, but needs improvement. Those holding fishing rights (quota owners) should be given more responsibility for managing them. Outlines institutional framework in which associations are set up based on quota ownership, but within groups government represents recreational interests through a quota-based vote. Environmental interests are represented through strong consultation process and Fisheries Boards that present a unified vision of Maori, recreational, environmental and commercial interests.
1996	MFish: Changing course: Towards Fisheries 2010	A long-term strategic planning document by the Ministry. it lays the groundwork for stakeholder based management by discussing the need for cooperative management, least-cost policy tools, internalizing external environmental costs, and the need for roles and responsibilities in fisheries management to be better defined among stakeholder groups. Stakeholders defined more widely than subsequent definitions.
Dec. 1996	FIB: "Briefing Document for the Minister"	This is a broad-ranging document. The following points are of primary interest: fishers should pay the full cost of fisheries management, but as a result they should be able to exert considerable influence on how the money is spent. E.g., fisheries research.
Jan. 1997	FIB: "Briefing Paper to the Minister"	Primarily addressing other issues, notes "widespread agreement" that industry should be built around fisheries based stakeholder groups, which they define as quota-owner based. These would primarily represent stakeholders through lobbying, working with MFish on compliance, and carrying out independent research.
Nov. 1997	MFish: "Towards Better Management"	A follow-up to "Towards 2010," the relevant part of this discussion document defines core and non-core government functions, and proposes that non-core functions should be either devolved (like the quota registry) or subject to "direct purchase" from commercial stakeholder groups.
May 1998	SeaFIC Annual Conference	A series of introductory letters and speeches by the Minister, SeaFIC executives, and the Chief Executive of MFish. The consistent theme running through these documents is the assumption that the shift to stakeholder group management is already happening – even though this is a year before the enabling legislation is introduced.
May 1998	Clarke & Clough: "NZ Fisheries: Co-Management"	This report, commissioned by SeaFIC discusses a wide variety of issues beyond the shift to stakeholder group management. Their key point is that different activities are best managed by different groups, and functions should be devolved down to the rights holders groups able to manage them, especially since the industry pays for management through cost recovery.
Sept. 1998	Hartvelt: "Fishing For the Future"	This is the independent review of the 1996 Fisheries Act. In recommendations related to stakeholder group management, he recommends a co-management system based exclusively on commercial quota owner associations, with other interests represented through the Ministry's standards setting and auditing. Recommendations on group organization and management are also made.
May (?) 1999	Fisheries Amendment Bill 1999 Introduced	Bill proposes reforms described in previous section. Preface notes "after considering the report of the independent reviewer, the Government has agreed that the [1996] Act needs to be amended."
Sept 1999	Fisheries Amendment Act	All part of the Fisheries Amendment Act are passed.

The first document I have been able to identify as discussing the stakeholder management approach is Pearse's 1991 "Building on Progress." This independent review of QMS approach was commissioned by the Ministry of Fisheries (MFish), and its results are at least partially supported by the Minister who wrote in its preface "Dr. Pearse provides a coherent overview of how fisheries policies might progress. ... I believe the current debate of conservation, commercial, recreational and Maori issues in fisheries management will benefit by having "Building on Progress" as a common starting point."

(i) Pearse reaches four main conclusions: 1) Compared to traditional management, QMS is a better way of managing the fisheries and should be retained. 2) Changes are urgently needed to make the systems work better. 3) Those who hold rights to fish should have more responsibility for managing them. 4) Environmental concerns are not well handled.

Pearse argues that QMS provides an "awkward combination" of property rights and prescriptive input controls; and that there needs to be a separation of responsibility between rights holders and government. The Ministry has the responsibility for setting the conservation standards, and this is where the environmental interests should have an active voice in the form of meaningful consultation. This also means a continuing access to scientific expertise and the ability to determine the state of the fisheries. Then, "within the limits of official conservation prescriptions, those who hold the rights to the fish should be encouraged to manage resources and their fishing operations taking account of all the costs and benefits of their actions. This will involve making collective decisions about fishing patterns and fishing rules, projects of enhancement, and administering their arrangements with the Government among other things." (Pearse: 20)

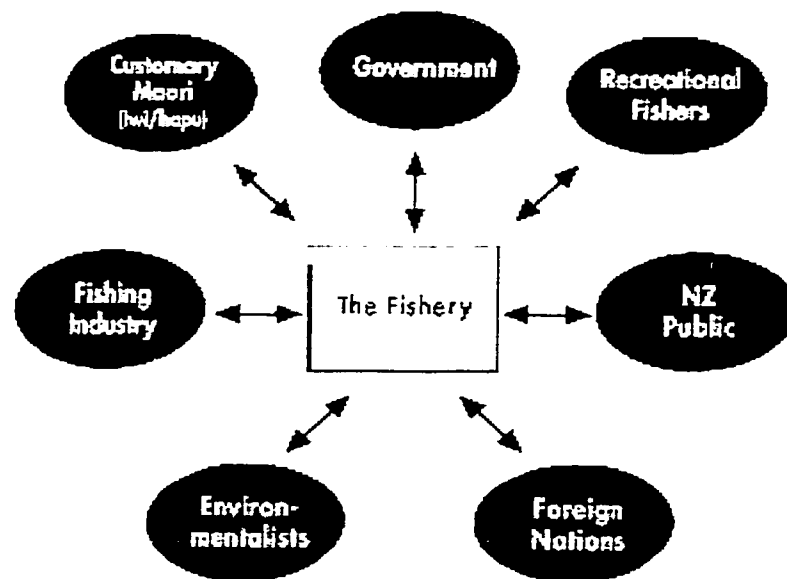
He then sketches how associations could be set up based on quota ownership and shareholder style votes (i.e., 1 vote = 1 ton), subject to a 2/3 majority. Pearse's model includes recreational fishers within the stakeholder group by having the Ministry or some other group holding quota on their behalf and voting within the group for them. He also points out that protection for some minority interests (which he does not define) is necessary, and could be arranged by appeal rights, or some groups holding veto powers. Finally, Pearse suggests that these fishery based stakeholder groups should be supplemented by a fisheries board that would provide expertise and support services (including management and research services) to groups, advise the Minister on standard practices, operate a quota exchange and possibly manage the quota exchange. These fisheries boards should represent all fishing interests, including recreation, Maori, and environmental interests.

Between 1991 and 1996 documentation on the stakeholder group management movement is unavailable, but in 1996 a flurry of papers appears. This starts with MFish's "Changing Course: Towards Fisheries 2010."¹⁷⁰ This paper is a long-term vision statement for the future management of New Zealand's fisheries. As such, it contains general policy statements rather than specific policy prescriptions. However, it is presented in some of the later documents as a key reference point. The report starts by discussing the strengths of QMS, noting "in New Zealand we can boast perhaps the best managed fisheries in the world under the pioneering Quota Management System." It then makes a series of observations and recommendations. These start by emphasizing co-management, stating "management of our fisheries is vital to our community and

¹⁷⁰ When I was in New Zealand, I could not obtain a paper version of this document. However, a version of this is on the MFish web site .

successful management depends on the involvement, co-operation and support of all those with an interest in the fishery.” It also discusses the importance of defining property rights in a way that encourages sustainable private and collective decision-making; the adoption of “least cost” approaches; fishers internalizing external environmental costs; and the importance of MFish proactively building stakeholder relations. MFish defines the meaning of stakeholders much more widely than either Pearse or any other future documents. As illustrated in Figure 7-1, fishery stakeholders are defined as including: the Government, recreational fishers, the public, foreign nations, environmentalists, the fishing industry, and customary Maori. While couched in broad language, this report showed a strong orientation within Ministry policy makers towards co-management based in quota-driven property rights.

Figure 7-1: 1996 Ministry of Fisheries Definition of Fishery Stakeholder (Ministry of Fisheries 1996)



Following the release of “Towards Fisheries 2010. in December 1996 and January 1997, the Fishing Industry Association (FIA)¹⁷¹ sent two briefing papers to the Minister of Fisheries. These papers were wide-ranging, but both contained materials advocating an increased role for stakeholder groups. These reports began by arguing that the fishers should pay the full cost of fishing activities, but that “the corollary of cost recovery must be the empowerment of users, through consultation and contestability, to influence the means by which fisheries services are provided.” (FIA 1996: 19) Quota holder rights were also advocated: “Rights-holders should be given increased responsibility to collectively manage fisheries within appropriate sustainability parameters.” (FIA 1996: 4) The January briefing paper continued this theme, but was more focused. It continued the theme of quota-owner based stakeholder groups, but suggests that groups based in individual fisheries would provide the strongest “community of interest” and that the existing system of industry representation was too fragmented. The FIA proposed:

the primary building block of industry representatives ... should be stakeholder groups representing individual major fisheries or groups of fisheries. Several such stakeholder groups are already in existence and providing substantial benefits to their constituents. ... The role of these quota holder organizations includes: representing the interests of the stakeholders in statutory decision making; working with MFish to establish research needs and priorities; working with MFish to establish compliance strategies; and carrying out research to advance its stakeholder interests. (FIA 1997: 23)

The stakeholder group structure described for the first time here remained nearly unchanged through the passage of the 1999 Amendment Act.

In November 1997, MFish released “Towards Better Management of New Zealand’s commercial fisheries.” This report was presented as a more concrete follow-up to “Changing Course: Towards Fisheries 2010” which presented “the next step of this

¹⁷¹ The FIA was an interest group that represented the large fishing and processing companies to the New Zealand government. When SeaFIC was established, the FIA was consumed by the new organization.

evolutionary process, that commenced in 1986, of developing workable fisheries management strategy for the commercial sector of New Zealand's fisheries." (p.4) While the report addresses several issues, the primary focus of it is the development of stakeholder group management. This report was the first time the Ministry specifically defined the difference between core functions that MFish should maintain and non-core functions, which could be devolved to stakeholder groups. A summary of these functions is presented in Table 7-2.

Table 7-2: Summary of Core and Non-Core Ministry of Fisheries Functions (Ministry of Fisheries 1997)

Core Responsibilities (p.5)	Non-Core Responsibilities (p. 6)
Ensure ecological sustainability	Fisheries Research Services
Meet Treaty of Waitangi Obligations	Fisheries administration (e.g., quota registry)
Meet International Treaty Obligations	Non-criminal compliance (e.g., education)
Enabling efficient resource use	Collection of levies and deemed value
Ensuring integrity of management system	Daily database management

The report echoes many of the themes in previous documents. It notes a conflict between quota owners paying for most services, but having little voice in the design, delivery, and cost of those services. It states that: "...the current commercial fisheries management regime has been counter-productive to some extent. It hinders quota owners from acting collectively to manage their catching rights. It limits the ability of quota owners to manage their own quota rights and the responsibilities that go with those rights" (8-9). The report then uses the distinction between core and non-core services to propose that non-core services be devolved to stakeholder groups – either directly managing them, as in the quota registry services where a private company owned by SeaFIC now has a contract with MFish to manage the service, or through what MFish

describes as “independent purchase of required services” in which “commercial stakeholders purchase or provide non-core government required supporting services” (p.15) which matches the stakeholder arrangements discussed in earlier reports. The report concludes “These proposals will not remove the Crown’s obligations to manage in a manner which delivers on the Crown obligations ... Shared management between both state and fisheries stakeholders holds the key to the best use of the valuable fisheries resources towards 2010.” (p. 21)

In May 1998, Clarke and Clough’s “New Zealand’s Fisheries: Co-Management and Property Rights.” a report commissioned by SeaFIC, was released. The authors echo the often-stated argument that the impetus for co-management comes from management costs, and they trace the initial discussion of co-management to the Pearse Report. (p. 13) They note that “[t]he government and the industry share the common concern that the industry is faced with the liabilities without the opportunity to directly manage the related responsibly.” (p.13) From this point, they examine activities within the fishing industry, and identify which responsibilities are best managed by specific levels of management. These results are summarized in Table 7-3. The authors conclude “The next 6 steps in the process should be the devolution of those functions that commercial fishers are likely to hold a comparative advantage in their provision.” (p.20)

Table 7-3: Clarke and Clough's "Comparative advantages of organizational options" (Clarke and Clough p.20)

Tasks	→ increasing collectivism →				
	Individual organisation	Local / species collective	National collective	Local government	Central government
Sources of operational costs:					
• harvesting	5	4	1	0	0
• processing	5	4	1	0	0
• wholesaling / retailing	5	4	1	0	0
• marketing	5	4	4	0	0
Sources of transaction costs:					
• setting total extractions	1	2	3	4	5
• stock assessments	1	5	4	2	3
• registering extraction rights	1	3	5	2	4
• monitoring trades in rights	1	3	5	2	4
• matching catch with rights	1	3	5	2	4
• monitoring impacts on third parties	1	3	5	2	4
• ensuring compliance	4	5	2	3	1
• enforcement	4	4	4	4	4
• setting standards and specifications	1	2	3	4	5
• auditing	1	2	3	4	5

Key: 0 = none 1 = very low 2 = low 3 = moderate 4 = high 5 = very high

Also in May 1998, SeaFIC held its annual conference, focusing on the theme "Accepting the Challenge of Self Management". During that conference, industry and Ministry leaders discussed the devolution of fisheries management to quota-owner based stakeholder groups. For example:

- ◆ John Luxton, Minister of Fisheries, writes in an introductory letter: "Devolving the delivery of some functions carried out by the Ministry of Fisheries to the fishing industry will also allow it to take a greater share of the responsibility of managing our fishing resources in which the industry has a vital interest." In his Keynote Address he says "Devolution is a way that the Crown can provide the right environment for self management"
- ◆ John Valentine, Chief Executive SeaFIC writes in an introductory letter: "MFish "has concluded that the best option for improving fisheries management is through the development of multi-year fisheries sustainability plans. He also has proposed to amend the Fisheries Act to allow for such plans."
- ◆ Warwick Tuck, Chief Executive of Ministry of Fisheries, says in his address that "the future role of the Ministry will be based upon those important core responsibilities

that I mentioned earlier. However I see us as having a diminished role as rights-holders increasingly exercise the responsibilities associated with their rights”

What is noteworthy about this meeting is the degree of agreement between the industry and MFish; and how, even though it is approximately a year before the 1999 amendment bills are introduced, the devolution is discussed, to a certain extent as though it is a certainty that devolution will proceed.

Finally, in September 1998, a report commissioned by the Ministry of Fisheries and written by Tony Hartevelt of Price Waterhouse Coopers was released. “Fishing for the Future” is the Independent Report cited in the 1999 Amendment Bills to validate the need for amending the 1996 Act and to introduce the stakeholder-based co-management approach. The report specifically recommends the amendments to legislation contained in the 1999 Acts. He recommends a “co-management regime” under which the “Minister will retain responsibility for ensuring that the Crown’s fisheries management obligations are met. Quota owners will be responsible for managing the fish stocks on which their rights are based.” (p.78)

Hartevelt also offers detailed recommendations about how the stakeholder groups should work. He identifies management responsibilities appropriate for the stakeholder groups as including: identifying specific stock outcomes (whatever that means), identifying research, support service, and enforcement needs, and how they should be measured and delivered, and acting to make sure that output standards are met. (p.79) The basis of quota owner associations management should be fish-stock management plans which will outline how the group will manage the resource. Plans should contain the following: sustainability goals and strategies; allocation strategies

(TACC, spatial rules), research and stock monitoring plans, compliance strategy, and monitoring and auditing mechanisms. (p.80)

Hartvelt recommends that management plan should have the mandate of its members (75% of quota), and have consulted with recreational, customary, and environmental interests. Plans must also meet the sustainability requirements of the 1996 Act, avoid or mitigate conflict with customary Maori or recreational interests. "The Minister should also be satisfied that the quota owner association is able to implement the proposed fish stock management plan and that the plan meets any additional requirements, specifications or standards that the Minister may specify in regulations or policy." (p.81) While the details of the Independent Report were not included in legislation, its recommendations closely match 1999 Amendments.

While more specific than many of the previous reports, the "Independent Review" follows in the steps of reports dating back to 1991 that trace the evolution of the co-management concept in New Zealand fisheries management from a broad concept that included recreational fishers, and other stakeholders, to an increasingly limited approach, based on quota ownership and a corporate-style voting structure. (1 ton = 1 vote)

Both the stream of papers summarized in this section and interviews support the idea that stakeholder group management was not developed in a crisis. Instead it is an approach that developed over time in collaboration between the Ministry and fishing industry. It was seen as a step in the evolution of the fisheries management system, encouraged by the changing incentives and perceptions of property rights associated with QMS..

While the devolution movement and adoption of co-management was clearly a result of long-term evolution in the fishing industry, as well as lobbying and coordination, the adoption of cost recovery was clearly a watershed event – increasing the support for devolution and the rate at which the movement developed. Among elite interview subjects there was considerable agreement that the high levies the industry was paying under cost recovery was the primary motivation for this movement. The industry quotes from earlier in this chapter supporting devolution clearly illustrate this point. It is also nicely summarized by Rick Boyd, Senior Consultant at Kingett Mitchell & Associates: “Devolution has to do with industry response to cost recovery. The thinking is “if we have to pay for it, we should have more of a say” (Boyd, 1999).

But perhaps the most interesting commentary about the development of stakeholder-based management was Stan Crothers, Deputy Chief Executive of the Ministry of Fisheries, who noted:

Cost recovery is contentious. ... Industry believes “user pays, user says” The way they see it is that MFish is providing service to them. However, MFish is providing a service to the Minister to fulfill his obligations, which have been placed on him by the people of New Zealand through the Parliament. The Minister recovers a proportion of those costs through industry. The problem is that it has appearance of selective taxation. (Crothers, 1999)

This illustrates the previously stated industry frustration with cost recovery helping the movement towards co-management. But Crothers goes on to suggest a longer-term reasoning and development behind devolution. He states:

I see cost recovery and resource rentals as critical fisheries management tools in achieving the efficient use of fisheries resources within the constraints of ecological sustainability. Cost recovery based on a mixture of a beneficiary/risk exacerbator pays approach will go some way to internalizing the externalities associated with the activity of fishing. Cost recovery also has the added incentives of getting quota

owners to act collectively and pick the responsibilities that go with their access rights.

Cost recovery has and will continue to be one of the primary change drivers in the way New Zealand commercial fisheries are managed. It will move fisheries management from a central Government command and control approach to a more co-managed approach where Government and rights holders work collaboratively to meet sustainability and efficient resource use objectives.

Some people have said cost recovery has been a disaster. From a policy perspective, I believe it has been a success despite needing considerable fine tuning. It has created the tension for change. Change that will result in more efficient use of our scarce fisheries resource.

While Ministers were advised of the change that would be sparked by cost recovery, I do not think they fully appreciated the nature and extent and implication of these changes over time. However, the Minister of Fisheries at the time, the Honourable Doug Kidd, noted that, "the commercial blow torch of cost recovery would ignite massive changes to MAF and the way we managed fisheries the fishers would have more say."

The policy advisers in Treasury and MAF who promoted cost recovery had a very clear understanding of how it could be used as a policy tool and a change driver. (Crothers, 1999)

Essentially, he is arguing that cost recovery (which was introduced in 1992) was a policy tool used by the Government to create a situation in which the industry would have a strong incentive to begin demanding management responsibilities and a co-management regime. Cost recovery was developed by leaders in the Ministry and Treasury (who Rogers (1995) would call "change agents" and others might call "policy elites") with the expectation that this new policy would lead to pressure from the industry for a co-management regime.

This vision of the move towards stakeholder group management as being government driven is seconded by Peter Stevens, former president of the New Zealand Federation of Commercial Fishermen and former editor Seafood New Zealand, who commented "It's all part of the government's plan – its part of user pays, as government

realized that companies are able to run industry themselves. Just another commercial industry they're stepping out of. Cost recovery is first step in the movement. You see it working in scallop, rock lobster, somewhat in orange roughy" (Stevens, 1999). This quote also ties cost recovery and devolution back to the larger political and public management context of limited government.

Examination of the history of the devolution movement reveals a long-term effort leading to the passage of co-management legislation. This history includes a pattern of changes in property rights associated with QMS (discussed in Chapter 6) . documentation of efforts by both the Ministry and the fishing industry's leadership to develop and advocate first the concept of co-management and then the details of the co-management policy. Finally, there is evidence of the importance of cost recovery as the turning point in gathering support and momentum in the devolution movement. This pattern of evidence shows that, unlike the patterns described by Pinkerton (1989) or Pomery and Berkes (1997), in the case of New Zealand, co-management was the result of a long-term policy development effort rather than a response to a period of extreme stress within the fishery management system.

Current Characteristics of Stakeholder Groups

The 1999 Amendment Acts provides enabling legislation for stakeholder group-based management, and the literature leading up to the passage of the acts document the intended roles of stakeholder groups. Little is known about these groups – what are their characteristics? As the Government moves towards devolving some fishery management responsibilities to stakeholder groups, it is important to understand the characteristics of these groups, both as a benchmark for future research, and so we can

conduct a preliminary assessment of the extent to which these groups will be able to take on these responsibilities successfully.

No systematic data is available about these groups, so to gather the necessary information about their characteristics, I conducted a survey of commercial fishing stakeholder groups between August 16 and September 15, 1999. SeaFIC identified a comprehensive list of stakeholder groups. Most of these groups are stakeholder groups as discussed in the previous sections. A few of these groups, however are more traditional commercial fishing organizations that are nonetheless considered members of SeaFIC and thus stakeholder groups. Stakeholder groups were contacted by mail and asked to complete a four page survey on issues such as the group's characteristics, organization, management, interactions with other groups, and their views of the future. Thirty-two surveys were distributed and eighteen were returned, giving a return rate of 56%.¹⁷² A brief comparison of responding and non-responding groups showed no significant difference between the two, so the survey should be representative. However, since the total number of responses is small, analysis here is restricted to simple descriptive statistics.

Stakeholder groups are overwhelmingly interested in a single-species (72%), and are evenly split between national and regional in scope. These groups are relatively recent phenomena. While two stakeholder groups began before 1990¹⁷³, 78% were formed during or after 1995, with seven formed in 1997, and four formed in 1998. These figures may be somewhat misleading, however, because 33% of the groups were formed when an existing group transformed into a stakeholder group. Stakeholder

¹⁷² One group identified by SeaFIC (Paua 2 Industry Association) was not included because no contact address was provided and provided phone number was incorrect.

¹⁷³ Both these groups are more traditional fishing organizations.

groups tend to be small. While 22% have membership in the hundreds,¹⁷⁴ 50% have membership of 25 or less and 72% have membership of 50 or less. However, these groups see themselves as representative of their fishery. Of those responding to the question, 61% report representing 81% or more of the fishery, while 44% report representing 91% or more of the fishery.¹⁷⁵

In order to be a member of a stakeholder group, one must be a member of the fishing industry, and in most cases, one must either own quota or hold a fishing license (or permit). Perhaps the most surprising result of this survey is that only 71% of stakeholder groups work with species under quota management, while 29% represent non-quota species. Of the stakeholder groups under quota management, 67% restrict voting to quota owners only, and many vote on a corporate 1 ton = 1 vote basis. Many groups report that in practice they act on a consensus basis, but formal decision rules are split between those requiring simple majorities (39%) and super majorities such as 75% majority or a consensus(44%). These rules are consistent with the stakeholder group design discussed in the reports that developed the stakeholder group approach. But it also means that many of the working fishers who either do not own quota or own minimal quota are effectively unable to exert a voice in their stakeholder groups, since if a formal vote is held, the larger fishing and processing companies can effectively control the result of a tonnage-based vote.

¹⁷⁴ This includes the a traditional fishing organization with membership over 500

¹⁷⁵ The survey question these data are based on asked: “*What percent of the fishery does your group represent? (e.g., 85% of quota owners)*” However most respondents simply responded with a number (e.g., “92%”). Thus, it is unclear whether this percentage represents fishers, quota owners, quota holders, or license holders. Furthermore, “92%” could mean 92% of quota or 92% of the quota owners. The most conservative interpretation of these results is that these responses refer to percent of quota represented – not percent of quota owners represented or percent of fishers represented.

When exploring the responsibilities that stakeholder groups are undertaking, some interesting patterns emerge. (See Table 7-4) While groups appear to be successfully taking on responsibilities such as communication and conflict resolution within the group and providing a

Table 7-4: Summary of Group Responsibilities (in percent) ¹⁷⁶

Activity	now	plan 1yr	plan 2-5 yr	no plan	no response
Communication	100	0	0	0	0
Voice for Members	82	18	0	0	6
Harvest Rules	56	11	11	22	0
Enhancement	58	12	6	24	6
Monitor Conditions	69	13	7	13	11
Monitor Activity	47	24	6	24	6
Penalties for Group Rules	18	12	6	65	6
Penalties for Law	17	6	16	61	0
Resolve Conflict	72	0	0	27	0

voice for members outside of the group. important activities such imposing penalties for rule-breaking are undertaken by less than by less than 20% of groups. Between 69% and 56% of groups are involved in important activities such as creating harvest rules, enhancing the fishery, and monitoring fishery conditions and activities. While some groups plan to undertake activities in the future, many groups do not plan to undertake activities such as monitoring fishing activities or enhancement. Furthermore, over 60% have no future plans for imposing penalties on group members. This issues of monitoring and imposing penalties are key because they are vital stakeholder group responsibilities. While it is not surprising that less than 20% are currently imposing penalties (it is difficult to punish members while trying to build a community); the fact that so many have no plans of doing so at any stage in the future raises concerns.

¹⁷⁶ Numbers in first four columns represent percent of those responding. "No Response" represents the percent of the total sample not responding. Thus, some totals add to considerably more than 100%. Totals for the first four columns equal 100%, with some rounding error.

Management of stakeholder groups varies widely – depending upon their size and scope. While 77% of the groups report relying primarily on staff (either dedicated or with other duties) for managing the stakeholder groups, 89% use staff members for some duties. In contrast, only 11% of stakeholder groups use volunteers as their primary management resource, and only 25% report using volunteers in any capacity. This suggests a considerable degree of professionalization in management. When discussing group management capacity, an important issue is the degree to which stakeholder groups are nested as part of other larger and smaller fisheries organizations. Regarding smaller sub-groups, 55% report that they do not contain sub-groups. However, this is not surprising since 50% of stakeholder groups have 25 or fewer members. Of those who do maintain sub-groups, 40% use them primarily to address local issues, and 50% use them primarily to address topical issues (e.g., stock assessment).

In regards to larger organizations, all but one identified themselves as members of a larger organization (SeaFIC). Stakeholder groups overwhelmingly identified SeaFIC's primary responsibility as representing the stakeholder groups or the fishing industry in general on "generic issues."¹⁷⁷ According to Dave Sharp (Chairman SeaFIC)'s 1998 "Address to the Seafood Week Conference," SeaFIC started as a consolidation of the three main fishing industry organizations: the Fishing Industry Board, Fishing Industry Association, and Federation of Commercial Fishermen. But with the development of stakeholder group management, control of the organization "... will be devolved in the future to stakeholder groups ... [indeed, by 1999 this was already occurring] ... SeaFIC should only be involved in areas which concern all fisheries such as training, legislation,

¹⁷⁷ "Generic issues" are those that cut across species and stakeholder groups. For example, whether the scientific research associated with stock assessments should be privatized is a generic issue, while the scientific basis for the Snapper stock assessment is a specific issue.

charges, generic science and trade issues. ... A forum will be established where all these organizations can send representatives and have their say on generic matters.” By early 1999, the stakeholder group basis for SeaFIC was established. In an interview, Tony Craig, SeaFIC Business Policy Manager described the organization as follows: “SeaFIC [is] a body that represents the generic interests of quota owners/rights holders while quota owners become shareholders of a specific species groups. Quota owning groups are shareholders depending on the % of levy they pay. For example, hoki – 34% of levy gets 34 votes. Squid is 8% gets 8 votes. etc.” Thus, in general terms, votes within stakeholder groups is on a vote-per-ton basis, while voting between stakeholder groups is done as a proportion of total industry levies paid.

Another important characteristic of stakeholder groups is exactly who they represent. As was previously discussed, stakeholder groups report that they exclusively represent the industry. Other interests in the fisheries (such as recreational fishers, customary Maori users, environmentalists, or fishing communities) are not members of stakeholder groups. Some stakeholder groups do, to varying degrees, interact with the other fishery interests. (See Table 7-5) Roughly 50% of stakeholder groups report no interaction between themselves and other interests. Of those reporting interaction, the predominant form of interaction is consultation – in which the groups seek out the advice of other interests, but are under no obligation to follow the advice that they receive. The largest numbers of stakeholder groups consult with recreational interests, followed by customary Maori and environmentalists. This pattern of interaction raises significant concern. The stakeholder groups are seeking management responsibility for the entire

Table 7-5: Comparison of Auckland Small-Scale and Nationwide Company Survey Responses
(Likert Scale: 1=Strongly Disagree 4=Strongly Agree)

	Mean Fisher. (Mean Co.)	Std Dev Fisher (Std Dev Co.)	Levine's F (Sig)	t (df)	Sig
Economic condition improved under ITQs	2.32 (3.40)	.94 (.75)	1.697 (.198)	-4.342 (52)	<.001
ITQs conserve stock	2.73 (3.36)	1.07 (.70)	6.135 (.016) [†]	-2.718 (54.992)	.009
ITQs compatible with my beliefs	2.21 (3.23)	.81 (.86)	.170 (.682)	-4.727 (58)	<.001
ITQs make it difficult for young people to enter fishing industry	3.44 (3.35)	.81 (.80)	.052 (.821)	.475 (60)	.636
ITQs make industry more efficient	2.57 (3.25)	1.00 (.68)	4.783 (.033) [†]	-2.905 (47.626)	.006
Industry is better off under ITQs	2.55 (3.35)	.97 (.75)	3.170 (.080)	-3.473 (57)	.001
I/Company can get information to make good business decisions	2.39 (2.69)	.72 (.92)	1.422 (.238)	-1.401 (55)	.167
I/Company have opportunity to comment under ITQs	2.20 (2.72)	.83 (.79)	.411 (.524)	-2.433 (58)	.018
ITQs/Ministry are responsive to industry	2.24 (2.00)	.78 (.71)	2.863 (.096)	1.190 (57)	.239
ITQs make it difficult for small fishers	3.26 (2.72)	.78 (.98)	2.109 (.152)	2.362 (58)	.022

[†] Equal variance not assumed for independent sample t-test

fishery, but only professional fishing interests can be voting members of a stakeholder group. Furthermore, interaction between the stakeholder groups is limited, indicating that stakeholder groups (in their current form) probably will not be able to govern on behalf of the entire fishery.

When asked to identify the challenges that stakeholder groups face, a wide variety of topics were identified. Broadly they can be identified as two issues: building stakeholder groups' capacity so they can successfully take on the responsibilities they anticipate, and ensuring that the Ministry allows stakeholder groups to take on these responsibilities. In the future, the groups see SeaFIC continuing in its role addressing generic issues, although a few groups see the role of SeaFIC being reduced as time goes on. Finally,

groups present a consistent vision of the future role of the Ministry of Fisheries. They see the Ministry as developing policy, or broad standards for the stakeholder groups. In addition, they see the Ministry as responsible for auditing stakeholder groups' compliance and providing a legal framework in which the stakeholder groups could operate.

This analysis of the stakeholder group survey shows that in broad terms, the groups do conform to the expectations of the Ministry and the industry. Stakeholder groups are primarily based on quota ownership and maintain a corporate voting structure. The majority of groups also report that they represent 81% or more of the fishery. However, what is unexpected is the degree to which variations exist within the stakeholder group community. For example, the number of stakeholder groups that represent non-quota species. Some (but not all) of these species are under consideration for entry into quota management. Similarly, there is considerable variation in how groups are managed, and the range of activities they are undertaking and intend to undertake in the future. There is also considerable variety in stakeholder groups' relations with fishing interests (e.g., customary Maori, recreational fishers, and environmentalist). Thus, while the stakeholder groups characteristics broadly conform with the expectations of the Ministry and the industry, there remains considerable variation among these institutions.

Congruence between Stakeholder Group Approach and Literature

While the stakeholder groups appear to conform to the expectations of the New Zealand fishing industry and Ministry of Fisheries, another important consideration is the degree to which the stakeholder group approach conform to the expectations of the co-

management literature. Co-management under New Zealand's stakeholder group approach will differ from the co-management groups described in the literature in several ways. These include: historical context (both the industry's history and the development of co-management); geographic diversity; membership diversity; and congruence between stakeholder group and fishery interests (including both voice within stakeholder groups, and limitations on stakeholder group membership). These differences have important theoretical and policy implications.

Historical Context

First, there is the historical context. As discussed above, the history of the New Zealand fishing industry is considerably different from the typical co-management scenario. Many of the most commercially important species (such as the deep-water orange roughy, hoki, and the dories) have only been seriously fished by the New Zealand fishing industry since the 1983 declaration of the 200 mile EEZ. The domestic inshore fishing industry for species such as flounder, mullet, and snapper has a longer history, but there is not so much evidence of the type of historically strong fishing communities often described in the literature (e.g., McCay, Creed, Jentoft).

Historical context also included development of the co-management approach. As is discussed earlier in this chapter, the development of the co-management movement does not fit the pattern of biological or administrative crisis described by Pinkerton or Pomeroy & Berkes. Instead, the development of the stakeholder group approach can be documented as a long-term top-down collaboration between the Ministry and the higher levels of the fishing industry. They clearly saw the move towards stakeholder group co-management as an evolution of the system, rather than as a response to crisis.

Furthermore, New Zealand's stakeholder group approach developed out of a market-based approach, rather than historically strong fishing communities. This is a departure from the pattern usually observed in the literature. The importance of this difference is discussed later in this section.

Geographic Diversity

Under traditional co-management, the participating groups are usually grounded in the fishing community – usually associated with a fairly small geographic area. However, in this regime, stakeholder groups are not based in local communities, as envisioned by the literature. Instead, most groups are species-based – either nationally or regionally. While this can work in the deepwater fisheries, which are usually dominated by a single species; it poses a real problem for the mixed inshore fisheries. Also, those stakeholder groups that are regionally based, are focusing on regions that are so large that they cannot be considered local communities. (E.g., Paegus Auratus, the stakeholder group for snapper Quota Management Area 1, has a constituency covering a region roughly equaling one-third of the North Island.) If these larger stakeholder groups had strong smaller locally based groups, this problem could be addressed by a nested organizational structure. However, the few groups that have sub-committees divide them up by management task rather than community. Similarly, the stakeholder groups (with a very few exceptions) are not organic, long standing organizations. Instead, (as previously discussed) they are relatively young organizations that primarily rely on professional management staff.

Membership Diversity

When researchers analyze groups involved in self-governance or co-management activities, it is suggested that a degree of common needs, outlook, and interests are necessary to overcome issues such as trust, decision-making, and collective action problems. One way of overcoming these difficulties is having small groups of parties with common interests.

However, most stakeholder groups in New Zealand involve high levels of diversity. This begins with the geographic diversity described above, but also includes variations in quota ownership and outlook of participants. As is demonstrated in Chapter 5, a considerable amount of consolidation and aggregation has occurred in both the inshore and deepwater fisheries, with consolidation occurring more rapidly in the inshore fisheries. Similarly, in the primarily inshore snapper fishery, in 1996 there were 341 snapper quota owners, but 22 held 81% of the snapper quota. Similarly, in the red cod fishery, in 1996 there were 272 quota owners, but 24 held 86% of the quota (Clement, 1996: 20). Thus, stakeholder groups face at least two distinct types of members: larger corporations with large quota holdings, and smaller fishers who own small parcels of quota (usually enough to cover just their boats).¹⁷⁸

Given this diversity, particularly the existence of the corporate quota owners and the smaller fishers as distinct groups, it is important to know the degree to which these groups have similar or divergent opinions on policy issues and visions of the fishing industry. To assess the degree of diversity in opinion between companies and small fishers exists, I compared responses to the Auckland Region fisher survey and the

¹⁷⁸ In addition, depending on membership rules, other interests (such as fishers who do not own quota) may also be included in stakeholder groups. However, such situations are rare, and primarily exist in species that are not under quota management.

Nationwide Company survey on a variety of issues. (See Table 7-5.) This analysis shows that on a diverse set of issues (e.g., economic conditions, stock conservation, relationships with government) the small fishers were consistently more pessimistic than the larger companies. Exceptions to this were questions on information availability and government responsiveness (where both were neutral) and difficulty of young people entering the fishery, where both groups are negative. Thus, it appears that there are indeed important philosophical and policy differences between the two groups.

Congruence between Stakeholder Group and Fishery Interests

Another important consideration is the congruence between the characteristics and interests of the stakeholder groups and the interests of the fishery. In this case, there are two issues: voice within stakeholder groups, and limitations on stakeholder group membership. Voice within stakeholder groups refers to voting rules. Of those stakeholder groups representing species under quota management, two-thirds restrict membership to quota owners, and base voting rights on a corporate one ton = one vote basis. This appears to be in line with the voting rules advocated by some in the co-management literature (e.g., Townsend & Pooley 1995 advocate such a structure and gave it the label “corporate management”) but this structure could have unintended consequences in the inshore fisheries where there are numerous small “on the water” fishers with little or no quota. In these fisheries, the vertically integrated companies own a disproportionately large proportion of the quota. In this situation, companies will often own the quota (and the vote) then lease the quota (without a vote) to smaller fishers who do the actual catching.

Thus, there is a danger that when the rules and decisions are made, the voice of those who are actually doing the fishing will be heard less than the voice of the companies owning large amounts of quota. There is a similar, but less pronounced, danger in the off-shore fisheries where corporations own the quota, but will have to rely on non-voting employees to obey and carry out the rules.¹⁷⁹ This lack of congruence between the rule-makers and the rule-followers is of concern because:

“the distance from the organization leadership to the fishers may be as great as the government agency. A risk is that co-management may entrench the power of an administrative elite and be as impersonal, insensitive, and indifferent to local concerns as management by government.” (Jentoft et al. 1998: 431)

The interests of the rule followers (in this case the smaller quota owners or fishing companies) would most likely be more closely aligned with the stakeholder group leaders than with governmental regulators. But, as Jentoft et al point out, this lack of voice can lead to an unwillingness on the part of “on the water” fishermen to follow stakeholder group rules, just as they were previously unwilling to follow the government.¹⁸⁰

Another concern is that in all groups, the stakeholder groups restrict their membership and representation to industry interests only.¹⁸¹ Furthermore, as Table 7-6 shows, the ability and willingness of many of the stakeholder groups to interact with other interests appears to be limited. Approximately half of the stakeholder groups surveyed report having no interaction with customary Maori or environmental interests.

¹⁷⁹ This can be seen as much more of a corporate model than a co-management model

¹⁸⁰ Interests between small-scale fishers and stakeholder groups may well be more closely aligned than interests between fishers and the Ministry of Fisheries. But it is likely that the interests would not be as closely aligned as those envisioned by much of the literature.

¹⁸¹ This is particularly surprising since as late as 1996, the Ministry was describing stakeholders as a wide variety of interests including (among other) recreational fishers, the public, environmentalists, the fishing interests, and customary Maori. See Figure 1.

and 44% reported no interaction with recreational fishers. Also, when interactions are examined, “arm’s length” activities such as consultation dominate. Closer activities such as participating in each other’s meetings or forming partnerships are rare.

Table 7-6: Summary of Interactions of Stakeholder Group and Fishery Interests¹⁸²

	Customary Maori	Environmentalist	Recreation
None	50%	56%	44%
Consult	39%	28%	33%
Advisory Group	0	0	11%
Represent Members at their Meetings	6%	6%	6%
Invite to Stakeholder Meetings	0	11%	0
In Court	0	0	6%
Partnership	6%	0	0

This means that recreational fishers, customary Maori fishers, and environmental interest are excluded from the groups that would hold management responsibility for the entire fishery – not just the commercial allocation. Concerns over this exclusion are amplified when the Chief Executive of the SeaFIC writes statements such as:

“Some thinkers in the industry have a laudable vision of an industry in charge of its own destiny. Necessarily that vision will need to be ‘in the national interest.’ That means stakeholders will need to work together. And dis-enfranchise anybody who can’t or won’t. Not, as some suggest, because they aren’t well enough resourced to compete -- but because they don’t even want to play the game” (SeaFIC, 2000: 5).

Since a fundamental characteristic of successful co-management is the participation of all parties (Jentoft et al, 1998), the relative lack of power and lack of interest in including the “on the water” fishers and the non-industry interests is cause for concern.

¹⁸² One group did not respond to this question because they are a traditional fishing organization rather than a fishery stakeholder group.

Implications of Differences between Literature and Stakeholder Groups

Overall, this comparison shows that there is a lack of congruence between the broad literature's vision of a successful co-management approach and the realities of New Zealand's stakeholder group management approach. Indeed, there are so many differences between the two: it is reasonable to ask whether the literature is even an appropriate point of reference¹⁸³. Unfortunately, that is a question that we will need to wait for some time to pass before we can know the answer for certain. Given the constraints imposed by the 1999 legislation, the literature does offer some suggestions for increasing the robustness of stakeholder groups:

- ◆ Creating a more inclusive voting structure. This could take many different forms, including: switching voting structure from one ton = one vote to one member = one vote or one boat = one vote.¹⁸⁴
- ◆ Increasing the role of non-quota owning fishing interests – either by including them within the stakeholder group, or by creating a formalized relationship with a meaningful consultation process.
- ◆ For in-shore fisheries, use sub-groups to build local port relationship and address local issues, rather than subject-specific concerns.

Steps such as these could strengthen the ties between the stakeholder groups and those using or interested in the fishery – on a commercial or any other basis.

¹⁸³ Indeed, another difference is that the co-management literature often characterizes the approach as lacking scientific information. This may be because these studies have focused on co-management regimes developing out of community-based management. However, the New Zealand co-management approach, with its roots in ITQ management and large industrial fishing, extensively uses scientific information.

¹⁸⁴ Such an alteration is not a consequence-free change. Switching the voting structure away from a tonnage basis would have other important and potentially detrimental effects. As Townsend (1995) argues that cooperative organizations create a shorter time horizon for members as costs are distributed immediately, but distribution of benefits will depend on a later (uncertain) vote. Thus, a large number of smaller risk-averse members can shift the entire organizations' interest to a shorter time horizon. Townsend applies this to fishery stakeholder groups by noting "In as much as many fisheries face the task of investing in stocks through deferred harvest, cooperative governance seems especially unsuited to the task at hand. ... [T]he difference in time horizons of corporate owners versus cooperative voters is likely to be clearest." (43)

The differences between the literature and the stakeholder group approach not only have important policy implications. They also have important theoretical implications. As is discussed in Chapters 2 and 8, the literature has focused on co-management as a variety of arrangements that combine degrees of community and bureaucracy-based management. However, in this case, co-management has developed out of the market-based approach. This shows that co-management is a broad array of institutional arrangements in which management responsibilities are shared between government and users. It is not restricted to arrangements between traditional communities and the government.

Predictions for Success of Stakeholder Group Approach

Although New Zealand's stakeholder group approach is considerably different from that described in the traditional co-management literature, it is still possible to make some preliminary predictions about the approach's potential for success. In developing these predictions, Ostrom's work is particularly helpful because she offers insight into successful governing institutions by drawing upon the successes and failures of both traditional and non-traditional institutions. Drawing upon many case studies Ostrom defines seven characteristics for successful, long-lived self-governance, which are described in detail in Table 7-7.¹⁸⁵ They are: clearly defined boundaries; congruence between rules and local conditions; collective-choice arrangements; monitoring; graduated sanctions; conflict-resolution mechanisms; and minimal recognition of rights

¹⁸⁵ In-depth description of these conditions can be found in both Ostrom 1990 and Ostrom 1995, as well as the literature review chapter of this dissertation.

to organize. In addition, for CPR management institutions that are part of a larger system, nested enterprises enhance performance.

Table 7-7: Ministry and Stakeholder Group Performance Related to Design Principles

Design Principle	Description	Ministry	Stakeholder Groups	Co-Management Performance
Clearly Defined Boundaries	Individuals or households who have rights to withdraw resource units from the CPR must be clearly defined, as must the boundaries of the CPR itself.	ITQs define commercial withdrawal rights. Recreational and Maori rights less well defined. Ministry sets & enforces geographic boundaries through QMAs, but they are often inappropriately large.	Stakeholder groups presently organized to only represent commercial withdrawal rights. Groups have potential to set more appropriate geographic boundaries.	Ministry's geographic boundaries are too large, but combination of Ministry and groups has potential to perform this task well. Non-commercial withdrawal rights not well defined.
Congruence	Rules that restrict time, place, technology, and/or quantities of harvest are related to local conditions and to provision rules.	Traditionally kept input restrictions limited, and limited to national or regional scope	Over 1/2 of stakeholder groups make harvest rules, more plan to. Rules vary from national to extremely localized.	Ministry performance lacking. Overall performance mixed, depending on success of stakeholder groups.
Collective Choice	Most parties affected by the operational rules can participate in modifying the operational rules.	Ministry may be default provider of voice for non-commercial interests. Historically, they are not successful in this role.	Voting rules appropriate for homogeneous deep-water fisheries. Tonnage rules deny voice to smaller fishers in heterogeneous fisheries. No voice for non-industry.	Except for deepwater industry, collective choice arrangements do not adequately include all parties. An area that needs improvement.
Monitoring	Monitors, who actively audit fishery conditions activities, are accountable to the appropriators or are appropriators themselves.	Traditionally the sole or primary monitor of conditions and activities. Mixed success experienced for both activities. Continued role anticipated.	Groups are actively interested in monitoring conditions, but less interested in monitoring activities of members.	Combination of Ministry and Groups has potential to perform monitoring conditions very well. Monitoring activities may continue to be a problem.
Graduated Sanctions	Fishers who violate rules are likely to be	Ministry has sanctioning responsibility.	Few groups are interested in sanctioning.	Sanctioning exists primarily in Ministry's domain, rather than in

	assessed graduated sanctions by fishers, officials accountable to the fishers, or both.	However, graduated sanctions are not used.	Those that do use civil contracts. Private prosecutions are not allowed under current legislation.	the co-management context. Sanctioning is not graduated
Conflict Resolution	Appropriators and their officials have rapid access to low-cost local arenas to resolve conflicts among appropriators or between appropriators and officials	Ministry provides a conflict resolution mechanism to all interested parties. Some in industry have expressed concern over impartiality.	Groups actively interested in resolving conflicts between members, but less interested in resolving inter-group conflicts.	Performance is mixed – strong within stakeholder groups but needs further development at broader levels.
Right to Organize	The rights of appropriators to devise their own institutions are not challenged by external governmental authorities.	Under 1999 legislation, government recognizes right of stakeholder groups to organize, if appropriate procedure is followed.	Right to organize is recognized.	Right to organize is fully recognized.
Nested Enterprises	Appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities are organized in multiple layers of nested enterprises.	Stakeholder groups represent a nesting of Ministry's national responsibilities.	While a few groups have nested enterprises, most are subject-based rather than based on regions or localities	While some degree of nested enterprises exists, it is not developed or localized to the point necessary for a successful national regime.

These design principles can be used to guide an assessment of the extent to which stakeholder group management match the characteristics of long-lived institutions, and possibly offer insights into the probability of the stakeholder group approach being successful. A key point to note is that these principles serve as a guide for understanding whether the incentives and social groundwork are developed enough to support the hard work necessary to maintain an institution managing a common pool resource.

Furthermore, since this is a co-management system, the roles of both the Ministry of Fisheries (MFish) and the stakeholder groups must be considered.

An analysis of the stakeholder group approach follows, using Ostrom's design principles as its guide. (See Table 7-8 for summary.) A very important caveat should be noted on this analysis. It is focusing primarily on the commercial fishery since it is technically all that is managed under the stakeholder group approach. However, the decisions made in this context – particularly when they are making decisions about research, commercial catch levels, and the manner in which commercial catch is taken, means that these groups have enormous influence on the conditions experienced by recreational and customary Maori fishers. This failure to formally incorporate these users into the stakeholder groups may prove to be a very serious flaw in the entire approach.

Clearly Defined Boundaries

Clearly defined boundaries means that rights of withdrawal are clearly defined, as are the boundary of the resource. The presence of the QMS system means that within the commercial fishery, individual rights are well defined by quota ownership. However, recreational rights and customary Maori rights are not so well defined. Furthermore, geographic boundaries can be inappropriately large.

Customary Maori Withdrawal Rights

Customary Maori rights are recognized under the Treaty of Waitangi settlement, but exactly what is "customary" fishing is open to debate. According to one interpretation, the Fisheries Amendment Act that enables the settlement describes them as the right to "take fish, aquatic life, and seafood for hui, tangi, or other traditional non-

commercial fishing use` but not for trade or pecuniary gain` (Quaintance, 39). But a series of incidents in which commercially-sized catches were claimed as customary take¹⁸⁶ has led to charges that the approach was creating “one law for Maori and another law for the rest” (Quaintance, 33). Thus, it appears that the customary Maori community lacks the institutional capacity or the incentives to enforce appropriate use of the customary catching rights¹⁸⁷. Thus, while it is agreed that the customary right exists in the aggregate, it appears that the quantity associated with this right, and how this right is defined for individual Maori is still poorly defined. This lack of clearly defined rights and responsibilities is a large part of why conflict over Maori customary fishing rights exists.

Recreational Withdrawal Rights

Similar problems exist over defining recreational fishing rights. As with the customary Maori rights, the recreational fishing rights are clearly recognized in the aggregate, with the QMS. Indeed, the annual quota allocation process specifically requires that, for applicable species, a portion of the total allowable catch (TAC) be set aside for recreational purposes, however this portion is not specified and thus can change annually – either as a proportion of the TAC or in total tonnage (McMurrin, 1999: 1). How this right is allocated to individual recreational fishers is not specified, and there is no way to guarantee that recreational fishers will exceed their allocation.¹⁸⁸ This

¹⁸⁶ For example, in one incident “a fish processing company gave Maori rights fisherman John Hikuwai three blank cheques as ‘koha’ in return for the 4 ½ tones of snapper he claimed under customary rights in December 1997.” (Herald, 1999)

¹⁸⁷ Quaintance, 1998 provides an excellent discussion of the conflict over customary Maori rights and the abuse of these rights. Other examples are: Herald, 1999; White, 1998; Bingham, 1998.

¹⁸⁸ This is a major concern of commercial fishers – both among smaller fishers in the Auckland Region survey, and among the broader industry interests. Particularly galling to the commercial fishers are charter boats – often skippered by former commercial fishers that make their living from recreational fishers, but are not required to buy quota or otherwise act as commercial interests.

situation developed because of a long-held New Zealand belief in a fundamental personal right to fish. As described by Max Hetherington (secretary of the New Zealand Recreational Fishing Council):

New Zealanders consider it a BIRTHRIGHT to go down to the sea and harvest a reasonable days catch. They consider that the fishery is a public resource owned by them and managed by the Crown. Research has shown that around 80% of recreational fishing is not carried out for sport or recreation. It is carried out for the purposes of SUSENENCE of self and family. (Hetherington, 1999: 1 emphasis original)

Because of this belief, recreational fishing interests have long refused to accept any form of regulation, and insisted that management was solely a government responsibility. (As summarized by Hetherington the recreationalists' position was "no licensing, no quota, crown to manage the fishery" (Hetherington, 1999: 1).) In this atmosphere, definition of recreational fishing rights remained essentially unchanged since the introduction of QMS in 1986.

This lack of definition (of both customary Maori and recreational fishing interests) is becoming a concern for many commercial fishing interests, who are now advocating that property rights – particularly recreational rights need to be for clearly define and even brought into the devolved QMS approach¹⁸⁹. Indeed, as the end of 1999, a working group of recreational interests and government representatives were examining ways to better define recreational rights.¹⁹⁰ Possible refinements of the recreational rights include: making them a defined proportion of the TAC, and creating a series of Recreational Management Groups (RMGs) that would be legally recognized and

¹⁸⁹ Such concerns are long-standing. Indeed, as early as 1991, there was discussion of extending QMS to include recreational fishers (O'Brien, 1991)

¹⁹⁰ According to Hetherington, the decision to negotiate this right "followed an address by Stan Crothers of the Ministry of Fisheries who stated that the public's right was being eroded by the other rights created by the crown and the lack of definition of the pubic right." (Hetherington, 1999: 1)

able to work with the government to regulate commercial fishing and work with customary and commercial interests to develop fishery management plans (McMurrin, 1999: 4-5). In early 2000, this working group released a consultation document on recreational fisheries management. This included the option of a proportional share of TAC for recreational fishers. (Ministry, 2000b).

Geographic Boundaries

The final aspect of defining boundaries is the geographic limits of where a resource can be taken. This aspect of boundaries is clearly defined since quota owners may fish anywhere within the quota management areas in which they own quota. (See Figure 4-2.) But these areas are very large and in many cases (particularly inshore fisheries) are too large to provide meaningful boundaries for individual fishers to participate effectively in boundary management. This has led to concerns over localized depletions – particularly for some of the inshore stocks. For example, one quota owner (a former fisher, now president of the Federation of Commercial Fishermen) reported that he leases his quota to a company outside of the Bay of Plenty region because he was concerned about over-fishing within the Bay of Plenty. He notes “there are too many fishers there [in the Bay of Plenty] and by leasing it to Leigh Fisheries I take effort out of the local area.” (Jones, 1999).

Similarly, in the localized rock lobster industry, there have been cases where associations of local cray fishers (under the auspices of the CRA 5 management group) have coordinated efforts to better care for the local stock¹⁹¹, which recovered rapidly under good husbandry.

¹⁹¹ e.g., resting harvest areas for up to 10 months, increasing mesh size, timing harvest to coincide when lobster are best able to recover from handling.

Unfortunately the word has got out about our fantastic fishery and that it is ripe for the picking. Some loose quota created in the last TACC increase has found its way into our area, fished on boats with ideas more akin to roving wolf packs ... These transient fishing boats bring with them an atmosphere of less care and more risk than local fishers, who care for and enhance the areas. Boats that fish multiple areas up and down the coast, taking the best from each area are not good in the overall management of local areas. ... Generally less care by transient fishermen puts the brakes on stock rebuild. I've seen it happen on the Wiarapa Coasts they've had a similar problem. Two years ago they were basically two seasons ahead of us in size and biomass rebuild. This season I'd say we are two years ahead of them in catch rates and sizes available" (Burkhart, 2000: 28)

As is illustrated by this case, when the boundaries are so widely defined, it can reduce the incentive for local fishers to manage their resources responsibly or to participate in boundary management. Stakeholder groups may provide a solution to this problem. Indeed, the Orange Roughy Management Company identified separate fisheries within its QMA, then worked with fishing companies and the Ministry to manage these fisheries as separate identities. (Clement, 1999: 4) However, as is discussed under "nested enterprises" it is appears that most nested organizations will be primarily task-based rather than geographically based.

Analysis

Overall, commercial fisher rights are clearly defined by quota ownership and the QMA boundaries. Furthermore, these boundaries and rights are enforced by MFish, putting the force of the national government behind these rights. However, there are also limitations to these rights definitions. The primary concern is that non-commercial rights are not so well defined, so these groups rely on their own fragile institution and/ or MFish to protect their rights – options that have not been tremendously successful in the past. (See Chapters 5 and 6.) This option continues to be available under stakeholder group

management, but it removes these interests from the stakeholder group context: which was designed to provide a venue for resource users' management activities.

Furthermore, as is discussed above, QMA boundaries are not always appropriate to social and ecological conditions of the fishery. Historically, this is an issue that MFish has not been able or willing to address. However, this is an area that stakeholder groups may be in a better position to address by providing nested enterprises. There is some evidence of stakeholder groups (such as the Orange Roughy Management Company and CRAYMAC 5) being willing to create more appropriate boundaries (on formal or informal bases), but it does not appear to be a priority of stakeholder groups as a whole.

Congruence

Congruence means that rules concerning withdrawal of the resource (in this case, the fish) are appropriate to the resource and local conditions. Traditionally, a hallmark of the QMS approach was that it placed minimal input controls on fishing. (Although some input controls have continued to exist.) So, the existing rule base created by the ministry is minimal. Also, as is discussed above, rules would usually be applied to larger geographic areas¹⁹² -- either QMAs or nationwide. Thus, rules created by the ministry traditionally are minimal and may not be optimal for localized conditions.

However, the introduction of the stakeholder group approach allows the groups to place restrictions they believe appropriate. Results of the stakeholder survey show that some of the stakeholder groups (56%) are taking on this responsibility now (primarily in the form of codes of practice), and another 22% are planning to take on this responsibility within the next 10 years. 22% report that they have no plans to engage in creating harvesting rules. Examples of these rule-making activities include the following:

¹⁹² There were a few more localized rules

- ◆ The Rock Lobster Industry Council (RLIC) introducing the “No Tag, No Sale” program in which all legally caught rock lobsters were given non-removable tags so that wholesale, retail and restaurant purchasers could differentiate between black market (poached) and legal catch (RLIC, 2000: 17; RLIC, 1999: 13-14).
- ◆ A regional shellfish association places limits on when harvest takes place and the number taken per day (Stakeholder Survey #10)
- ◆ The Squid Fishery Management Company has an extensive Code of Practice to reduce the bycatch of hooker sea lions during trawling and jigging for squid. (Pfahlert, 1998: 17)
- ◆ The Northland Inshore Fisheries Company introduced a Code of Practice (including closed areas and use of “pingers” on nets) to reduce bycatch of the endangered Hector’s Dolphin. (Walsby, 2000)

Rules created by these groups can be nationwide (such as “No Tag, No Sale”) or localized (such as the Hector’s Dolphins Code of Practice). These examples and the stakeholder survey responses show that stakeholder groups have a distinct willingness and ability to engage in rule-making that places restrictions on members beyond what is required by law.

Collective Choice Arrangements

Collective choice arrangements ensure that the individuals or groups affected by the operational rules can participate in modifying them. In this case, there are two distinct issues to consider: voice for those inside the industry and outside of the industry.

Industry Voice

Collective choice within the fishing industry would mean that both companies who own quota and “on the water” fishers (whether quota owners or leasers) can participate in and influence the creation and change of the rules under which they catch. However, as is discussed earlier in this chapter, the stakeholder survey shows that of those under quota management, 67% restrict voting to quota owners only, and many vote on a corporate 1 ton = 1 vote basis. Depending on the characteristics of the fishery, this

approach could result in strong collective choice arrangements. For example, in some of the newer deepwater fisheries, a small number of companies own and harvest the quota. For these fisheries, the collective choice arrangements are highly appropriate.

This arrangement can be troubling in other situations – such as many of the inshore fisheries – where a large number of fishers work, but the quota is controlled by a few companies. Under this arrangement, if a fisher is working under leased quota, he is unable to vote. Similarly, if a large number of fishers own a small amount of quota, while a few quota-owning companies own a significant proportion of the quota, these companies could impose rules in spite of the opinions or input of those catching this fish. The on-the-water fishers and their representatives are already expressing these concerns:

- ◆ “We [the members of the Federation of Commercial Fishermen – primarily an owner-operator association] got outvoted. They don’t want a democratic system. They want is so if you invest you have control. Some areas try to set up [stakeholder groups] with one man – one vote but the big companies won’t participate” (Jones, 1999).
- ◆ “Finally the Ministry are relinquishing some of their roles to the more efficient private industry in the form of devolution. But beware of people upstairs making decisions on your behalf, when although they mean well, they do not have the hands-on experience that only a practiced hands-on fisherman can supply. Your advice and participation as a whole is not necessary but imperative.” (Beggs, 1999: 41).
- ◆ “I don’t like Pagrus Auratus [the stakeholder group for snapper in QMA 1]. It’s really Moana Pacific. Bruce Young [the head of Moana Pacific] has publicly said that Moana Pacific wants to own Area 1 and Area 9. I refuse to join. A second organization was set up to compete with Pagrus Auratus, but it didn’t work. The organizer sold out and joined Pagrus Auratus” (Auckland Survey #7).
- ◆ “In quota owner associations, you only need 50% of the ownership to take responsibility. In Snapper 8 [Quota for snapper in QMA 8] Sanford owns 54% of the quota so they can control the fishery” (Auckland Survey #40).
- ◆ “They say ‘do you think we would let the industry suffer?’ and we say ‘yes, you would let us suffer’” (Auckland Survey #6)

As it is presently designed, the collective choice arrangements are appropriate for the homogeneous conditions found in the large offshore fisheries like Orange Roughy or the

Doreys. However, for some of the more heterogeneous or diverse inshore fisheries (such as snapper, flatfish, or trevalley), these arrangements could result in little or no access to collective choice arrangements for many on-the-water fishers.

Non-Industry Voice

An additional issue for collective choice is a voice for fishing interests who are stakeholders in fishing, but not part of the fishing industry – such as recreational fishers, customary Maori fishers, and environmental interests. Almost universally, stakeholder groups are set up to solely represent industry interests – and in many cases only quota owning interests. As is discussed earlier in this chapter, providing a voice for these interests is not often discussed, but is clearly not seen as a role for the stakeholder groups. It appears that by default this role will fall to the Ministry. But as is discussed in Chapter 5, there is considerable discontent (particularly on the part of recreational and environmental interests) with the Ministry's efforts to either act as a voice for these interests themselves, or provide a setting in which these interests can represent themselves on an equal footing to fishing industry interests.

Monitoring

The monitoring design principle notes that groups that experience long-term success monitor both the condition of the resource and the activity of member, and that the monitors are accountable to members. Stakeholder groups and the Ministry have distinct roles in this activity:

Ministry Activities

Traditionally in New Zealand, the Ministry undertakes monitoring of activities as part of its criminal enforcement efforts. As such, it is not designed to be responsive or

accountable to the broader fishing community. In regards to actual monitoring activities, as is discussed in Chapter 5, the Ministry is perceived as having at best mixed success, and often is criticized for insufficient monitoring – particularly for high-value species such as paua and rock lobster which are susceptible to poaching. However, the Ministry has set up some groundbreaking monitoring programs (such as the satellite-based Vessel Monitoring System) and relies extensively on tracking. Also, activity monitoring primarily focuses tracing the paperwork created by QMS, rather than the on-the-water monitoring activities that are usually considered under the design principles.

Monitoring of fishery conditions is also a traditional Ministry activity, but it is one that under the 1999 legislation was going to be transferred to stakeholder groups. However, in 2000 a moratorium was placed on this transfer (see Chapter 6 for details). As is discussed in Chapter 5, success in monitoring is mixed, but is perhaps described as the best that could be expected given scientific and financial limitations.

Stakeholder Group Activities

Stakeholder group survey results show that some groups appear to be actively interested in monitoring fishery conditions, but stakeholder groups are considerably more hesitant about monitoring members' activities. Nearly 70% of stakeholder groups report that they engage in monitoring fishery conditions, with another 20% planning to within the next five years. Logbook programs, informal monitoring, and catch sampling were the most frequently reported forms of condition monitoring. Monitoring group member activities was less common with only 47% currently monitoring, 30% planning to, and 25% reporting no future monitoring plans.

Gathering data on the condition of the fishery is the most common form of monitoring activities. Some activities are already documented in the scientific literature, such as the rock lobster, where it was found that “a fisher-based voluntary logbook programme can collect accurate and useful data for use in stock assessment similar to those from research catch-sampling programmes” (Starr and Vignau, 1997: 1079). Similar programs are underway in the orange roughy fishery where (in addition to logbook programs) the Orange Roughy Management Company estimates it has spent NZ\$14 million in biomass estimates and research (Clement, 1999: 7). Some stakeholder groups go beyond monitoring, and engage in enhancement activities – such as the Challenge Scallop Enhancement Company (CSEC), which engages in both seeding activities and research on how these activities are best undertaken (Hart, 1999: 3).

Groups are considerably more sanguine about monitoring members’ activities, with less than half of the Stakeholder Survey respondents reporting that they engage in this activity. What might be considered “true” monitoring is considerably lower, since many of the survey respondents included self-reporting catch as monitoring activity. A few groups reported what might be considered traditional community monitoring “through peer review” (Stakeholder Survey #11) or “they all keep an eye on each other” (Stakeholder Survey #10). One group can be considered a leader in formal monitoring. They have created a formal independent audit program in which auditors board randomly selected boats throughout the hoki fishing season and evaluate the boats’ performance on safety, fishing techniques and compliance, marine mammal bycatch, and compliance with the Cook Strait cable protection zone (Stakeholder Survey #1, Fisheries Audit Services, 1999a; Fisheries Audit Services, 1999b). Thus, the stakeholder groups’ monitoring activities are mixed. There is an existing and rapidly growing movement to engage in fishery monitoring activities (through both formal and informal means) but there is less interest in and

enthusiasm for monitoring members' activities. This difference should not be surprising because monitoring members is a much more sensitive activity than monitoring the fishery. However it should also be noted that 25% of the stakeholder groups reported that they have no self-monitoring activity planned for any stage in the future, so this is not universally perceived as a stakeholder group responsibility.

Graduated Sanctions

Another important design principle is graduated sanctions. Ostrom's research found that organizations that succeeded in the long-term had a sanctioning system in which users who break the rules are likely to receive sanctions. But the initial penalties are low, then they increase with the frequency and seriousness of the infractions. This gives both the individual an opportunity to learn appropriate behavior, and the community a chance to develop the cohesion or will necessary for successful sanctioning.

In New Zealand, however, graduated sanctioning does not exist. As described in Chapter 5, under current law and enforcement practices, fishers face a relatively low chance of being caught, but face extremely high penalties if they are. These penalties can include not only fines but also loss of quota, boat, and (in the case of owner-operators) even homes and vehicles. Essentially, the approach focuses on deterrence, brought about through fear of consequences imposed by the government. Thus, while the Ministry does provide sanctioning, it is the opposite of graduated sanctioning.

Turning to stakeholder groups, it appears that most do not engage in sanctioning, and among those who do sanction, it could not be determined whether sanctioning is graduated. Stakeholder survey results show that only 17% report imposing any type of

penalties for breaking group rules or fishing law (all reported that they relied on “civil contracts”), and over 60% report that they have no plans for imposing penalties on members. One example of a group that is engaging sanctioning is the Challenger Scallop Enhancement Company (CSEC), where participants sign a contract with the CSEC under which sanctions “are applied to individual industry participants (e.g., vessel operators) for non-compliance with rules, whether they be regulations or contract rules.” (Harte, 1999: 4) Similar activities may be undertaken in the future, however, this appears to be an area that stakeholder groups are very hesitant to engage.

Stakeholder groups’ ability to sanction members who break fishing law is further limited by the fact that the 1999 Amendment Acts eliminated the ability of individuals or groups to bring about private prosecutions.¹⁹³ When this barrier is combined with the natural (and reasonable) hesitancy of stakeholder groups to engage in rule making and enforcement while still building community, it creates an environment in which it is very difficult to engage in sanctioning activity. Nonetheless, since sanctioning is such an important component of long-lived institutions, stakeholder groups’ lack of willingness to consider sanctioning is a serious cause for concern.

Conflict Resolution Mechanisms

Conflict resolution mechanisms are an important tool for long-lived institutions. As the name suggest, this involves “rapid access to low-cost local arenas to resolve conflicts among appropriators or between appropriators and officials” (Ostrom 1990: 90). Conflict resolution can be seen as taking place at two levels: within stakeholder groups and between stakeholder groups and other interests. Regarding within-group conflicts,

¹⁹³ This compounds an already existing problem with the lack of graduated sanctions in the existing fisheries law where low chances of being caught are combined with exorbitant penalties(see Chapter 5).

72% of stakeholder groups report that they are already engaged in conflict resolution among members. Using informal communication, staff mediating disputes, and holding formal meetings were the most frequently reported forms of conflict resolution. Indeed, this is one of the most common activities for stakeholder groups to engage in.

Conflict resolution between stakeholder groups and other interests (either other stakeholder groups or non-commercial interests such as Maori or environmentalists) is another important issue. As is discussed earlier in this chapter, stakeholder groups have fairly restricted interaction with these interests. This suggests that formal or informal conflict resolution mechanisms organic to these groups are minimal.

But the Ministry of Fisheries does have a formal dispute resolution process (which is described earlier in this chapter), but there are concerns over this process focusing on impartiality:

“now it might be expected that MFish would be the impartial and objective party to this dispute between recreational and commercial fishermen. But this is not necessarily the reality. Dispute resolution is a very political process and Ministry staff ultimately answer to politicians” (Sykes, 2000: 13).

Thus, it appears that conflict resolution within stakeholder groups is strength, however conflict resolution between stakeholder groups and other interests can be weak.

Recognition of Right to Organize

Governmental recognition of the rights of stakeholder groups to organize is another key characteristics of long-lived CPR institutions. With the passage of the 1999 Amendment Acts, stakeholder groups are clearly recognized, and indeed, are encouraged to take on management responsibilities in a co-management regime with the government. These groups need to follow the steps described earlier in this chapter to gain contracted

management powers. Under the new Labour government, part of this process (the direct purchase of fisheries research) is currently "on hold" as this aspect of the policy is re-evaluated (MFish, 2000). But the fundamental right of stakeholder groups to organize remains intact.

Nested Enterprises

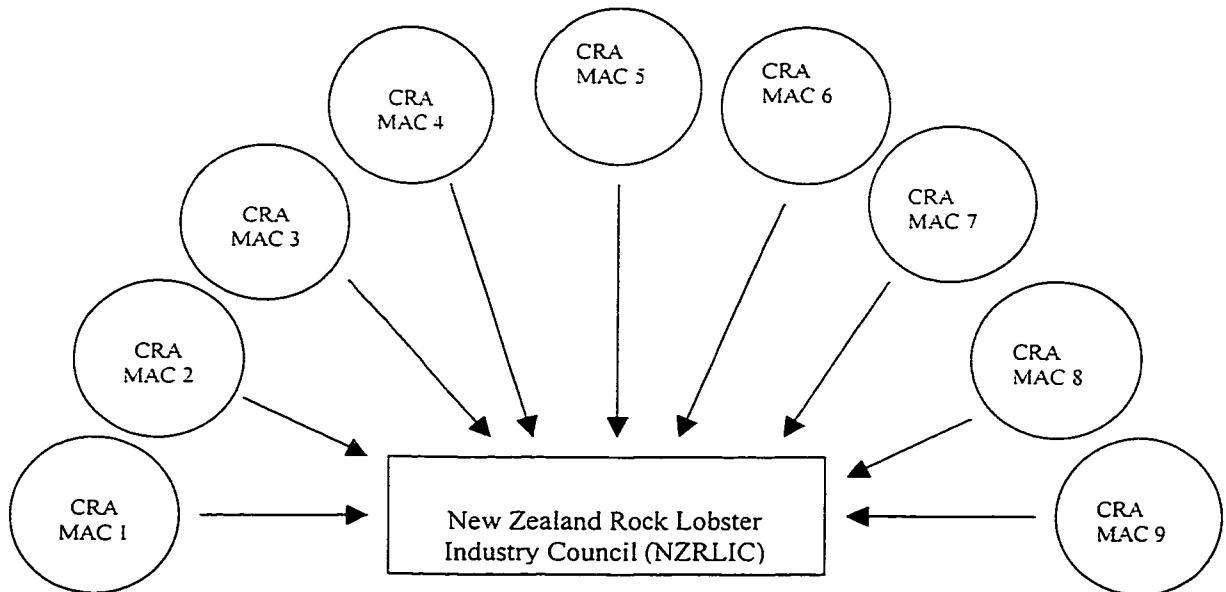
Finally, Ostrom's design principles find that over time, institutions managing large-scale CPRs are most successful when they use "nested enterprises" or multiple layers of organizations to manage the resource. At the broadest level, the stakeholder groups can be seen as enterprises nested inside the national legal structure. They take on representation and management responsibilities for specific fisheries and (in some cases) specific QMAs.

However, as is described earlier in this chapter, stakeholder groups are usually organized by large quota management area or by national species. So, the need for further nesting is clear. Since stakeholder groups can organize themselves in any manner they choose, they have the freedom to use nested enterprises if they desire. However, only 39% of stakeholder groups have sub-groups, and among those who do, most are subject oriented, concerned with specific issues or operations, rather than local issues. Given the small size of stakeholder groups (half have less than 25 members), the lack of nesting may not be surprising, but given the physical size of the areas many are addressing, it presents a challenge.

One example of successful nested organizations within a stakeholder group is the New Zealand Rock Lobster Industry Council (NZRLIC). As described by Daryl Sykes (Executive Officer, NZRLIC), NZRLIC is an umbrella organization of regional

management councils (CRAMACs). These organizations are autonomous (see Figure 7-2) with each CRAMAC operating individually and having its own characteristics. Membership requirements vary, but most include quota owners, processors, lease holders and deckhand – although quota owners often have priority on voting. (Sykes, 1999; NZRLIC, 2000) Each of the nine CRAMACs appoint a board member to the NZRLIC, which represents the rock lobster industry on broad national issues. (NZRLIC, 2000) Furthermore, the CRAMACs supports smaller groups of local fishers in rebuilding and managing resources within their local fishing areas (Burkhart, 2000). So, stakeholder groups are clearly capable of developing regional and local nested enterprises, but as survey results show, it is not a dominant part of their organizational strategy.

Figure 7-2: Organization of New Zealand Rock Lobster Industry Council (Sykes, 1999)



At one stage of the devolution movement (1998), the Federation of Commercial Fishermen worked to create nested enterprises based on port associations. This effort began as response to “pressure from members and others to get involved with setting up a system to cater for these inshore finfish harvesters who feel they may not get adequate recognition under [stakeholder groups]” (Jones, 1998: 36). Under this vision, small quota owners would “pool their quota portfolio under their Port Association banner and elect a local to hold their proxy” for port association and stakeholder group meetings (Jones, 1998: 36). As described in the Federation’s annual meeting notes: “The whole idea was that the whole situation was driven from the bottom up i.e., Fisher to Port Association to Regional to National” (Jones and Hall, 1998: 24).

Federation leadership was to analyze how this could work and report back to membership.¹⁹⁴ By mid 1999, a few organizations were set up to perform this role. For example, the NZFCF Regional 7&8 Forum was working with the regions’ inshore quota owners’ association, and the Port Association in Area 2 was working with the Area 2 Inshore Finfish Management Company . Furthermore, many other regions and port associations were in the process of setting up similar organizations (Jones, 1999b). However, the stakeholder responses did not reflect an awareness of these groups or an integration of these fisher organizations into the stakeholder groups – either as members or as closely allied partners. The development of these organizations in the future, and the stakeholder groups’ reaction to them will be essential to the character and even the success of stakeholder group management.

¹⁹⁴ This analysis was completed in July 1998, but was not published in generally available outlets such as *Seafood New Zealand* (NZFCF, 1998: 65)

Analysis of Design Principles

Over all, an analysis of New Zealand's co-management regime based design principles present a mixed impression of the stakeholder group approach. As it is presently organized, it is difficult to come up with a single assessment for each design principle. Each assessment must include not only the stakeholder groups but also the Ministry of fisheries, since this is a co-management regime in which both the government and stakeholder groups have important roles.

Assessment is also difficult because some stakeholder group clearly have nearly all or all design principles present, while others are missing many. This dynamic is illustrated in Table 7-8 where one stakeholder group engages in all activities, three groups engage in all but one or two activities, and eight groups fail to engage in five or more activities. Groups such as the Rock Lobster Industry Council and the Challenge Scallop Enhancement Company are clearly leaders in stakeholder group development, while other groups lag behind.

Table 7-8: Responsibilities Broken Down by Group

ID #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Communi- cation	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Voice	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	*	Y	F	F	Y	Y	F	Y
Harvest/ Sell Rules	Y	Y	Y	F	F	N	Y	F	Y	Y	F	N	N	Y	Y	N	Y	Y
Enhance- ment	Y	N	F	N	F	N	Y	Y	Y	F	Y	Y	N	Y	Y	*	Y	Y
Monitor Fishery	Y	Y	F	F	Y	N	Y	F	Y	Y	*	Y	N	Y	Y	*	Y	Y
Monitor Activity	Y	F	F	N	F	N	F	F	Y	Y	Y	N	N	Y	Y	*	Y	Y
Penalties Group	N	N	N	N	F	N	F	F	N	N	N	N	N	Y	N	*	Y	Y
Penalties Law	N	N	N	N	F	N	F	F	N	N	Y	N	N	Y	N	N	F	Y
Resolve Conflict	Y	Y	N	N	Y	Y	Y	Y	N	N	Y	N	Y	Y	Y	Y	Y	Y

Y= Yes. N=No. F = Future

In order to examine the current status each design principle, both the Ministry's and the stakeholder groups' activities must be considered to develop an overall assessment of the regime's performance. This was performed in the previous section, and is summarized in Table 7-7. Co-management performance can be summarized as follows:

- ◆ Clearly Defined Boundaries: Geographically, boundaries based on Ministry are too large, but combination of Ministry and Groups has potential to perform this task well. Non-commercial withdrawal rights are not well defined.
- ◆ Congruence: Ministry performance is lacking. Overall performance is mixed, depending on success of stakeholder groups.
- ◆ Collective Choice: Except for deepwater industry, collective choice arrangements do not adequately include all parties. This area needs improvement.
- ◆ Monitoring: Combination of Ministry and stakeholder groups has potential to perform conditions monitoring very well. But monitoring activities may continue to be a problem.
- ◆ Graduated Sanctions: Sanctioning exists primarily in the Ministry's domain, rather than in the co-management context. Sanctioning is not graduated.
- ◆ Conflict Resolution: Performance is mixed – strong within stakeholder groups but needing further development at broader levels such as between groups or between groups and other interests.
- ◆ Right to Organize: Right to organize is fully recognized.
- ◆ Nested Enterprises: While some degree of nested enterprises exists, it is not developed or localized to the point necessary for a successful national management regime.

This analysis suggests the right to organize is the strongest of the design principles, with the 1999 legislation clearly enacting into law the stakeholder groups' right to organize.

But the remaining principles are much more difficult to assess. They are best described as having mixed performance in relation to the design principles. For example, the basis the Ministry provides for congruence is weak, but some stakeholder groups successfully supplement this, while many others have no interest. Similar situations exist for monitoring and conflict resolution, as well as defining geographic boundaries. These

are all areas that are presently weak, but could quickly be strengthened in a co-management regime with active stakeholder groups.

Several other areas raise more fundamental concerns – even as institutional performance remains weak. For example, under “Clearly Defined Boundaries” the withdrawal rights of customary Maori and recreational fishers are not so well defined. This raises collective choice problems for these interests. Collective choice interest are also raised by the voting rules that effectively reduce or deny the voice of small fishers or those fishing on leased quota. Another issue is graduated sanctioning, where a sanctioning regime exists, but it is not graduated and the stakeholder groups (who would be most likely to introduce graduated sanctioning) are leery of taking on this responsibility. Finally, although the existence of stakeholder groups shows that a degree of nesting exists, nesting below this level often either does not exist, or is based around specific national problems, rather than more detailed regional or local management.

Weaknesses in areas such as these are of particular concern because they represent the fundamental character of the co-management regime. These are issues fundamental to the design of the institution. These are the issues for which it is the most important and most difficult to reach an appropriate arrangement. The danger is that if the issues of rulemaking, sanctioning, and responsibility are not successfully resolved, it will be more difficult for the institution to survive the many challenges it will face in the long term. Thus, while it will take time, it is important to make sure these arrangements are fair and robust.

When this assessment of the stakeholder group approach is compared to the Ostrom’s assessments and outcomes, it suggests that as presently designed and

implemented, stakeholder group management is presently best described as fragile. This should not be surprising, since these design principles are for long-lived self-governing organizations, and the New Zealand fisheries stakeholder groups are still in their formation stages.

The stakeholder group approach, with the weaknesses described above, is vulnerable to threats both internal to and external from this institutional arrangement.

Internal threats include:

- ◆ Stakeholder groups' legitimacy as representative institution: This could occur if stakeholder groups are perceived as representing solely the interests of the largest quota holders in a fishery rather than the full range of diverse interests present in some fisheries.
- ◆ Stakeholder groups as cartels: When a stakeholder group or stakeholder groups are composed of a few large quota owners, there is a danger that they will either act as cartels or be perceived as acting as cartels -- rather than simply performing a more limited set of legitimate stakeholder responsibilities.
- ◆ Stakeholder groups' institutional capacity: Many stakeholder groups plan to take on extensive management responsibilities. But they may not have characteristics in place (such as nesting, graduated sanctioning, or collective choice arrangements) that would help them successfully absorb the challenges involved in these activities.

The stakeholder group management approach also faces challenges that are external to the stakeholder groups themselves. These challenges include the following:

- ◆ Stakeholder groups' legitimacy as representative institutions: As is discussed above, stakeholder groups are criticized for not including all parties interested in fisheries management (e.g., recreational, customary Maori, and environmental interests). Unless a means is found to include a voice for "non-industry" parties within the stakeholder group management approach, there will be danger that the existing stakeholder groups (and even the entire approach) could lose legitimacy as it comes to be seen as "industry capture" rather than true "co-management."
- ◆ Change in government support: Presently, the stakeholder group management approach enjoys strong support from the government. However, as has been described, there is considerable political opposition to this approach. While this approach is new, and groups are gaining their initial recognition, this approach will be quite susceptible to changes in government support for the approach.
- ◆ Threat from environmental change: Environmental changes, such as a sudden fishstock collapse or the endangerment of a by-catch species could force this new regime of government and stakeholder groups to face a crisis before they have fully

developed their management abilities and trust – between each other and within groups. Furthermore, if a few collapses are unsuccessfully managed, the stakeholder group management approach could be called into question.

There is room for optimism, however, because the industry and government has indicated a commitment to making stakeholder management work, suggesting that incremental improvements over time are likely. As the stakeholder group approach both develops a track record and increases in institutional strengths, its susceptibilities to the potential threats will reduce considerably. So, while the approach is fragile, this fragility is largely due to the newness of the approach.. The fact that it is in a supportive environment may help it grow beyond its clear weaknesses into a more robust approach. The degree to which this support is present, and the ensuing willingness of stakeholder groups and the Ministry to take on some of the more challenging aspects of co-management (such as collective choice arrangements, nested enterprises, monitoring activities, and sanctioning) may well determine the success of this new institutional structure.

Conclusion

New Zealand's adoption of stakeholder group management represents a shift from what the co-management literature would predict. This difference begins with the process through which stakeholder group management was adopted (a gradual top-down evolution, rather than a crisis-driven revolution or bottom-up process), then continues through the characteristics encoded in legislation and the characteristics of the stakeholder groups themselves.

An analysis of the stakeholder group approach, based on the design criteria for long-lived institutions suggests that while some principles are present, other important

characteristics (such as collective choice arrangements, monitoring, graduated sanctions, and nested enterprise) not fully developed yet. This suggests that at presently constructed the stakeholder group management at this stage of development approach can be described as a fragile which will need continued support if this approach is to take on the great responsibilities envisioned for it.

Key issues that will need to be addressed if this approach is to grow and become robust include: relations with and participation of outside interests (such as customary Maori, recreational fishers, and environmental interests): collective choice arrangements that provide a voice for all on-the water fishers:¹⁹⁵ and increased monitoring and sanctioning activities. Over the next decade, there is every reason to expect that there will be continued and perhaps rapid change in the development of these stakeholder groups. Given the way in which this management approach developed, and the way it is continuing to evolve, continued monitoring and analysis of this institutional system should be an important priority not only for my personal research agenda, but also for the broader natural resource management and institutional analysis communities.

¹⁹⁵ Jones' proposal of nested enterprises based in port associations is one mechanism through which this could be accomplished (Jones, 1998: 24)

Chapter 8: Conclusions

Whenever we try to pick out anything by itself, we find it hitched to everything else in the universe.

--John Muir

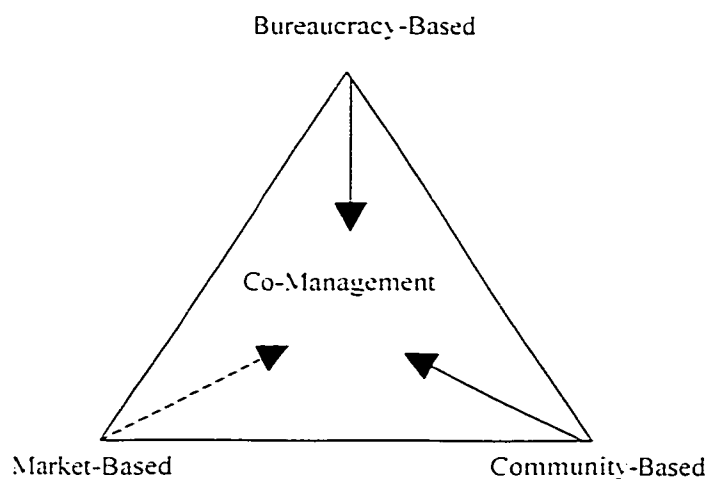
Introduction

This dissertation focuses on the management of common pool resources (CPRs); and the evolution of the institutions that people create to help them in this difficult task. I explore these issues using the case of New Zealand's fisheries and the use of a market-based Quota Management System (QMS) to manage the fisheries. This case presents an excellent opportunity to study these issues for several reasons. The first is that fisheries, which are characterized by both high subtractability and extreme exclusion difficulties, are a classic example of a CPR. New Zealand also has one of the longest-lived market based approaches to fisheries management in the world. Finally, in 1999, New Zealand passed legislation enabling what is now a rapidly developing co-mgmt regime. This combination of challenges and institutional regimes offers an important opportunity to investigate issues of institutions and CPR management. As I describe in Chapter 2, an extensive literature documents a lively debate over the best way to manage CPRs. Many important issues are raised by this debate. One is the merits of various management approach -- bureaucracy vs. market-based vs. community vs. co-management. These can be explored using criteria for success embedded within each approach, or by more universal criteria such as transaction costs.¹⁹⁶ Another issue is the possibility of movement between these management approaches. The convergence of

¹⁹⁶ When this dissertation examines the ITQ management, it focuses on effects predicted by the literature, rather than transaction costs. However, an examination of ITQs based on transaction costs remains an important research area.

community-based and bureaucracy-based management is well documented (e.g., McCay, 1993; Pomeroy & Berkes, 1997); and Scott (1993, 1999) theorizes that co-management can also develop market-based regulation. (See Figure 8-1.) The importance of various forms (or combinations) of property

Figure 8-1: Approaches to Natural Resource Management



rights is also a well documented and developed theme in the literature, showing that as the rights and responsibilities individuals and groups have over a CPR increase, so does the incentives to manage the resource sustainably.

This dissertation builds upon this theoretical base by examining institutional choice and the consequences of these choices in New Zealand's fisheries. I explore four broad questions:

- ◆ How and why was New Zealand's Quota Management System Adopted?
- ◆ What effect did the Quota Management System have on the structure and characteristics of the fishing industry in New Zealand?
- ◆ What types of property rights do Individual Tradable Quotas (ITQs) represent? Has this changed over time, and what are the effects of such changes?
- ◆ What are the characteristics and origins of New Zealand's co-management approach? How likely is this approach to succeed?

These questions are examined using data from a combination of sources including: a panel survey of ITQ owners in the Auckland Region dating to the start of QMS, national surveys of large companies and stakeholder groups, quota ownership records, expert interviews, and extensive archival and published documents.

Summary of Findings

The results of my research show that ITQs and similar market-based approaches to CPR management cannot be seen as a static policy tool, but as a vital institutional change that profoundly influences the regulated and regulatory community far beyond the original natural resource management goals. When policies such as QMS or co-management are adopted, careful thought must be given to the changing property rights associated with these regimes, and the long-term effects that these changing property rights will have on the incentives that the regulated and regulatory community face. More specific findings on each research question follow. (See Table 8-1 for summary.)

Table 8-1: Summary of Research Questions and Findings

Research Question	Findings	
How and why was New Zealand's Quota Management System Adopted?	A confluence of inshore ecological crisis, a favorable political environment, and long-term work by industry leadership led to the adoption of QMS in New Zealand.	
What effect did the Quota Management System have on the structure and characteristics of the fishing industry in New Zealand?	Sustainability	Quality of scientific research is high but there is uncertainty over sustainability. Non-industry voices lack access to assessment process.
	Efficiency	There is widespread belief that ITQs have increased efficiency within the fishing industry
	Consolidation	Industry consolidation (and associated aggregation) occurs in deepwater and inshore fisheries, but more rapidly inshore.
	Compliance	Findings are mixed, but it appears that compliance has improved to some degree

What types of property rights do Individual Tradable Quotas (ITQs) represent? Has this changed over time, and what are the effects of such changes?	ITQs changed from representing an extraction right to a more complete bundle of rights that include significant management responsibilities. Key changes include proportionality (shifting risk of stock changes from government to ITQ owners) and cost recovery (creating incentive and opportunity for ITQ owners to be involved in management decisions).	
What are the characteristics and origins of New Zealand's co-management approach? How likely is this approach to succeed?	Characteristics	An institutional layer supplementing QMS. Uses industry-led quota owner associations with little input from other stakeholders. Management responsibilities shared with govt.
	Origins	A long-term industry and government led effort. Three key factors were national political and public management environment: the academic discussion of property rights discussion, and the evolution of quota owners' responses to the changing ITQ property rights.
	Success	Partially due to its newness, the approach is presently fragile. But government and industry commitment to co-management suggests there is room for optimism – particularly as the approach matures.

Chapter 4 describes the history of the New Zealand fishing industry. As part of that exercise it examines the first research question: how and why New Zealand adopted its Quota Management System. My findings show that neither of the dominant explanations for the adoption of QMS (as a response to inshore crisis or an expansion of the existing deepwater policy) fully explains why QMS was adopted. Instead, discussion of ITQs can be documented as early as 1973 -- roughly 13 years before QMS was implemented and more than 10 years before public debate began. The adoption of QMS was the result of a long-term evolution in thinking throughout the industry that was influenced (at least in part) by the dominant international academic advice of the time. More specifically, the idea of adopting ITQs in New Zealand came primarily from the

Fishing Industry Board (FIB), but it also found an early intellectual home in Treasury. When the Labour Government came to power, it created an intellectual and political environment in which both the FIB and Treasury could both advocate QMS to both the Ministry of Fisheries and later the fishers themselves. Essentially, a confluence of inshore ecological crisis, a favorable political environment, and long-term work by industry leadership led to the adoption of QMS in New Zealand.

Chapter 5 examines the effects of QMS management, focusing on the effects most commonly discussed in the literature by both proponents and opponents of ITQ management. The two primary positive effects attributed to ITQ management are resource sustainability and increased efficiency. Regarding sustainability, the key question is the quality of the information in the stock assessments. Opinion on the stock assessment process are mixed. Scientists support it as rigorous and encouraging peer review of research resulting in world-class scientific research; but politically, environmentalist and recreationalists complain that they are unable to effectively participate. Turning from process to sustainability, participants agree that there is the degree of uncertainty in the stock assessment is high enough that it is difficult or impossibility to definitively declare QMS a success or failure on sustainability¹⁹⁷. Turning to efficiency, this study focused on the more directly measurable perception of efficiency. Results show that even though the direct proof of increased efficiency is difficult to obtain, there is a strong perception among the industry and observers that QMS has led to an increased efficiency within the fishing industry.

¹⁹⁷ Adequate information to assess and ensure sustainability is a problem endemic to fisheries management. It is not a problem restricted to ITQ management or to the New Zealand scientific or research community.

Turning to negative effects associated with ITQ management, the dominant concern is industry consolidation (and the associated aggregation of quota and loss of small fishers). Results show that within the inshore fishery, consolidation and aggregation of quota ownership is clearly occurring. In the inshore fishery, this rapid rate of consolidation is coupled with that is a dramatic loss of small fishers. In the deepwater fishery, consolidation occurs much slower (in part due to continued growth in the sector), but it is underway there as well. Furthermore, QMS had difficulty addressing aggregation of quota – particularly in the deepwater fishery where two or three owners can control a fishery.¹⁹⁸ Finally, there is considerable debate over whether ITQs increase or decrease compliance. My findings show that just as opinion in the literature is mixed, so is the evidence surrounding compliance within QMS. There is clearly some degree of cheating occurring – including ITQ-specific forms of cheating. But industry and government are in agreement over the need for enforcement – disagreeing only on what form enforcement should take. There is also disagreement between the more pessimistic smaller fishers and the more optimistic companies. While QMS has not eliminated cheating, it is probable that to some degree compliance with fisheries regulation has increased under QMS.

Chapter 6 focuses on the changing perceptions of property rights surrounding ITQ management. I find that over time, the property right ITQs represent has grown. This progressive extension was drive by external political and social forces, as well as internal

¹⁹⁸ When QMS was introduced, the inshore fishery was in crisis and there was agreement that the level of effort in the fishery needed to be reduced, and that QMS was the most efficient method to accomplish this goal. The changes in the inshore fishery are at least in part a result of the need to reduce pressure on the inshore fishery. The pain associated with these changes would have been felt if other more traditional regulatory were used. Nonetheless, there can be little or no doubt that the pressures created by QMS have increased the pressure on small fishers, and led to consolidation and aggregation problems.

changes in the attitudes and actions of the fishing industry. ITQs started as a clearly constrained set of property rights – the right to catch a prescribed amount of fish. But over time, a progressive series of policy changes slowly extended the perception of what property rights ITQs represent. These changes in policy and perception of property rights are sequentially linked, with one round of policy change creating the incentives and pressures for the following round of changes. This was particularly evident with the switch to proportionality and the switch to cost recovery both creating incentives which led to the informal and then formal adoption of increasing management responsibilities on the part of the ITQ owners. These perceived rights grew to include a larger bundle of rights, which at least partially included rights previously held by the Government – including some management responsibilities. This increase in property rights encouraged ITQ owners to become more involved in the QMS management process, and resulted in the 1999 Fisheries Amendment Act, which provides a framework for quota owners to co-manage fisheries through ITQ-based stakeholder groups.

Chapter 7 explores the newly created co-management approach, which can be described as follows. The approach is not a replacement to QMS, but rather an additional institutional layer. Stakeholder groups, which are usually defined as quota owner associations, are empowered to take over key fisheries management responsibilities. These responsibilities include: managing fishery resources, scientific research, and registry services. The Ministry must approve stakeholder groups, and the Ministry maintains the role of setting management standards (including setting annual catch entitlements), enforcement, and auditing stakeholder group activities.

Turning to the origins of the co-management approach. I find that (as with the adoption of QMS) the development appears to be part of a long-term and well-planned effort of the part of both the Ministry and the upper levels of industry interests. Three longer-term and cumulative forces were the drivers behind the move to co-management. These forces are: the national political and public management environment; the international academic discussion of property rights and co-management; and most importantly the evolution of quota owners' responses to the changing incentives created by QMS.

Chapter 7 also examines the congruence between this management approach and the existing literature. I find that there is a lack of congruence between the broad literature's vision of a successful co-management approach and the realities of New Zealand's stakeholder group management approach. For example, the co-management literature sees the approach as developing out of either long-lived regimes (e.g., Ostrom, 1990) or times of ecological crisis (e.g., Pinkerton, 1989; Pomeroy and Berkes, 1997). Furthermore, the approach is usually associated with self-organizing governance and the idea that a smaller local community grounded with the resource has essential time and place information needed to manage a resource in an adaptive manner (e.g., Wilson et al., 1994; Jentoft, 2000). (See Figure 2-3)

New Zealand, then represents a case where co-management developed out of a market-based approach – not out of the community-based approach. This is a substantial deviation from the co-management literature. Instead, it what Scott (1993, 1999) predicted would be likely to happen based on the incentives associated with property rights. Essentially, this case provides empirical support for Scott's prediction. Thus, (as

is suggested in Chapter 2) co-management can be thought of as a spectrum of institutional arrangements in which management responsibilities are shared between the users and government. The origins of co-management can come from a variety of regimes, but a key foundation characteristic is that users having a strong bundle of property rights. These rights can be distributed to a long-lived social group (e.g., community management) or to individuals and companies (e.g., market-based regulation); but the foundation of a strong bundle of property rights is necessary for the development of a co-management regime.

In addition to allowing the broader theoretical finding discussed above, the differences between New Zealand's co-management regime and the co-management literature raises practical policy problems with the current regime. Specifically, the geographic and membership diversity, and the lack of congruence between stakeholder groups and broader fishery interests (e.g., environmental, recreational, customary Maori) raise concerns about the strength of this management approach as it is presently designed. Specific recommendations for increasing the robustness of New Zealand's co-management regime are presented in Chapter 7.

Finally, I use Ostrom's (1990) design principles to examine the co-management regime's likelihood of long-term success¹⁹⁹. I find that the approach has a good start with the clearly recognized right to organize and support by both the government and industry. Other design principles (such as congruence, monitoring conditions, conflict

¹⁹⁹ These design principles can be used to guide an assessment of the extent to which stakeholder group management match the characteristics of long-lived institutions, and possibly offer insights into the probability of the stakeholder group approach being successful. A key point to note is that these principles serve as a guide for understanding whether the incentives and social groundwork are developed enough to support the hard work necessary to maintain an institution managing a common pool resource. See Table 7-8 for a summary of the findings for each design principle.

resolution, and geographic boundaries) are presently weak, but stakeholder groups are actively interested in building these capacities. However, other areas (such as defining rights for Maori and recreational fishers: collective choice, graduated sanctioning, and nesting) raise more fundamental concerns. Groups are less interested in addressing these issues, but these areas represent fundamental aspects of the management regime. When this co-management regime is compared to the design principles: it suggests that the approach is best described as fragile. Specific internal and external threats to the approach are outline in Chapter 7. However, this fragility is largely due to the newness of this institutional arrangement. As the stakeholder group approach develops a history and increases in strength, its susceptibility to potential threats will diminish. Furthermore, there is room for optimism because the industry and government have a strong commitment to making co-management work.

The finding presented in Chapters 4 through 7 have important policy implications, as well as implications for the fisheries and natural resource management literature. The following sections examine these implications.

Policy Implications

Perhaps the most important policy implication of this research is the finding that ITQs and similar market-based approaches to CPR management cannot be seen as a static policy tool. Instead, they represent a fundamental shift in property rights and the incentives associated with them. As Chapters 6 and 7 illustrate, the introduction of QMS and the subsequent introduction of co-management profoundly influences the regulated and regulatory community far beyond the original natural resource management goals. When traditional bureaucratic regulatory approaches (such as input control) are used,

they can be changed without influencing the fundamental nature of the fishing community. For example, increasing minimum mesh size or requiring pingers on nets may require additional expenditures by fishers, but does not fundamentally change how they think about fishing. In contrast, ITQ management and co management do introduce such changes. When policies such as QMS or co-management are adopted, careful thought must be given to the changing property rights associated with these regimes, and the long-term effects that these changing property rights will have on the incentives that the regulated and regulatory community face.

Another set of policy implications comes from the Chapter 5 analysis of the effects of QMS. Based upon the limited set of effects examined, it appears that ITQ management is neither universally positive as advocates of the approach suggest nor universally negative as opponents of the approach suggest. Indeed, my analysis shows that QMS appears to be working better in the deepwater fisheries than the inshore fisheries. This emphasizes the need (already noted by others) for what can be described as "best fit" policy design. Advocating market-based regulation (or any of the other approaches) as a universal or near universal management cure is not the answer. Instead, as the Institutional Analysis and Design (IAD) framework emphasizes, characteristics such as attributes of the physical world, institutions, and community must be taken into account when developing and analyzing policy.

Also, likely effects of management approaches should be addressed directly. For example, with ITQ management, there are often concerns over loss of small fishers or consolidation. These concerns can be addressed by stricter aggregation limits and other measures. But there will most likely be a loss in the efficiency that makes ITQ

management such an attractive approach. Similarly, ITQs are often associated with minimal input controls. But if well-designed input controls can provide finer-grain matching of the physical conditions in the fisheries, they can be a welcome addition to the management approach. Indeed, when stakeholder groups in New Zealand impose additional rules on members, they often focus on seasonal restrictions and input controls. Rather than focusing on adopting pure arch-types of management approaches, policies should be designed to best meet the conditions and goals the management approach faces.

Theoretical Implications

In addition to policy implications, there are also theoretical implications of this research. One important implication is the movement between management approaches. As I describe at the start of this chapter and in Chapter 2, co-management is usually described as developing out of a convergence of the bureaucratic and community approaches, while Scott has proposed that it can also develop out of the bureaucratic approach (the dotted line in Figure 8-1). Chapters 6 and 7 demonstrate that this transition does indeed occur, and that co-management can develop out of a convergence of all three of the dominant approach.

Furthermore, Scott's reason for the development of co-management (the ITQs solving distribution problems) does indeed describe a large part of why co-management can develop from ITQ management. But it is not the complete explanation. In addition to distributing the resource, ITQs represent a set of property right. As the bundle of rights associated with ITQs increases, so do the incentives for the ITQ owners to sustainably manage the resource. Thus, either by happenstance (as in the case of proportionality and Treaty of Waitangi settlement) or through policy choice (as in the

case of cost recovery) bundles of rights can be changes to change behavior and relationships with resources and other stakeholders. This research provides some hints at how this process works, and future research may better elaborate on this finding.

Another theoretical finding is the importance of learning and continuing change in CPR management institutions. As Chapters 4 and 6 show, New Zealand's QMS is a very different institution today than it was in 1986. Key changes came about as fragilities in the institutions became clear, and the people working within the institutional structure worked to change and improve it. For example, allocation of ITQs was switched from strict tonnage to proportionality when it became clear that the cost of the government entering the ITQ market to reduce TACC was unsustainable. This change represented an important time when learning and change occurred in QMS as an institution. Similar instances on learning occurred at other points in QMS, and more will occur as multiple stakeholder management groups struggle with learning how to manage their resources and themselves. As the earlier lessons of QMS (and many other documented cases in the literature) show, institutions can learn and be strengthened by their mistakes and by their adjustments over time. An important question in the future will be whether the stakeholder groups will be given the opportunity to make mistakes and learn from them.

Gazing into the Crystal Ball

In Chapter 7, I analyzed the long-term likelihood of success for the co-management approach. I found that the approach is presently fragile, but has the potential to succeed due to the commitment by the government and fishing industry to make the approach work. Key design principles that need improvement to enhance the approach's long-term success include: congruence, monitoring conditions, conflict

resolution, geographic boundaries, rights of non-commercial interests: collective choice, graduated sanctioning, and nesting.

Recent developments (since my field research) do provide some evidence for optimism about the government and stakeholder groups working together to better co-manage the fisheries and address these design problems. For example:

- ◆ The Northern Inshore Fisheries Company has introduced measures to reduce the bycatch of the endangered Hector's dolphin (Walsby, 2000). These include closed areas, equipment restrictions, and reporting requirements applied to specific areas where the dolphins reside. These measures represent efforts to address congruence, monitoring, and geographic boundaries issues. It also represents an effort by a stakeholder group to address environmental issues – an important first step towards addressing the rights of non-commercial interests.
- ◆ The New Zealand Rock Lobster Industry Council has collaborated with NIWA (the government's fisheries research organization) to complete an extensive monitoring and stock assessment of the CRA 4 region's rock lobster stock. (Haworth, 2001a). This represents both monitoring efforts and co-management efforts between the government and stakeholder groups.
- ◆ The New Zealand Rock Lobster Industry Council introduced a voluntary ban on the export of live rock lobster from a region affected by a toxic algal bloom. It also worked with the Ministry of Health and the Ministry of Agriculture and Forestry to develop better toxin management procedures in the future (Hawthorn, 2001b). These efforts can be seen as addressing congruence and geographic boundary issues.
- ◆ Pagrus Auratus (the stakeholder group for Region 1 Snapper) shelved half a tonne of snapper after a commercial fisher had a net break and 300-400 fish washed ashore. This was not required by law, and compares to a similar incident in 1997 when thousands of fish washed ashore and no action was taken by the fishing industry (Yandall, 2000). This incident illustrates a change on the part of stakeholder groups and the effort by the stakeholder group to ensure catch stays within the TACC.

These efforts by the stakeholder groups and government show the stakeholder groups working together in fisheries management efforts that many would not have predicted a few years ago. Also, these groups are making some painful choices (such as shelving quota and introducing catch restrictions) that show a willingness to take on some of the harder management tasks that they were less enthusiastic about when survey results were examined.

This is a hopeful sign for the future of the management approach, but it does not mean that stakeholder groups should anticipate a universally smooth development of the co-management regime. Instead, it is reasonable to expect some groups to thrive under co-management, and others to do less well and perhaps even fail spectacularly. A key test will be how the co-management regime deals with these failures. Will the institutions and the people associated with them (be they government, stakeholder group leadership, membership, and outside interests) have the opportunity to learn from and build upon their mistakes, or will failure mean an end of co-management efforts in that fishery (or even the entire fisheries management system)? These are key questions and challenges for the future of this regime.

Future Research

This dissertation offers many opportunities for future research. Perhaps the most immediate, is the future of New Zealand's co-management regime. As is already discussed, this is an important and maybe even unique development in CPR management. It is also a regime that is currently unfolding. Thus, it represents an important opportunity to engage in on-going monitoring and analysis of the co-management approach as it goes. With the 1999 survey providing baseline data, changes in the characteristics and outlooks of the stakeholder groups over time can be tracked. Furthermore comparative case studies of stakeholder groups offer the opportunity to hold many regulatory and social variables constant, and focus on the effects of variables such as size, geographic boundaries, membership, nesting, etc. on the long-term success of these institutions.

There are also opportunities for cross-national analysis. Why has co-management developed in New Zealand, but not developed so successfully in other countries where various forms of market-based regulation are used? This may help us tease out a more specific understanding of how this transition occurs, and even how to best match CPR management institutions to the biological, institutions, and social conditions they exist within.

Finally, this research can be extended beyond fisheries to other co-management regimes and the role of non-governmental stakeholder groups in managing other natural and man-made CPRs. Examples may include forestry, rangeland, or even home owner associations.

Works Cited

- Acheson, J. M. 1975. "The lobster fiefs: economic and ecological effects of territoriality in the Maine lobster industry". *Human Ecology* 3: 183-207.
- _____. 1996. "Maine's Lobster Fishery: Managing A Common Pool Resource." In *Increasing Understanding of Public Problems and Policies*. 145-160. Farm Foundation.
- Acheson, James and Jennifer Brewer. 2000. "Capturing the Commons: Social Change in the Territorial System of the Maine Lobster Industry." Presented at: Eighth Conference of the International Association for the Study of Common Property, Bloomington, IN, May 31- June 4 2000.
- Agrawal, Arun, and Gautam N. Yadama. 1997. "How do local institutions mediate market and population pressures on resources? Forest Pahchayats in Kumaon, India." *Development and Change* 28:435-465.
- Agrawal, Arun and Elinor Ostrom. 1999. "Collective Action, Property Rights, and Devolution in Forest and Protected Area Management." Paper presented at: CAPRI Workshop on "Devolution, Property Rights, and Collective Action" Puerto Azul, the Philippines, June 21-25, 1999.
- Alpers, Anthony. 1964. *Maori Myths and Tribal Legends*. London: William Clowes and Sons.
- Anderson, Lee G. 1986. *The Economics of Fisheries Management* Rev. ed. Baltimore: The Johns Hopkins University Press.
- _____. 1989. "Conceptual Constructs for Practical ITQ Management Policies." In *Rights Based Fishing* P.A. Neher et al. (eds.) 191-209. Kluwer Academic Publishers.
- Anon. 1996. "Briefing Document for the Minister of Fisheries". Wellington, New Zealand.
- Annala, John H. 1993. "Fishery Assessment Approaches in New Zealand's ITQ System." In *Proceedings of the International Symposium on Management Strategies for Exploited Fish Populations*, ed. G. Kruse et al. 791-805. Fairbanks, AK: University of Alaska Press.
- _____. 1996. "New Zealand's ITQ system: have the first eight years been a success or a failure?" *Reviews in Fish Biology and Fisheries* 6: 44-62.
- _____. Manager Science Policy, Ministry of Fisheries. 1999. Interview by author. Wellington, New Zealand.
- Annala, John H. K.J. Sullivan, and C.J. O'Brien. 1999. *Report from the Fishery Assessment Plenary, April 1999: Stock Assessments and Yield Estimates* Wellington, New Zealand: Ministry of Fisheries.
- Annala, John H. Kevin J. Sullivan, and Arthur Hore. 1989. "Management of Multispecies Fisheries in New Zealand by Individual Transferable Quotas." Paper presented at: ICES 1989.
- Arbuckle, Michael. 2000. "Fisheries Management under ITQs: Innovation in New Zealand's Southern Scallop Fishery." Paper presented at: International Institute of Fisheries Economics and Trade 2000 Conference: Corvallis, OR, July 10-14, 2000.
- Arnason, Ragnar. 1991. Efficient management of ocean fisheries. *European Economic Review* 35: 408-17.
- Arron, Ed. 1999. "Letter to the Editor: Willingness!!" *Seafood New Zealand* 7(5): 8-9.

- Ashby, Maurice. 2000. "Letter to the Editor: Misplaced Blame." *Seafood New Zealand* 8(9): 6-7.
- Ashby, Maurice, regional leader, New Zealand Federation of Commercial Fishermen. 1999. Interview with author. Papakura, New Zealand.
- Barber, Laurie. 1989. *New Zealand: a short history*. Auckland, New Zealand: Century Hutchinson. Ltd.
- Batkin, Kirsten M. 1996. "New Zealand's Quota Management System: A Solution to the United States' Federal Fisheries Management Crisis?" *Natural Resources Journal*. 36(Fall): 855-880.
- Batstone, CJ and BMH Sharp. 1999. "New Zealand's Quota Management System: The First Ten Years." *Marine Policy* 23(2): 177-190.
- Becker, Zeitoni, and Scechter. 1996. "Reallocating Water Resources in the Middle East through Market Mechanisms." *Water Resources Development*.
- Beckerman, Wilfred. 1975. *Pricing for pollution: market pricing, government regulation, environmental policy*. London: Institute for Economic Affairs.
- Beggs, Bob. 1998. "Help us to help you" *Seafood New Zealand* 6(3): 54.
- _____. 1999. "Nets: Bob Beggs's Point of View." *Seafood New Zealand* 7(1): 40-41.
- Bellingham, Mark. 1993. "A better deal for life in the sea?" *Forest and Bird* 267:39.
- Berkes, Fikret, ed. 1989. *Common Property Resources: Ecology and Community-based Sustainable Development*. London: Belhaven Press.
- Berkes, Fikret and M. Taghi Farvar. 1989. "Introduction and Overview." In *Common Property Resources: Ecology and Community-based Sustainable Development*, ed. Fikret Berkes, 1-17. London: Belhaven Press.
- Berkes, Fikret and Carl Folke, ed. 1998. *Linking Social and Ecological Systems: Management practices and social mechanisms for building resilience*. New York: Cambridge University Press.
- Bernstein, Mark, Alex Farrell, and James Winebrake. 1994. The environment and economics: the impact of restricting the SO₂ allowance market. *Energy Policy* 22(9): 748-54.
- Berry, Frances Stokes, and William D. Berry. 1999. "Frameworks Comparing Policies Across a Large Number of Political Systems: Innovation and Diffusion Models in Policy Research." In *Theories of the Policy Process* ed. Paul Sabatier, 169-200. Boulder: Westview Press.
- Bess, Randall and Michael Harte. 2000. "The role of property rights in the development of New Zealand's seafood industry." *Marine Policy* 24: 331-339.
- Bhatta, Ramachandra. 1996. "The Cooperative as an Institution for Management of Marine Fishery Resources: A Case Study from Karnataka." In *Cooperative Management of Natural Resources*, eds. K. Sing and V. Ballabh. Thousand Oaks, CA: Sage Press.
- Billington, G.C. 1994. "Discussion Paper on Quota Aggregation Limits." Wellington, New Zealand: New Zealand Fishing Industry Board.
- Bingham, Eugene. 1998. "Govt acts to end abuse of fishing rights." *New Zealand Herald* Auckland, New Zealand. February 7, 1998.

- Blanshard, David, former fishing industry reporter for the Bay of Plenty Times. 1999. Interview with author. Tauranga, New Zealand.
- Blomquist, William. (1992) *Dividing the Waters: Governing Groundwater in Southern California* San Francisco: ICS Press.
- Boldt, David. 1998. "Steadying the Scales of Justice Deep in the Waters of Controversy: Our Appetite for Correctness may Flet a Vulnerable Livelihood." *The Philadelphia Inquirer*. 14 August 1998. Downloaded From: <http://www.fishingnj.org/artswrdink2.htm>. On June 21, 2000.
- Boston, Jonathan and June Pallot. 1997. "Linking Strategy and Performance: Developments in the New Zealand Public Sector." *Journal of Policy Analysis and Management*. 16(3): 382-404.
- Boston, Jonathan and Martin Holland (ed). 1987. *The Fourth Labour Government: Radical Politics in New Zealand*. New York: Oxford University Press.
- Botsford, Louis W. et al. 1999. "The Management of Fisheries and Marine Ecosystems." *Science* 277: 509-515.
- Boyd, R. O., and C. M. Dewees. 1992. Putting theory into practice: Individual Transferable quotas in New Zealand's fisheries. *Society and Natural Resources* 5: 179-98.
- Boyd, Rick, Senior Consultant Kingett Mitchell & Associates, Ltd. 1999. Interview with author. Auckland, New Zealand.
- Boyle, Donal, Consultant, Clement & Associates. 1999. Interview with Author, Tauranga, New Zealand.
- Bradstock, M.P. 1979. *From 12 to 200: New Zealand's Exclusive Economic Zone*. Wellington, New Zealand: Ministry of Agriculture and Fisheries.
- Branson, Jim H. 1987. Regional Fisheries Management Councils: A new form of government. *Coastal Management* 15, no. 4: 299-303.
- Bridgeport Group. 1992. "Synopsis of Submissions on Fisheries Task Force Report: Sustainable Fisheries Tiakina Nga Taonga A Tangaroa." Bridgeport Group: Wellington, New Zealand.
- Brin, David. 1995. "The Internet as a Commons." *Information Technology and Libraries* 14:240-242.
- Buck, Eugene H. 1995. *Individual Tradable Quotas in Fishery Management*. Congressional Research Service, Washington, DC.
- Buhl-Mortensen, Lene and Reider Toresen. 1997. "The Scientist's Responsibility in Attaining a Precautionary Approach in Fisheries Management". Paper Presented at the Conference Environmental Justice: Global Ethics for the 21st Century. Melbourne, Australia.
- Buhrs, Ton and Robert V. Bartlett. 1993 *Environmental Policy in New Zealand: The Politics of Clean and Green?* New York: Oxford University Press
- Burkhart, Trevor. 2000. "Rock Lobster: Effective management through self determination, responsible quota placement and good husbandry techniques." *Seafood New Zealand*. 8(6): 27-29.
- Campos, Jose Edgardo and Sanjay Pradhan. 1997. "Evaluating Public Expenditure Management Systems: An Experimental Methodology with an Application to the Australia and New Zealand Reforms." *Journal of Policy Analysis and Management*. 16(3): 423-445.

- Carr, Edward. 1998. "The Deep Green Sea: The Economist Survey" *The Economist* (May 23, 1998) Supplement.
- Carter, RC, SF Tyrrel, and P. Howsman. 1999. "The Impact and Sustainability of Community Water Supply and Sanitation Programs in Developing Countries." *Water and Environmental Management* 13: 192 –
- Cassidy, Miranda. 1999. "Ngai Tahu Customary Fisheries Management: Implementation of a Common Language." Paper presented at: FishRights 99 Conference. Freemantle, Australia. November 11-19, 1999.
- Catch '77*. 1977. "Assistance and Incentives for Fishermen." *Catch '77* (October Supplement – No page numbers, entire issue. Published by New Zealand Ministry of Agriculture and Fisheries.)
- Charles, Anthony T. 1988. Fisheries Socioeconomics: A Survey. *Land Economics* 64, no. 3: 276-95.
- _____. 1992. Fisheries Conflict: A Unified Framework. *Marine Policy* : 379-93.
- Charles, Anthony T., and C. W. Yang. 1990. A Decision Support Model for Coastal Fishery Planning: Optimal Capacity Expansion and Harvest Management. *Operations Research and Management in Fisheries*, ed. A. Guimaraes Rodrigues. NATO ASI Series E: Applied Sciences, no. 189. Norwell, MA: Kluwer Academic Publishers.
- Christian, Peter. 1998. "Fishing's Firm Forecast: Uncertain." *Christchurch Press*. Christchurch, New Zealand. April 21, 1998. Downloaded from: <http://www.press.co.nz/16/98042116.htm> on May 27, 1998.
- Christie, Walter. 1997. *Treaty Issues*. Christchurch, New Zealand: Wyvern Press.
- Clark, Ian. 1993. Individual transferable quotas: the New Zealand experience. *Marine Policy* 17, no. 5: 340-352.
- _____. 1994. Fisheries management in New Zealand. *Managing Fisheries Resources: Proceedings of a symposium co-sponsored by the World Bank and Peruvian Ministry of Fisheries held in Lima Peru, June 1992* Eduardo A. Loyaza. World Bank Discussion Papers Fisheries Series, no. 217. Washington, DC: The World Bank.
- Clark, Ian, Philip J. Major, and Nina Mollett. 1988 "Development and Implementation of New Zealand's ITQ Management System". *Marine Resource Economics* 5: 325-49.
- Clarke, Mary and Peter Clough. May 1998. "New Zealand's Fisheries: Co-Management and Property Rights: Report to the New Zealand Seafood Industry Council." Wellington, New Zealand: New Zealand Institute of Economic Research Inc.
- Clement & Associates. 1996. "Changes in Quota Ownership 1982 – 1996: A Report Commissioned by the New Zealand Fishing Industry Association. Tauranga, New Zealand: Clement & Associates.
- _____. 1997. *New Zealand commercial fisheries: the guide to the quota management system*. Tauranga, New Zealand: Clement & Associates, Ltd.
- Clement, George. 1999. "The Orange Roughy Management Company Limited: A Positive Example of Fish Rights in Action." Paper presented at: FishRights 99 Conference. Freemantle, Australia. November 11-19, 1999.
- Clough, R.L. 2000. "Letter to the Editor: Sea-going Serfs." *Seafood New Zealand* 8(1):7.

- Connor, Roblin. 1999. "Trends in Fishing Capacity and Aggregation in Fishing Rights in New Zealand under ITQs." Presented at: FishRights99 Conference. Freemantle Australia.
- Copes, Parzival. 1995. "Problems with ITQs in Fisheries Management with Tentative Comments on Relevance for Faroe Islands Fisheries." In *Nordic Fishing Communities in the Future* ed. Samal Trondur Finnsson Johansen. 19-37. Copenhagen : Nordic Council of Ministers.
- _____. 1996a. *Adverse impacts of individual quota systems on conservation and fish harvest productivity*. 96-1. Institute of Fisheries Analysis. Simon Fraiser University. Burnaby, BC.
- _____. 1996b. *Social Impacts of Fisheries Management Regimes Based On Individual Quotas*. 96-2. Institute of Fisheries Analysis. Simon Fraser University. Burnaby, BC.
- Cordue, P.L. 1998. "Designing optimal estimators for fish stock assessment. *Canadian Journal of Fisheries and Aquatic Sciences* 55: 376-386.
- Cox, Susan J. B.. 1988. "Interjurisdictional Management in Chesapeake Bay Fisheries." *Coastal Management* 16 (no. 2): 151 – 166. Craig, Tony. 6 April 1999. Interview by author. Written notes. Seafood Industry House, Wellington, New Zealand.
- Craig, Tony. Business Policy Manager. New Zealand Seafood Industry Council. 1999. Interview with author. Wellington. New Zealand.
- _____. 1999. "Introducing Property Rights into Fisheries Management: Governments Cannot Cope with Implementation Alone." Paper presented at: FishRights 99 Conference. Freemantle, Australia. November 11-19, 1999.
- _____. 2000. "Devolution of Fisheries Management Functions in New Zealand." Paper presented at: International Institute of Fisheries Economics and Trade 2000 Conference: Corvallis, OR. July 10-14, 2000.
- Cranna, John. 1997. "The Fortunes of Fishing." *New Zealand Geographic* 36(Oct-Dec): 68-94.
- Crapper, P. 1969. "Practical Approaches to Fishing Operations: the owner-operator." In *Fisheries and New Zealand: Proceedings of a Seminar on Fisheries Development in New Zealand*. E.B. Slack, ed. Wellington: Victoria University of Wellington. 138-141.
- Creed, Carolyn, Richard Apostle, and Bonnie J. McCay. 1994. "ITQs From a Community Perspective: The Case of the Canadian Scotia-Fundy Groundfish Fishery" Paper Presented at the 1994 Statutory Meeting of the International Council for the Exploration of the Sea. St. Johns, Newfoundland.
- Crothers, Stan. 1988. "Individual Transferable Quotas: The New Zealand Experience." *Fisheries*. 13 (1): 10-12.
- _____. 1999. "Address to SeaFIC Conference: The Future of Fisheries Management from a Ministry of Fisheries Perspective." Speech Presented at: Annual Seafood Industry Council Conference: Auckland, New Zealand, May 12, 1999.
- _____. 1999. "Administration of Enforcement Mechanisms for Rights-Based Fisheries Management Systems." Paper presented at: FishRights 99 Conference: Freemantle, Australia, November 11-19, 1999.
- Crothers, Stan. Deputy Chief Executive. Ministry of Fisheries. 1999. Interview with author. Wellington, New Zealand.
- Crozier, Lorraine (lorraine@seafood.co.nz). 1999. E-mail to Tracy Yandle. 2 July 1999 "Question-Reply."

- Dalziel, P.C. 1991. "The Rhetoric of Treasury: A Review of the 1990 Briefing Papers." *New Zealand Economic Papers* 25(2): 259-274.
- Davidse, W. 1997. "Property Rights and Regulatory Systems: The Strategic Response of Dutch Fishermen." In *Property Rights and Regulatory Systems in Fisheries* ed. Symes, D., 57-66. Oxford: Blackwell.
- Davidse, W.P. L.V. McEwan, and N. Vestergaard. 1999. "Property rights in fishing: from state property towards private property? A case study of three EU countries." *Marine Policy* 23 (6): 537-547.
- Davis, Anthony, and Conner Bailey. 1996. Common in custom, uncommon in advantage: common property, local elites, and alternative approaches to fisheries management. *Society and Natural Resources* 9: 251-65.
- Deweese, Christopher M. 1989. Assessment of the implementation of individual transferable quotas in New Zealand's Inshore Fishery. *North American Journal of Fisheries Management* 9(2): 131-39.
- _____. 1996a. Fishing for Profits: New Zealand Fishing Industry Changes for "Pakeha" and Maori with Individual Transferable Quotas. *Social Implications of Quota Systems in Fisheries Workshop*.
- _____. 1996b. Industry and Government Negotiations: Communication and Change in New Zealand's Individual Transferable Quota System. *Fisheries Resource Utilization and Policy: Proceedings of the World Fisheries Congress, Theme 2*, eds. Robert M. Myers, Chang Zhang, Malcolm L. Windsor, Bonnie J. McCay, Leroy J. Hushak, Robert M. Muth, and Robert J. Jr. Wolotira Oxford: Oxford & IBH Publishing Co.
- _____. 1998. Effects of Individual Quota Systems on New Zealand and British Columbia Fisheries. *Ecological Applications* 8(1): S133-S138.
- _____. 2000. Personal Communications. Bloomington, IN May 30, 2000.
- Dibble, P.D. 1954. *A Geographical Study of the Fishing Industry of New Zealand*. Masters Thesis. University of Auckland.
- Doeringer, Peter B., and David G. Terkla. 1995. *Troubled Waters: Economic structure, regulatory reform, and fisheries trade*. Toronto, Canada: University of Toronto Press.
- Dubbink, Wim and Martijn vanVliet. 1996. "Market Regulation versus Co-Management: Two Perspectives on Regulating Fisheries Compared." *Marine Policy* 20(6): 499-516.
- Duncan, Gordon. 1992. "Report on New Zealand's Deepwater Fishery." Source Consulting Ltd: Auckland.
- Duncan, Leith. 1993. "ITQs: A Critical Appraisal." In *Proceedings of the Mini-Symposium on Justice and the Environment: Common Property, Indigenous Rights and Inequality of Access*. 1-40 Auckland, New Zealand: Department of Economics, University of Auckland.
- Easton, Brian, ed. 1989. *The Making of Rogernomics*. Auckland: Auckland University Press.
- _____. 1990. "Government Management: A Review of its Political Content." *Political Science* 42(2): 35-42.
- _____. 1997. *The Commercialization of New Zealand*. Auckland: Auckland University Press.
- (The) Economist. 1998. "North Atlantic Salmon: End of the Line" *The Economist* (Feb 14, 1998): 80-81.

- Edwards, Mark. 1999. "The administration of fisheries managed by property rights." Paper presented at: FishRights 99 Conference: Freemantle, Australia, November 11-19, 1999.
- English, Philip. 1999. "Hidden slaughter in ocean's deep." *New Zealand Herald*, Auckland, New Zealand, 1 October 1999.
- Eythorsson, Einar. 1996. Coastal Communities and ITQ Management: The Case of Icelandic Fisheries. *Sociologia Ruralis* 36(2): 212-23.
- Fairgray, J.D.M. 1986. "Individual Transferable Quota Implication Study: Second Report Community Issues – Prepared for Fisheries Management Division, Ministry of Agriculture and Fisheries" McDermott Associates Limited, Wellington (?): New Zealand.
- Feeny, David, Fikret Berkes, Bonnie J. McCay, and James M. Acheson. 1990. "The Tragedy of the Commons: Twenty-Two Years Later." *Human Ecology* 18(1): 1-19.
- Feeny, David, Susan Hanna, and Arthur F. McEvoy. 1996. "Questioning the Assumptions of the Tragedy of the Commons" Model of Fisheries." *Land Economics* 72(2): 187-205.
- Fiorino, Daniel J. 1995. *Making Environmental Policy* Berkeley, CA: University of California Press.
- Fisheries Amendment Act 1983
- Fisheries Amendment Act 1986
- Fisheries Amendment Act 1986 Part II A(28)
- Fisheries Act 1996 II (8)(1)
- Fisheries Act 1996 IV(59-61)
- Fisheries Act 1996 Amendment Act 1999
- Fisheries Audit Services Ltd. 1999a. "Catch Sector Compliance Audits: A Proposal for West Coast Hoki." Nelson, New Zealand. [proposal to Hoki Management Group, obtained from Andrew Branson]
- _____. 1999b. "Vessel Checklist." Nelson, New Zealand [document, . obtained from Andrew Branson]
- "Fisheries research fund cuts condemned." *Christchurch Press*, Christchurch, New Zealand, July 8, 1996. Downloaded from http://www.press.co.nz/28_96070812.htm on December 5, 1996.
- Fishing News International. (October 1997) New Zealand quotas for 15 more species -- and a new fraud squad. *Fishing News International*, p. 8.
- Francis, M.P. 1998. "New Zealand shark fisheries: Development, size and management. *Marine and Freshwater Research* 49:579-591.
- "Frigate Sails to Hunt Poachers." 1999. *Christchurch Press* Christchurch, New Zealand, February 3, 1999. Downloaded from http://www.press.co.nz/o5_99020312.htm on February 5, 1999.
- Fullerton, E. Charles. 1987. "Regional Fishery Management Councils: The Federal Perspective." *Coastal Management* 15 (no. 4): 305 – 308.
- Furuseth, Owen and Chris Cocklin. 1995. "An Institutional Framework for Sustainable Resource Management: The New Zealand Model." *Natural Resources Journal* 35: 243-273.

- Gaffney, Kaitlin R. 1997. "Property Rights Based Fisheries Management: Lessons from New Zealand's Quota Management System." Masters Thesis, Victoria University of Wellington, 1997.
- Garcia, SM and C Newton. 1997. "Current Situation, Trends, and Prospects in World Capture Fisheries." In *Global Trends: Fisheries Management*, ed. Pikitch, EL, DD Huppert, and MP Sissenwine, 3-27. American Fisheries Society Symposium 20. Bethesda, MD: American Fisheries Society.
- Garland, Eddie. 2001. "Dialogue: Pakeha a term of respect, even endearment." *New Zealand Herald* Auckland, New Zealand, January 10, 2001. Downloaded from <http://www.nzherald.co.nz/storydisplay...2&thesection=news&thesubsection=general> on January 9, 2001.
- Gatewood, John and Bonnie McCay. 1990. "Comparison of Job Satisfaction in Six New Jersey Fisheries: Implications for Management". *Human Organization* 49:14-25.
- Gibbs, Christopher JN and Daniel W. Bromley. 1989. "Institutional Arrangements for Management of Rural Resources." In *Common Property Resources: Ecology and Community-based Sustainable Development*, ed. Fikret Berkes, 18-21. London: Belhaven Press.
- Gibson, Clark C., Margaret A. McKean, and Elinor Ostrom. 2000. *People and Forests: Communities, Institutions, and Governance*. Cambridge, MIT Press.
- Gilbert, John T.E. 1994. "New Zealand – Environmental Policy on the Move: Government and Environmental Policy Framework." In *Environmental Governance in the Pacific Century: Proceedings of the Fourth Pacific Environmental Conference*, James E. Nickum and Judy R. Nishioka, eds. Honolulu, HI: East-West Center and Japan Environment Association.
- Gillespie, Alexander. "Intervention urgently needed to salvage depleted fish species." *New Zealand Herald*, Auckland, New Zealand, 27 October 1999.
- Gordon, Daniel V. and Gordon R. Munro. 1996. *Fisheries and Uncertainty: A Precautionary Approach to Resource Management*. Toronto, University of Calgary Press.
- Gordon, H. Scott. 1954. The Economic Theory of a Common-Property Resource: The Fishery. *Journal of Political Economy*: 124-42.
- Grafton, R. Quentin. 1995. Rent Capture in a Rights-Based Fishery. *Journal of Environmental Economics and Management* 28: 48-67.
- _____. 1996. Experiences with individual transferable quotas: an overview. *Canadian Journal of Economics* 24(special issue): S135-S138.
- Grafton, R. Quentin, et al. 1996. "Private Property Rights and Crises in World Fisheries: Turning the Tide?" *Contemporary Economic Policy* 14:90-99.
- Greboval, Dominique and Gordon Munro. 1999. "Overcapitalization and Excess Capacity in World Fisheries: Underlying Economics and Methods of Control." In *Managing Fishing Capacity: Selected Papers on Underlying Concepts and Issues*, ed. Greboval, Dominique, 1-48. FAO Fisheries Technical Paper, No. 386. Rome: FAO.
- Greenlaw, Linda. 1999. *The Hungry Ocean: A Swordboat Captain's Journey*. New York: Hyperion.
- Gunderson, Lance H., C. S. Holling, and Stephen S. Light, (eds.). 1995. *Barriers and Bridges to the Renewal of Ecosystems and Institutions*. New York, NY: Columbia University Press.

- Hahn Robert W., Gregory J. McRae, and Jana B. Milford. 1998. Coping with complexities in the design of environmental policy. *Journal of Environmental Economics and Management* 27: 109-25.
- Hall-Arber, Madeleine, and Christopher Finlayson. 1997. Role of local institutions in groundfish policy. *Northwest Atlantic Groundfish: Perspectives on a Fishery Collapse*. eds. John Boreman, Brian S. Nakashima, James A. Wilson, and Robert L. Kendall. 111-37. Bethesda, MD: American Fisheries Society.
- Halliday, R. G, F. B Peacock, and D. L. Burke. 1992. Development of management measures for the groundfish fisheries in Atlantic Canada. *Marine Policy* 17: 411-26.
- Halliday, Ralph G., and Allenby T. Pinhorn. 1997. Policy Frameworks. *Northwest Atlantic Groundfish: Perspectives on a Fishery Collapse*. eds. John Boreman, Brian S. Nakashima, James A. Wilson, and Robert L. Kendall. 95-109. Bethesda, MD: American Fisheries Society.
- Hanna, Susan, Carl Folke, and Karl-Goran Maler. 1996. *Rights to Nature: Ecological, Economic, Cultural, and Political Principles of Institutions for the Environments*. Washington, DC: Island Press.
- _____. 1996. "Property Rights and the Natural Environment" In *Rights to Nature: Ecological, Economic, Cultural, and Political Principles of Institutions for the Environments*. ed. Hannah, Susan, et.al., 1-10. Washington, DC: Island Press.
- Hannesson, Rognvaldur. 1991. "From Common fish to rights based fishing." *European Economic Review*. 35:397-407.
- _____. 1990. "Are Stable TACs Desirable?" In *Operations Research and Management in Fishing*. ed. A. Guimaraes Rodrigues. 111-122. Netherlands: Kluwer Academic Press.
- Hardin, Garret. 1968. "The Tragedy of the Commons." *Science*. 162: 1243-8.
- _____. 1998. "Extension of the 'Tragedy of the Commons'" *Science* 280: 682-3.
- Harley, Shelton J., Russ B. Millar, and Brian H. McArdle. 2000a. "Estimating unaccounted fishing mortality using selectivity data: an application in the Hauraki Gulf snapper (*pagrus auratus*) fishery in New Zealand." *Fisheries Research* 45:167-178.
- _____. 2000b. "Examining the effects of changes in the minimum legal sizes used in the Hauraki Gulf snapper (*pagrus auratus*) fishery in New Zealand." *Fisheries Research* 45: 179-187.
- Hargreaves, Kirk. 1998. *On The Next Tide: Portraits and Anecdotes of New Zealand Fishermen and Women*. Christchurch, New Zealand: Canterbury University Press.
- Harte, Michael. 1998. "Guarding the Consensus: Stakeholder Participation in the Management of New Zealand's Fisheries Resources." *Public Sector* 21(4): 2-9.
- _____. 1999a. "Fisher Participation in Rights-based Fisheries Management: The New Zealand Experience." Paper presented at: FishRights 99 Conference: Freemantle, Australia, November 11-19, 1999.
- _____. 1999b. "Industry Perspective: Taking the initiative for the management of New Zealand's commercial fisheries. Paper presented at: FishRights 99 Conference: Freemantle, Australia, November 11-19, 1999.
- _____. 2000. "Collaborative Research: Innovation and Challenges for Fisheries Management in New Zealand." Paper presented at: International Institute of Fisheries Economics and Trade 2000 Conference: Corvallis, OR. July 10-14, 2000.

- _____. 2000. "Press Release: Industry Led Fisheries Research – No Reason to Question its Integrity"
Downloaded from: http://www.seafood.co.nz/Press/pr_indresearch.htm on December 26, 2000
- Harte, Michael, Michael Arbuckle, and Tom McClurg. 1998. "Property Rights and the evolution of fisheries management in New Zealand." *Private Rights and Public Benefits: Proceedings of the Environment and Property Rights Conference*. Canterbury, New Zealand: Lincoln University.
- Hartvelt, Tony. September 1998. "Fishing for the Future: Review of the Fisheries Act 1996 – Report of the Independent Reviewer of the Fisheries Act 1996 to the Minister of Food, Fibre and Border Control." Wellington, New Zealand: Ministry of Fisheries.
- Hatcher, Aaron C. 1997. "Producers' organizations and devolved fisheries management in the United Kingdom: collective and individual quota systems." *Marine Policy* 21(6): 519-33.
- Hawkins, Loraine. 1995. "Purchasing Health Services." *Public Sector* 18(1): 7-10.
- Haworth, Jenny. 2000a. "Voluntary prohibition on rock lobster exports confirmed." *FIS World News* December 28, 2000. Downloaded from: <http://www.fis.com/fis/hotnews/hotnews...&day=&id=16388&l=e&country=151&special=> on January 9, 2001.
- _____. 2000b. "Rock lobster research a success" *FIS World News* December 29, 2000. Downloaded from: <http://www.fis.com/fis/hotnews/hotnews...e&country=151&monthyear=1-2001&id=16426> on January 9, 2001
- Hayes, Scott P. and Henry R. Glick. 1997. "The Role of Agenda Setting in Policy Innovation: An Event History Analysis of Living Will Laws." *American Politics Quarterly* 25(4): 497-517.
- Hefford, A.E. 1937. "New Zealand Fishes and Fisheries." In *Handbook for New Zealand*. ed. Australian and New Zealand Association for the Advancement of Science. 71-77. Wellington: Government Printer.
- "Hefty Fine for Paua Theves." OneNews/TV New Zealand. Wellington, New Zealand. September 24, 1999. Downloaded from <http://onenews.co.nz/National/1999/09/24/00009950.htm> on September 25, 1999.
- Hetherington, M.J. 1999. "A New Zealand Perspective – Past, Present, and Future." Paper presented at: FishRights 99 Conference: Freemantle, Australia, November 11-19, 1999.
- Hewitt, J.E. et al. 1998. "The effect of changing sampling scales on our ability to detect effects of large-scale processes on communities." *Journal of Experimental Marine Biology and Ecology* 227:251-264.
- Hilborn, Ray. 1997. "Uncertainty, Risk, and the Precautionary Principle." In *Global Trends: Fisheries Management* eds., Pikitch, Ellen K. et. al. 100-106. Bethesda, MD: American Fisheries Society.
- Hodgson, Pete. 2000a. "Speech" Presented at: New Zealand Seafood Industry Council Conference: Nelson, New Zealand. 19 May 2000.
- _____. 2000b. "Managing Our Oceans." Presented at: New Zealand Marine Science Society: Waikato University, Hamilton, New Zealand. 30 August 2000.
- Horn, P.L. et al. 1998. "Between-area differences in age and length at first maturity of the orange roughy (*Hoplostethus atlanticus*). *Marine Biology* 132: 187-194.

- Horton, C.T. 1994. "Report to the Fisheries Ad-Hoc Ministerial Committee by the Fisheries Legislative Review Committee." Wellington, New Zealand.
- Horwood, Alison. 1999. "NZ takes world lead in fisheries work: Luxton." *New Zealand Herald* October 14, 1999: A10.
- Howard, Ted. 1998. "A Letter to the Minister of Fisheries." *Seafood New Zealand* 6(1): 23-24.
- _____. 1999. "RE: ITQs and Fugitive Resources." Posting to Fishfolk (Fishfolk@mitvma.mit.edu) on April 21, 1999.
- Hughey, Kenneth F.D., Ross Cullen, Geoffrey N. Kerr. 2000. "Stakeholder groups in fisheries management." *Marine Policy* 24: 119-127.
- Hyde, Tom. 1996. "Economies of Scales." *Metro* 183 (Sept):82-87.
- Imperial, Mark T. and Tracy Yandle. 1998. "Marching Towards Leviathan, Embracing the Market, or Romancing the Commons: An examination of three approaches to fisheries management. Paper presented at: Association for Public Policy Analysis and Management Twentieth Annual Research Conference, New York, NY, October 29-31, 1998.
- Jackson, R. 1999. "Letter to the Editor: Treaty Tolerance in Danger." *New Zealand Herald*, Auckland, New Zealand, Jan. 13, 1999.
- Jarman, N. E. 1978. *Implications of New Zealand's Declaration of a 200 Mile Exclusive Economic Zone*, Economics Paper #8. University of Auckland, Auckland.
- Jennings, W. 1968. "Practical Approaches to Fishing Operations: the share fisherman." In *Fisheries and New Zealand: Proceedings of a Seminar on Fisheries Development in New Zealand*. E.B. Slack, ed. Wellington: Victoria University of Wellington. 142-145.
- Jentoft, Sven. 1985. Models of Fishery Development: The Cooperative Approach. *Marine Policy* 9: 322-32.
- _____. 1986. Fisheries Co-operative: Lessons Drawn from International Experiences. *Canadian Journal of Development Studies* 7: 195-209.
- _____. 1989. "Fisheries Co-Management" *Marine Policy*. 13: 137-154.
- _____. 2000. "The Community: A missing link of fisheries management." *Marine Policy* 24:53-59.
- Jentoft, Sven, and Bonnie McCay. 1995. User participation in fisheries management: Lessons drawn from international experiences. *Marine Policy* 19(3): 227-46.
- Jentoft, Sven, Bonnie McCay, and Douglas C. Wilson. 1998. "Social Theory and Fisheries Co-Management." *Marine Policy* 22(4-5):423-436.
- Jentoft, Sven and Sandersen, Hakan T. 1996. "Cooperatives in Fisheries Management: The Case of St. Vincent and the Grenadine." *Society and Natural Resources* 9:295-305.
- Jesson, Bruce. 1986. "Treasury: The Hidden Persuaders" *Metro* 48 (June,1995): 30-31.
- Jones, Peter. 1998. "NZ Federation of Commercial Fishermen/Port Associations/ Diversified Inshore Finfish Quota Groups." *Seafood New Zealand* 6(1): 36.

- Jones, Peter. President. New Zealand Federation of Commercial Fishermen. 1999. Interview with author. Wellington, New Zealand.
- Jones, Peter. 1999b. "Federation and Regionalization." *Seafood New Zealand* 7(4): 23
- Jones, Peter and Dick Hall. 1998. "NZ Federation of Commercial Fishermen's (Federation) AGM." *Seafood New Zealand* 6(6): 24-26.
- Jung, Chulo, Kerry Krutilla, and Roy Boyd. 1996. "Incentives for Advanced Pollution Abatement Technology at the Industrial Level: An Evaluation of Policy Alternatives" *Journal of Environmental Economics and Management* 30: 95-111.
- Junger, Sebastian. 1997. *The Perfect Storm: A True Story of Men Against the Sea*. New York: HarperCollins.
- Kawamura, T. et al. 1998. "A review of the feeding and growth of post larval abalone." *Journal of Shellfish Research* 17(3): 615-625.
- Kelly, Graham (New Zealand Labour Party – Maria). 2 Sept 1999. Parliamentary Debate over the 1999 Fisheries Amendment Acts, p.19309.
- Kerr, Suzi. Nov. 1998. "Devolution and the Resource Management Act" *Victoria Economic Commentaries* 15, 2: 11-26.
- Kettl, Donald F. 1997. "The Global Revolution in Public Management: Driving Themes, Missing Links." *Journal of Policy Analysis and Management*. 16(3): 357-381.
- Kidd, Douglas. 1994. "Parliamentary debate on the Fisheries Act Amendment Bill." 13 July 1994.
- _____. 1999. "A Minister's Perspective on Managing New Zealand Fisheries." Paper presented at: FishRights 99 Conference: Freemantle, Australia, November 11-19, 1999.
- Kneese, Allen V., and Charles L. Schultze. 1975. *Pollution, Prices, and Public Policy*. Washington, DC: The Brookings Institution.
- Knudsen, Stale. 1995. "Fisheries along the Eastern Black Sea Coast of Turkey: Informal Resource Management in Small-Scale Fishing in the Shadow of a Dominant Capitalist Fishery." *Human Organization* 54:437-448.
- "Koha came in the form of blank cheques." *New Zealand Herald* Auckland, New Zealand, April 4, 1999.
- Krahl, Lane and Doug Henderson. 1998. "Federal Resources Policy and Rural Communities: Community Forestry in Northern New Mexico." *Natural Resources Journal* 38: 53.
- Lam, Wai Fung. 1996. "Institutional Design of Public Agencies and Coproductions: A study of Irrigation Associations in Taiwan." *World Development* 24: 1039-1054.
- Lee, Kai N. 1993. *Compass and Gyroscope: Integrating Science and Politics for the Environment* Washington, DC: Island Press.
- _____. 1995. "Deliberately Seeking Sustainability in the Columbia River Basin." in Gunderson, Lance H., C. S. Holling, and Stephen S. Light (eds.) *Barriers and Bridges to the Renewal of Ecosystems and Institutions*. New York, NY: Columbia University Press.
- Levi, Margaret. 1990. "A Logic of Institutional Change." in Karen S. Cook and Margaret Levi (eds.) *The Limits of Rationality*. Chicago, IL: University of Chicago Press.

- Levine, H.B. 1984. "Controlling Access: Forms of Territoriality in Three New Zealand Crayfishing Villages." *Ethnology* 23(2): 89-99.
- _____. 1989. "Maori Fishing Rights: Ideological Development and Practical Impacts." *Maritime Anthropological Studies (MAST)* 2: 21-33
- Libecap Gary D. 1989. "Distributional Issues in Contracting for Property Rights" *Journal of Institutional and Theoretical Economics* 145: 6-24.
- Liew, Doreen S.K. 1999. "Measurement of Concentration in Canada's Scotia-Fundy Inshore Groundfish Fishery." Paper presented at: FishRights 99 Conference: Freemantle, Australia, November 11-19, 1999.
- Lim, C.P., Y. Matsuda, and S.Y. Shigeni. 1995 "Co-management in marine fisheries: the Japanese experience." *Coastal Management*. 23(3) 195-222.
- Lindbloom, Charles E. 1959. "The Science of Muddling Through" *Public Administration Review* 19:79-88
- Lloyd, W.F. 1833. *Two Lectures on the Checks to Population*. Reprinted in *Population, Evolution, and Birth Control*, ed. G. Hardin, 37-. San Francisco: Freeman, 1964.
- Loayza, Eduardo A. 1994. *Managing Fisheries Resources: Proceedings of a symposium co-sponsored by the World Bank and Peruvian Ministry of Fisheries held in Lima Peru, June 1992*. World Bank Discussion Paper Fisheries Series, no. 217. Washington, DC: The World Bank.
- Luxton, John. 1998a. "From the Minister: Fisheries for the Future" *Official Programme New Zealand Seafood Industry Council Conference*. Christchurch, New Zealand: May 19-22, 1998.
- _____. 1998b. "Keynote Address to Open Seafood Week" *New Zealand Seafood Industry Council Conference*. Christchurch, New Zealand: May 20, 1998.
- Mace, P.M. et al. 1990. "Growth and productivity of Orange Roughy (*Hoplostethus atlanticus*) on the north Chatham Rise." *New Zealand Journal of Marine and Freshwater Research* 24: 105-119.
- Mace, Pamela M. 1993. "Will Private Owners Practice Prudent Resource Management?" *Fisheries* 18 (9): 29-31.
- _____. 1999. "Current Status and Prognosis for Marine Capture Fisheries." *Fisheries* 24(3): 30.
- Macfarlane, Alastair. 1999. "Editorial: Is Public Flogging a Useful Compliance Tool?" *Seafood New Zealand* 7(3):4.
- _____. 2000. "Editorial: February 2000." *Seafood New Zealand* 8(1): 4.
- Macilree, John. 1992. "The Treasury: What Goes on at No.1?" *Accountants' Journal*. 71(1): 17-22.
- Makarios, Emmanuel. 1996. *Nets, Lines and Pots: A History of New Zealand Fishing Vessels - Volume 1*. Wellington: IPL Books.
- Mantjoro, Eddy. 1996. Management of Traditional Common Fishing Grounds: The Experience of the Para Community, Indonesia. *Coastal Management* 24(3): 229-50.
- Martin, E. R. 1969. *Marine Department Centennial History: 1866 - 1966*. Wellington, New Zealand: New Zealand Marine Department.

- Matulich, Scott C. Ron C. Mittelhammer, and Carlos Reberte. 1996. "Toward a more Complete Model of Individual Transferable Fishing Quotas: Implications of Incorporating the Processing Sector." *Journal of Environmental Economics and Management* 31: 112-128.
- McCay, Bonnie J. 1993. "Management Regimes" Beijer Discussion Paper Series #38. Beijer International Institute of Ecological Economics.
- _____. 1995. "Social and Ecological Implications of ITQs : An Overview." *Ocean and Coastal Management*. 28(103): 3-22.
- _____. 1996. "Forms of Property Rights and the Impact of Changing Ownership." In *Increasing Understanding of Public Problems and Policies*. 127-138. Farm Foundation.
- _____. 1998. Individual Transferable Quotas, Comanagement, and Community. *Fisheries* 23(4): 20-23.
- McCay, Bonnie J. and James M. Acheson, eds. 1987. *The Question of the Commons: The Culture and Ecology of Communal Resources*. Tucson: University of Arizona Press.
- McCay, Bonnie J., Richard Apostle, and Carolyn F. Creed. 1998. "Individual Transferable Quotas, Comanagement, and Community : Lessons from Nova Scotia." *Fisheries* 23(4): 20-23.
- McCay, Bonnie J., and Sven Jentoft. 1996. From the Bottom Up: Participatory Issues in Fisheries Management. *Society and Natural Resources* 9: 237-50.
- McClurg, T. 1994. "Two Fisheries Enforcement Paradigms: New Zealand Before and After ITQs." In *Fisheries Enforcement Issues*. OECD, 123-139. Paris, France: OECD.
- McManus, Robert J. 1994. Allocation of Regulatory Power: The United States' Experience. In *Managing Fisheries Resources: Proceedings of a symposium co-sponsored by the World Bank and Peruvian Ministry of Fisheries held in Lima Peru, June 1992*. ed. Eduardo A. Loayza. 44-48. Washington, DC: The World Bank.
- McMurrin, Jennie. 1999. "Property Rights and Recreational Fishing: never the twain shall meet?" Paper presented at: FishRights 99 Conference: Freemantle, Australia, November 11-19, 1999.
- McKoy, John, Director Fisheries Research, National Institute of Water and Atmospheric. 1999. Interview by author. Wellington, New Zealand.
- Memon, Pyar Ali and Ross Cullen. 1992. "Fishery Policies and their Impact on the New Zealand Maori." *Marine Resource Economics* 7:153-167.
- Miles, Matthew B. and A. Michael Huberman. 1994. *Qualitative Data Analysis: An Expanded Sourcebook*. Thousand Oaks, CA: Sage Publications.
- Miller, Marc L. 1987. Regional Fishery Management Councils and Display of Scientific Authority. *Coastal Management* 15(4): 309-18.
- Minstrom, Michael. 1997. "Policy Entrepreneurs and the Diffusion of Innovation." *American Journal of Political Science* 41(3):738-70.
- Moon, Paul. 1999. *The Sealord Deal*. Palmerston North, New Zealand: Campus Press.
- Morgan, G. R. 1995. Optimal fisheries quota allocation under a transferable quota (TQ) management system. *Marine Policy* 19(5): 379-90.
- Morin, Richard. 1997. "An Ocean of Concern: A New Survey Finds Many are Worried about What's going into the Seas an What's coming out." *The Washington Post*. December 8, 1997.

- Morris, R.S. 1969. "Practical Approaches to Fishing Operations: the well-established concern." In *Fisheries and New Zealand: Proceedings of a Seminar on Fisheries Development in New Zealand*. E.B. Slack, ed. Wellington, New Zealand: Victoria University of Wellington. 133-137.
- Murawski, Steven A., Jean-Jacques Maguire, Ralph K. Mayo, and Fredric M. Serchuk. 1997. Groundfish Stocks and the Fishing Industry. *Northwest Atlantic Groundfish: Perspectives on a Fishery Collapse*. eds. John Boreman, Brian S. Nakashima, James A. Wilson, and Robert L. Kendall, 27-61. Bethesda, MD: American Fisheries Society
- National Fisheries Management Advisory Committee (NAFMAC). 1983 (?). "Report to the Minister of Fisheries on Future Policy for the Inshore Fishery." Wellington (?) New Zealand: National Fisheries Management advisory Committee.
- National Research Council. 1986. *Proceedings of the Conference on Common Property Resource Management*. Washington, DC: National Academy Press.
- _____. 1998. *Improving Fish Stock Assessments*. Washington, DC: National Academy Press.
- National Research Council Committee to Review Individual Fishing Quotas. 1999. *Sharing the Fish: Toward a National Policy on Individual Fishing Quotas*. Washington DC: National Academy Press.
- Neher, Philip A., Ragnar Arnason, and Nina Mollet, eds. 1988. *Rights Based Fishing: Proceedings of a Workshop on the Scientific Foundations for Rights Based Fishing*. Norwell, MA: Kluwer Academic Publications.
- New Zealand Department of Statistics. 1980. *New Zealand Official Yearbook 1980*. Wellington, New Zealand: Department of Statistics.
- _____. 1981. *New Zealand Official Yearbook 1981*. Wellington, New Zealand: Department of Statistics.
- _____. 1982. *New Zealand Official Yearbook 1982*. Wellington, New Zealand: Department of Statistics.
- _____. 1985. *New Zealand Official Yearbook 1985: 90th Annual Edition*. Wellington, New Zealand: Department of Statistics.
- New Zealand Federation of Commercial Fishermen. 1984. *Report of the Proceedings of the 26th Annual General Meeting and Conference of the New Zealand Federation of Commercial Fishermen Inc*: Napier, New Zealand. April 26 – 28 1984.
- _____. 1985. *Report of the Proceedings of the 27th Annual General Meeting and Conference of the New Zealand Federation of Commercial Fishermen Inc*: Nelson, New Zealand, April 23-26 1985.
- _____. 1986. *Report of the Proceedings of the 28th Annual General Meeting and Conference of the New Zealand Federation of Commercial Fishermen Inc*: Invercargill, New Zealand. April 16 – 18 1986.
- _____. 1987. *Report of the Proceedings of the 29th Annual General Meeting and Conference of the New Zealand Federation of Commercial Fishermen Inc*: Auckland, New Zealand. April 28 – May 1 1987.
- _____. 1998. "Update of the Federation's SWOT report." *Seafood New Zealand*. 6(7): 65.
- New Zealand Fisheries Act 1996.

New Zealand Fisheries Act 1996 Amendment Act 1999 (No. 1)

New Zealand Fisheries Act 1996 Amendment Act 1999 (No. 2)

New Zealand Fisheries Act 1996 Amendment Act 1999 (Supplemental Orders)

New Zealand Fishing Industry Association. 1991. "President & Council Report to New Zealand Fishing Industry Association Members: Business Year Ending December 1990" Presented by Peter Tally at: Fifty-Second Annual General Meeting and Conference of Members: Wellington, New Zealand, 3-6 April, 1991.

_____. 1995. "President & Council Report to New Zealand Fishing Industry Association Members: Business Year Ending December 1994" Presented by Vaugan Wilkinson at: Fifty-Sixth Annual General Meeting and Conference of Members: Auckland, New Zealand, 19-22 April, 1995.

_____. Dec. 1996. "Briefing Document for the Minister of Fisheries" Wellington, New Zealand: New Zealand Fishing Industry Association.

_____. 1997. "1996 Annual Report." Wellington, New Zealand: New Zealand Fishing Industry Association.

_____. 1997. "New Zealand Fishing Industry Association Briefing Paper to the Minister of Fisheries." Wellington, New Zealand: New Zealand Fishing Industry Association.

New Zealand Fishing Industry Board. 1973. *Report of the New Zealand Fishing Industry Board for the Year Ended 31 March 1973 (Annual Report)*. Wellington, New Zealand. New Zealand Fishing Industry Board.

_____. 1974. *Report of the New Zealand Fishing Industry Board for the Year Ended 31 March 1974 (Annual Report)*. Wellington, New Zealand. New Zealand Fishing Industry Board.

_____. 1979. *Report of the New Zealand Fishing Industry Board for the Year Ended 31 March 1979 (Annual Report)*. Wellington, New Zealand. New Zealand Fishing Industry Board.

_____. 1982. *Report of the New Zealand Fishing Industry Board for the Year Ended 31 March 1982 (Annual Report)*. Wellington, New Zealand. New Zealand Fishing Industry Board.

_____. 1983. *Report of the New Zealand Fishing Industry Board for the Year Ended 31 March 1983 (Annual Report)*. Wellington, New Zealand. New Zealand Fishing Industry Board.

_____. 1984. *Report of the New Zealand Fishing Industry Board for the Year Ended 31 March 1984 (Annual Report)*. Wellington, New Zealand. New Zealand Fishing Industry Board.

_____. 1986. *A Guide to Tendering Procedures: Inshore Finfish Fisheries*. Wellington, New Zealand: New Zealand Fishing Industry Board.

_____. 1986. "Second Tender Round for Buy-Back Scheme." 3(October 1986): 1.

_____. 198X. "The Zealand Fishing Industry: An Introduction." Wellington, New Zealand: New Zealand Fishing Industry Board.

_____. 1987. "Fishing quota stopped by court rule." *Fishing Industry Board Newsletter* 2(10): 1.

_____. 1988a. "Maori Fishing Rights." *Fishing Industry Board Newsletter* 3(4): 1.

- _____. 1988b. "The Industry View." *Fishing Industry Board Newsletter* 3(7): 1.
- _____. 1993. "Fishing Industry Response to the Minister of Fisheries: Critique of Government Policy to Tender Fisheries Rights and Other Policy Directions." New Zealand Fishing Industry Board: Wellington, New Zealand.
- _____. 1995. "Fishing Quota Aggregation Limits: Time for a change?" Wellington, New Zealand: New Zealand Fishing Industry Board.
- New Zealand House of Representatives. 1999a. "Debate on Fisheries Amendment Bills 2 September 1999." [pages 193030 – 19325 September 2, 1999 debate]
- _____. 1999b. "Third Reading Fisheries Amendment Bills 7 September 1999." [pages 19361-19372 September 7, 1999 debate.]
- New Zealand Marine Sciences Society (NZMSS). 1999. "Submission to Parliamentary Primary Production Committee." Wellington, New Zealand.
- New Zealand Ministry of Agriculture and Fisheries. 1980. *Fishing Industry Incentives 1980-81*. Wellington, New Zealand: Ministry of Agriculture and Fisheries.
- _____. 1980. *Report of the Ministry of Agriculture and Fisheries for the Year Ended 31 March 1980 (Annual Report)*. Wellington, New Zealand: Ministry of Agriculture and Fisheries
- _____. 1982. *Report of the Ministry of Agriculture and Fisheries for the Year Ended 31 March 1982 (Annual Report)*. Wellington, New Zealand: Ministry of Agriculture and Fisheries.
- _____. 1984. "Inshore Finfish Fisheries: Proposed Policy for Future Management" (also known as "The Blue Book") Wellington, New Zealand: Ministry of Agriculture and Fisheries.
- _____. 1985. "Grounds for Objections" *Inshore Fisheries Restructuring Programme: Information Bulletin*. 1 (August 1995): 2.
- _____. 1986. "Fisheries Amendment Bill: Annual Royalties – Background Reports to House of Representatives Primary Production Committee. Report on Fisheries Bill of 1986. Wellington, New Zealand: Ministry of Agriculture and Fisheries.
- New Zealand Ministry of Fisheries. 1996a. *An Introduction to the Fisheries Act 1996*. Wellington, New Zealand: Ministry of Fisheries.
- _____. 1996b. "Changing Course: Towards Fisheries 2010" [Online]. Available: <http://www.fish.govt.nz/information/changingcourse.html> [February 26, 2000].
- _____. November 1997. "Towards Better Management of New Zealand's Commercial Fisheries: A discussion Paper on Proposals to Reform Management in New Zealand's commercial fisheries." Wellington, NZ: Ministry of Fisheries.
- _____. 1998. "Compliance Survey Research Report" 28 February, 1998. Wellington, New Zealand: Ministry of Fisheries.
- _____. 1999a. "MFish Currents: Rights Holders handed powerful tool for settling disputes." *Seafood New Zealand* 7(10): 21.
- _____. 1999b. "Proposed Nature and Extent of Fisheries services for the 1999-2000 Financial Year." Wellington, New Zealand: Ministry of Fisheries.

- _____. 1999c. "Quota Aggregation Approvals: S.28W. Fisheries Act 1983." Provided by the Ministry of Fisheries upon written request by author.
- _____. 2000a. "Press Release: Industry Purchase of Fisheries Research 9 March, 2000." [Online]. Available: <http://www.fish.govt.nz/current/pr090300.htm> [March 17, 2000].
- _____. 2000b. "Soundings" [Online] Available: <http://www.fish.govt.nz/recreational/cast2.pdf>
- New Zealand Ministry of Research Science and Technology. 1996. *Science for Sustainable Fisheries* Wellington, New Zealand: Ministry of Research Science and Technology.
- New Zealand Rock Lobster Industry Council (NZRLIC). 2000. "New Century, New Government, New Minister, New Season: Are You Ready for This?" *Seafood New Zealand* 8(2): 12-17.
- New Zealand Seafood Industry Council (SeaFIC). 2000. "Total Exports" downloaded from <http://www.seafood.co.nz/exports.htm> on 17 May 2000.
- Nielander, William J. and Michael S. Sullivan. 1999. "ITQs – New Zealand and United States: Allocation Formula and Legal Challenges." Paper presented at: FishRights 99 Conference: Freemantle, Australia, November 11-19, 1999.
- Nixon, Tina. 1997a. "Costs Force Fishermen Out." *The Southland Times*. Invercargill, New Zealand. April 4, 1997. Downloaded from: http://ariadne.plain.co.nz/14_97040438 on April 20, 1997.
- _____. 1997b. "Fishermen Being Forced to Quit." *The Southland Times*. Invercargill, New Zealand. July 4, 1997. Downloaded from http://www.press.co.nz/27_97070429.htm on August 10, 1997.
- Noble, Bram F. 2000. "Institutional criteria for co-management." *Marine Policy* 24:69-77.
- Norman, Marc E., and John D. Keenan. 1995. Market incentives to reduce non-point source agricultural nutrient pollution: a theoretical and implementational discussion. *Journal of Environmental Systems* 24 (2) 151-67.
- Norris, Tom, Manager, Fisheries Operations for Treaty of Waitangi Fisheries Commission (Te Ohu Kai Moana). 1999. Interview with author. Wellington, New Zealand.
- _____. (Tom.Norris@tokm.co.nz) 2001. e-mail to Tracy Yandle, 20 April 2001 "PhD dissertation etc."
- Nugent, Rachel A., Katharine F. Wellman, and Allen Lebovitz. 1996. Developing Sustainable Salmon Management in Willapa Bay, Washington. *Society and Natural Resources* 9(3): 317-25.
- O'Brien, Peter V. "Legal convenience means fishing quota for all." *National Business Review* December 13, 1991: 173.
- Orange, Claudia. 1988. "The Treaty of Waitangi: A Historical Overview." *Public Sector* 11(4): 2-6.
- Ostrom, Elinor. 1990. *Governing The Commons: The Evolution of Institutions for Collective Action*. New York: Cambridge University Press.
- _____. 1995. "Designing Complexity to Governing Complexity." In *Property: Rights and the Environment: Social and Ecological Issues*, eds. Susan Hanna and Mohan Munasinghe, 33-45. Washington, DC: The World Bank, 1995.
- _____. 1999. "Coping with the Tragedies of the Commons." *Annual Review of Political Science* Vol. 2. (Workshop reprint W98-24)

- Ostrom, Elinor, Joanna Burger, Christopher B. Field, Richard B. Norgaard, and David Policansky. "Revisiting the Commons: Local Lessons, Global Challenges." *Science* 284: 278-281.
- Ostrom, Elinor, Roy Gardner, and James Walker. 1994. *Rules, Games, and Common-Pool Resources*. Ann Arbor: University of Michigan Press.
- Ostrom, Elinor, and Edella Schlager. 1996. "The Formation of Property Rights" In *Rights to Nature: Ecological, Economic, Cultural, and Political Principles of Institutions for the Environments*, ed. Hannah, Susan, et.al., 127-156. Washington, DC: Island Press.
- Ostrom, Elinor, Larry Schroeder, and Susan Wynne. 1993. *Institutional Incentives and Sustainable Development: Infrastructure Policies in Perspective*. Boulder: Westview Press.
- Ostrom, Vincent. 1989. *The Intellectual Crisis in American Public Administration*. Tuscaloosa, AL: University of Alabama Press.
- Palsson, Gisli and Agnar Helgason. 1995. "Figuring Fish and Measuring Men: The Individual Transferable Quota System in the Icelandic Cod Fishery." *Ocean and Coastal Management* 28 (1-3) 117-146.
- Paulin, Chris. 1998. *Common New Zealand Marine Fishes*. Christchurch, New Zealand: Canterbury University Press.
- Pearce, D. W. and R. K. Turner. 1993. Market-based approaches to solid waste management. *Resources, Conservation, and Recycling* 8: 63-90.
- Pearse, Peter H. 1991. "Building on Progress: Fisheries Policy Development in New Zealand" Wellington, New Zealand: Ministry of Fisheries.
- Pfahler, John. 1998. "Industry Codes of Practice." *Seafood New Zealand* 6(3): 17.
- Pinkerton, Evelyn. 1989. "Introduction: Attaining Better Fisheries Management through Co-Management: Prospect, Problems, and Propositions." In Pinkerton, Evelyn (ed.) *Co-Management of Local Fisheries: New Directions for Improved Management & Community Development*. Vancouver, Canada: University of British Columbia Press.
- Pinkerton, Evelyn, and Martin Weinstein. 1995. "Searching for Sustainability in West Coast Fisheries: Alternative Fisheries Management Institutions. A Report to the David Suzuki Foundation".
- Pomeroy, Robert S. and Fikret Berkes. 1997 "Two to tango: the role of government in fisheries co-management." *Marine Policy*: 21(5): 465-480.
- Putnam, Robert D. 1993. *Making Democracy Work: Civic Tradition in Modern Italy*. Princeton: Princeton University Press.
- Quaintance, Lauren. 1998. "Fishing Furore: Customary Rights or Deep Sea Plunder?" *North and South* March, 1998: 30-40.
- Quin, Marguerite. 1997. "The Fisheries Act 1996: Context, Purpose, and Principles." *Auckland University Law Review* 8(2): 503-531.
- Ray, Noel. 1996. "What went wrong and what can we learn from it." In *Fisheries and Uncertainty: A Precautionary Approach to Resource Management*. Gordon, Daniel V. and Gordon R. Munro, eds. 15-25. Toronto: University of Calgary Press.
- Reade, David. 1987. "The Moyle Interview: Words with the Minister." *Commercial Fishing* 25 (10): 14-19.

- Redmayne, Peter. 1997. "Anxious in Alaska." *Seafood Leader* Nov/Dec 1997: 59-60, 62, 64, 80-81.
- Rennie, Hamish G. 1998. "Geographical Problems in Implementing ITQs: New Zealand's Quota Management System." Paper Presented at: Seventh Conference of the International Association for the Study of Common Property, Vancouver, Canada, June 10-14, 1998.
- Robson, Seth. 1999. "Fisheries Confiscate 70 Tonnes of Squid." *Christchurch Press*, Christchurch, New Zealand, March 19, 1999. Downloaded from <http://www.press.co.nz/1199031936.htm> on March 22, 1999.
- Rock Lobster Industry Council (RLIC) 1999. "National Rock Lobster Management Group: 1998 Annual Report and Recommendations." *Seafood New Zealand*, 7(2): 13-16.
- _____. 1999. "No Tag – No Sale: New Zealand rock lobster industry: offensive against fish thieves." *Seafood New Zealand*, 7(4): 13-14.
- _____. 2000. "New Century, New Government, New Minister, New Season: Are You Ready of This?" *Seafood New Zealand*, 8(2): 12-17.
- Rogers, Evertt M. 1995. *Diffusion of Innovation*, 4th ed. New York: Free Press.
- Rose, Carol M. 2000. "Common Property, Regulatory Property, and Environmental Protection: Comparing Common Pool Resources to Tradable Environmental Allowances." Presented at: Eighth Conference of the International Association for the Study of Common Property, Bloomington, IN, May 31- June 4 2000.
- Rosenbaum, Walter A. 1998. *Environmental Politics and Policy*, 4th ed. Washington, DC: CQ Press.
- Sartori, Giovanni. 1970. "Conceptual Misformation in Comparative Politics." *American Political Science Review* 64: 1033-1053.
- Saunders, Justine. 1999. "The New Zealand Marine Science Society: Review 41" New Zealand: New Zealand Marine Science Society.
- Scheberle, Denise. 1997. *Federalism and Environmental Policy: Trust and the Politics of Implementation*. Washington, DC: Georgetown University Press.
- Schlager, Edella. 1990. "Model Specification and Policy Analysis: The Governance of Coastal Fisheries." Indiana University.
- Schlager, Edella, and Elinor Ostrom. 1992. Property rights regimes and natural resources: a conceptual analysis. *Land Economics* 68, no. 3: 249-62.
- _____. 1993. Property rights regimes and coastal fisheries: an empirical analysis. *The political economy of customs and culture: informal solutions to the common problems*, eds. Terry L. Anderson, and Randy T. Simmons, 13-41. Lanham, MD: Rowman & Littlefield Publishers.
- Schmidt, Carl-Christian. 1993. "The Net Effects of Over-fishing" *OECD Observer*, 184 (October/November 1993): 9-11.
- Schwartz, Herman M. 1997. "Reinvention and Retrenchment: Lessons from the Application of the New Zealand Model to Alberta, Canada." *Journal of Policy Analysis and Management*, 16(3): 405-422.
- Scott, Anthony. 1955. "The Fishery: The Objective of Sole Ownership". *Journal of Political Economy* 63: 116-24.

- _____. 1979. "Development of Economic Theory on Fisheries Regulation". *Journal of the Fisheries Research Board of Canada* 36: 725-41.
- _____. 1993. "Obstacles to Fishery Self-Government" *Marine Resource Economics* 8: 187-199.
- _____. 1999. "Moving Through the Narrows: From Open Access to ITQs and Self-Government." Paper presented at: FishRights 99 Conference: Freemantle, Australia, November 11-19, 1999.
- Scott, Graham, Ian Ball, and Tony Dale. 1997. "New Zealand's Public Sector Management Reform: Implications for the United States." *Journal of Policy Analysis and Management*. 16(3): 357-381.
- Scott, M. E. 1982. *The New Zealand Deep Water Fishing Industry*. Wellington, New Zealand: Development Finance Corporation of New Zealand.
- Seafood Industry Council (SeaFIC). 2000. "SeaFIC Chief Executive Comment: Fisheries Plans." *Seafood New Zealand*. 8(6): 5.
- Sealord Group Limited. 1999. "New Zealand: Biggest Population in the World." Nelson, New Zealand: Sealord Group Limited.
- Seiners' Scientific Research Meeting of the Whitianga & Coromandel Peninsula Commercial Fishermen's Association. Thames Sailing Club, Thames New Zealand: 19 March 1999. Minutes taken by Justine Longland (secretary) and notes taken by author.
- Sen, Sevaly and Jesper Raakjaer Nielsen. 1996. "Fisheries Co-management: a comparative analysis." *Marine Policy* 20(5): 405-418.
- Sharp, Basil M.H. 1997. "From regulated access to transferable harvesting rights: policy insights from New Zealand." *Marine Policy* 21 (6): 501-517.
- Sharp, Dave. 1998a. "From the Chairman: Self Management" *Official Programme New Zealand Seafood Industry Council Conference*. Christchurch, New Zealand: May 19-22, 1998
- _____. 1998b. "A view from the top" Address to the Annual Seafood Industry Council Conference. Christchurch, New Zealand: March 20, 1998.
- Sharp, David. 2000. "Fishing for the future: challenges for the industry" *Seafood New Zealand* 8(5):49-50.
- Sharp, David C. and Paul R. Roberts. 1991. "Initial Submission to: Taskforce Review of Fisheries Legislation. New Zealand Fishing Industry Board: Wellington, New Zealand.
- Shirley, Ken. 2000a. "Fisheries Management" e-mail to author. 18 February, 2000. Message sent by assistant (Heather Henderson: Heather.Henderson@parliament.govt.nz).
- _____. 2000b. "RE: Fisheries Management" e-mail to author. 30 March, 2000. Message sent by assistant (Heather Henderson: Heather.Henderson@parliament.govt.nz).
- Short, Katherine. 1999. "Submission to Ministry of Fisheries Re: Fisheries Amendment Bill No 258-1." Wellington, New Zealand.
- Sinclair, Keith, ed. 1997. *The Oxford Illustrated History of New Zealand*. New York: Oxford University Press.
- Sissenwine, M. P., and P. M. Mace. 1992. ITQs in New Zealand: The era of fixed quota in perpetuity. *Fishery Bulletin* 90: 147-60.

- Slack, E. B. 1969. "The Fishing Industry in New Zealand: A Short History". *Fisheries and New Zealand: Proceedings of a Seminar on Fisheries Development in New Zealand*. Ed. E. B. Slack Wellington: Victoria University of Wellington.
- Smith, Courtland L. 1990. "Resource Scarcity and Inequality in the Distribution of Catch." *North American Journal of Fisheries Management* 10:269-278.
- Sparre, Per J. 1994. "The Data Requirements for Basic Fisheries Bio-Economics" ICES 1994.
- Squires, Dale, James Kirkley, and Clement A. Tisdell. 1995. Individual Transferable Quotas as a Fisheries Management Tool. *Reviews in Fisheries Science* 3(2): 141-69.
- Starr, Paul J. et al. 1997. "Evaluation of a management decision rule for a New Zealand rock lobster substock." *Marine and Freshwater Research* 48: 1093-1101.
- Starr, Paul J. et al. 1998. "Contested stock assessment: two case studies." *Canadian Journal of Fisheries and Aquatic Science* 55: 529-537.
- Starr, Paul J. and Marianne Vignaux. 1997. "Comparison of data from voluntary logbook and research catch-sampling programmes in the New Zealand lobster fishery." *Marine and Freshwater Research* 48:1075-1080.
- Statistics New Zealand. 1999. *New Zealand Official Yearbook 1998: 101st Edition*. Wellington, New Zealand: GP Publications.
- Stevens, Peter. 1992. "Quota Appeals: Did the System Work? What Have We Learnt? Could it Have Worked Better?" *New Zealand Professional Fisherman* September 1992: 5-8.
- _____. Former Editor *Seafood New Zealand* and *New Zealand Professional Fisherman*. 1999. Interview with Author. Wellington, New Zealand.
- _____. 1999a. "The Far North" *Seafood New Zealand* 7(7): 25-28.
- _____. 1999b. "Seafood in Marlborough" *Seafood New Zealand* 7(6): 33-37.
- _____. 1999c. "The Lot of the Independent Fisherman" *Seafood New Zealand* 7(6): 33-37.
- _____. 1999d. "Napier: A Post-QMS Review" *Seafood New Zealand* 7(1): 11-14.
- _____. 1999e. "Gisborne the Fishing Port: Once bustling now boutique" *Seafood New Zealand* 7(4): 33-37.
- _____. 1999f. "The Port of Timaru: Not Pretty, but Practical." *Seafood New Zealand* 7(3): 33-37.
- _____. 1999g. "The Plight of the Owner-Operator" *Seafood New Zealand* 7(10): 29-31.
- _____. 1999h. "Lyttelton-Christchurch" *Seafood New Zealand* 7(10): 48-51.
- _____. 1999i. "Wellington: A Port in Limbo" *Seafood New Zealand* 7(9): 26-28.
- _____. 1999j. "Hoki: Once Ignored, Now Respected ... Internationally." *Seafood New Zealand* 7(8): 36-40.
- _____. 2000a. "Otago." *Seafood New Zealand* 8(2): 36-40.
- _____. 2000b. "The Ports of Nelson and Nelson Bays" *Seafood New Zealand* 8(9): 27-32.

- _____. 2000c. "The Bay of Plenty: Aptly Named" *Seafood New Zealand* 8(6): 12-17.
- _____. 2000d. "Taranaki: A Tale of Two Cities" *Seafood New Zealand* 8(1): 31-33.
- _____. 2000e. "Letting the Side Down? Fishing the Wairoa Head" *Seafood New Zealand* 8(2): 26-27.
- Sullivan, Michael Sean and William J. Nielander. 1999. "Enforcement and Compliance of ITQs: New Zealand and the United States of America." Paper presented at: FishRights 99 Conference: Freemantle, Australia. November 11-19, 1999.
- Sutch, W.B. 1962. "Submission to the Select Committee on the Fishing Industry, by W.B. Sutch, Secretary for Industries and Commerce." Wellington, New Zealand.
- Sykes, Daryl, Executive Officer, New Zealand Rock Lobster Industry Council. 1999. Interview with Author. Wellington, New Zealand.
- Sykes, Daryl. 2000. "The Art of Survival: A Warning to Inshore Fishermen." *Seafood New Zealand* 8(5): 13-16.
- Symes, David. 1997. "Fisheries Management: In Search of Good Governance" *Fisheries Research* 32: 107-114.
- Takiari, Bella. 1999. *An Analysis of Commercial Transactions under the New Zealand QMS*. Masters Thesis. University of Waikato: Hamilton, New Zealand.
- Tang, Shui Yan. 1992. *Institutions and Collective Action: Self Governance in Irrigation*. San Francisco: ICS Press.
- Terrebonne, R. Peter. 1995. Property rights and entrepreneurial income in commercial fisheries. *Journal of Environmental Economics and Management* 28: 68-82.
- Thomas, Louise. 2000. "World fish alert, but NZ in better shape." *New Zealand Herald*. Auckland, New Zealand. July 27, 2000. Downloaded from <http://www.nzherald.co.nz/storyprint.cfm?storyID=142708> on July 26, 2000.
- Thomson, Arthur S. 1859. *The Story of New Zealand: Past and Present - Savage and Civilized*. Reprint 1974. The Caxton Press, Christchurch, NZ. London: John Murray.
- Thrush, Simon. 1998. "Identifying the Effects of Fishing on Marine Communities." In *Seaview: Marine Ecosystem Management Obligations and Opportunities – Proceedings of the conference held in Wellington, 11-14th of February 1998*. Wellington, New Zealand: Environment and Conservation Organization.
- Tietenberg, Tom. 2000. "The Tradable Permits Approach to Protecting the Commons: What Have We Learned?" Presented at: Eighth Conference of the International Association for the Study of Common Property, Bloomington, IN. May 31- June 4 2000.
- Titchener, Paul. 1981. *The Story of Sanford Ltd: The First 100 Years*. Auckland: Sanford Ltd.
- Townsend, Ralph E. 1995. "Fisheries Self-Governance: Corporate or Cooperative Structures?" *Marine Policy* 19(1): 39-45.
- Townsend, Ralph E. and Samuel G. Pooley. 1995. "Distributed Governance in Fisheries" In. *Property Rights and the Environment: Social and Ecological Issues*, ed. Hanna, Susan and Mohan Munasinghe. 47-58. Washington DC: Berger Institute and The World Bank.

- Toh, Wong, and Lu. 1994. "Energy and Environmental Protection for Sustainable Development in Singapore." *Journal of Environment and Development*
- Torkington, Barry, Director. Aquaculture New Zealand. 1999. Interview with Author. Auckland, New Zealand.
- Tuck, Warwick. 1998 "Fisheries Management – The Way Forward." Address to the Annual New Zealand Seafood Industry Council Conference. Christchurch, New Zealand: May 20, 1998.
- Tucker, Anton D., Julie B. Robins, and Daryl P. McPhee. 1997. "Adopting Turtle Excluder Devices in Australia and the United States: What are the Differences in Technology Transfer, Promotion, and Acceptance." *Coastal Management* 25 (no. 4): 405 – 421.
- Turner, Matthew A. 1997. Quota-Induced Discarding in Heterogeneous Fisheries. *Journal of Environmental Economics and Management* 33: 186-95.
- Valentine, John. 1998. "New Zealand Seafood Industry Council." Address to the Annual New Zealand Seafood Industry Council Conference. Christchurch, New Zealand: May 20, 1998.
- Veitayka, Joeli. 1998. Traditional and Community-Based Marine Resources Management Systems in Fiji: An Evolving Intergrated Process. *Coastal Management* 26(1): 47-60.
- Vig, Norman J. and Michael E. Kraft, eds. 2000. *Environmental Policy: New Directions for the Twenty-First Century* (4d). Washington, DC: CQ Press.
- Wallace, Catherine. 1998. "Tradable Quotas in Practice: Decision Making, Institutions and Outcomes – The New Zealand Experience over 11 years. In *Proceedings of the Ninth International Conference of the International Institute of Fisheries Economics and Trade, Volume 2*, ed. Vassdal, Arne & Terje, 637-648. Tromsø, Norway: IIFET.
- Wallace, Catherine, Lecturer in Economics and Public Policy, Victoria University & ECO Representative. 1999. Interview by author. Wellington, New Zealand.
- Walsby, John. 2000. "Help on way for last 100 dolphins." *New Zealand Herald*. February 10, 2000. Available Online: <http://www.nzherald.co.nz/storyprint.cfm?storyID=153622>
- Walters, Carl. 1986. *Adaptive Management of Renewable Resources*. New York, NY: Macmillan Publishing Company.
- Watkinson, J.G. 1976. *Commercial Fishermen and the Law* Wellington, New Zealand: Ministry of Agriculture and Fisheries.
- Waugh, G. D. 1969. "The Work of the Fisheries Research Division of the Marine Department." In *Fisheries and New Zealand: Proceedings of a Seminar on Fisheries Development in New Zealand*. E.B. Slack, ed. Wellington, New Zealand: Victoria University of Wellington. 75-94.
- Weber, Peter. 1994. "Facing Limits in Oceanic Fisheries Part I: Extent of the Problem and Policy Responses" *Natural Resources Forum*. 18 (4): 293-303.
- Weeber, Barry. 1998. "Ecosystem management principles: New Zealand's Marine Legal Framework." In *Seaview: Marine Ecosystem Management Obligations and Opportunities – Proceedings of the conference held in Wellington, 11-14th of February 1998*. Wellington, New Zealand: Environment and Conservation Organization.
- _____. Senior Researcher, Royal Forest and Bird Protection Society. 1999. Interview by author. Wellington, New Zealand

- _____. 17 May 2000. "Press Release: Orange Roughy Fishery Should Be Closed." Wellington, New Zealand: Royal Forest and Bird. Downloaded from <http://www.forest-bird.org.nz media-release/orange> on May 25, 2000.
- White, Margo. 1998. "Trawling the Past." *The Listener* January 31, 1998: 2324.
- Whitehead, A.N.. 1948. *Science and the Modern World*. New York: Mentor.
- Wilén, James E. 1995. US Fishery Regulation Policy: Lessons for Peru. *Managing Fisheries Resources: Proceedings of a symposium co-sponsored by the World Bank and Peruvian Ministry of Fisheries held in Lima Peru, June 1992*. ed. Eduardo A. Loayza. 39-43. Washington, DC: The World Bank.
- Wilson, James A. et. al. 1994. "Chaos, Complexity and Community Management of Fisheries" *Marine Policy* 18(4): 291-305
- Wilson, James, Bobbi Low, Robert Costanza, and Elinor Ostrom. 1999. "Scale Misperceptions and the spatial dynamics of a social-ecological system." *Ecological Economics* 21(2): 243-57
- Wise, John P. 1991. *Federal Conservation and Management of Marine Fisheries in the United States*. Washington, DC: Center for Marine Conservation.
- Wood, Dave. Deputy Compliance Manager, New Zealand Ministry of Fisheries. 1999. Interview with author. Wellington, New Zealand.
- Wood, Dave. 1999b. "Letter to the Editor: Ministry Reply." *Seafood New Zealand* 7(4): 6.
- Wyatt, Nick. 2000. "Cost Recovery and Fisheries Management in New Zealand." Paper presented at: International Institute of Fisheries Economics and Trade 2000 Conference: Corvallis, OR. July 10-14, 2000.
- Yandall, Paul. 2000. "Snapper Dumping Charges Unlikely." *New Zealand Herald* October 31, 2000. Downloaded from: <http://www.nzherald.co.nz/storyprint.cmf?storyID=155939> on October 30, 2000.
- Yin, Robert K. 1993. *Applications of Case Study Research* Newbury Park: Sage Publishers.
- Young, Michael D., and Bonnie J. McCay. 1995. Building equity, stewardship, and resilience into market-based property rights systems. *Property rights and the environment: social and ecological issues*. eds. Susan Hanna, and Mohan Munasinghe. 87-102. Washington, DC: The World Bank.

Tracy Jane Yandle
700 Spring Mill Drive
Mooresville, IN 46158
tyandle@indiana.edu or (317) 834-6880
http://www.spea.indiana.edu/v160-yandle/tracy_yandle

Education:

Ph.D. Public Policy, Defended March, 2001: Indiana University, Bloomington, IN
Joint Ph.D.: Department of Political Science / School of Public and Environmental Affairs (SPEA)
Concentrations: Public Policy, Environmental Policy, Comparative Politics
Dissertation Chair: Elinor Ostrom
NSF Dissertation Grant, Graduate Assistantship, Fee Scholarship, GPA: 3.88

Honors Masters degree in Environmental Studies, 1993: Baylor University, Waco TX
Thesis: "Poverty, Race, and Hazardous Waste Landfill Siting in Texas"
Graduate Assistantship, 100% Tuition Remission, GPA: 3.91

BA in Government with Departmental Honors, 1991: Franklin & Marshall College, Lancaster PA
Honors Thesis: "How Green is the 'Green Bill': a study of Great Britain's 1990 Environmental Protection Act"
Resident Assistant, Student Hourly Employee, Dean's List: Fall 1989 - Spring 1991

Dissertation:

Market-Based Natural Resource Management: An Institutional Analysis of Individual Tradable Quotas in New Zealand's Commercial Fisheries. Market based regulation has recently gained favor as a means of natural resource management. New Zealand's fish individual tradable quota (ITQ) system is one of the oldest such market based systems operating. I examine ITQs as an institution: from its adoption, to how it changes the industry and the fishing community, to the current evolution of ITQs into a co-management system. I argue that ITQs cannot be seen as a static policy tool, but as a vital institutional change that profoundly influences the regulated and regulatory community far beyond the original natural resource management goals. This research will help us understand the strengths and weaknesses of this approach, the extent to which this approach changes the regulated community, and how it encourages of co-management and self-governance. This can increase our theoretical understanding of both common pool resource management, and the variables necessary to match policy tools to institutional setting. I use data including: a longitudinal survey of small-scale fishers; current surveys of fishing companies and stakeholder groups; statistical analysis of changes in quota holdings; interviews with key participants; and extensive document analysis.

Experience:

Assistant Professor – Environmental Policy: Emory University (Fall 2001 -)
Tenure-track position at Emory University's Environmental Studies Department

Associate Instructor – National & International Policy: Indiana University (Spring 2000, Fall 2000, Spring 2001)
Instructor of record and responsible for all aspects of this required 'gateway' course. Course introduces students to basic policy analysis skills, and teaches the skills necessary for the SPEA major (professional writing, effective group work, critical thinking). Received superior student evaluations while teaching a large introductory course and challenging students.

Associate Instructor – Statistical Techniques: Indiana University (Fall 1997, Spring 1998, Fall 1998)
Instructor of record for an undergraduate introductory statistics course. Responsible for all aspects of course including: course planning, text selection, all lectures, testing, grading, extensive office hours. Developed innovations adopted by other instructors. Received superior student evaluations, despite holding the line on grade inflation.

Research Assistant: Indiana University (Summers 1997, 1998, Fall and Summer 2000)
Actively participated in research conducted by the Indiana Conflict Resolution Institute. Assisted faculty in designing research examining the adoption of alternative dispute resolution methods by state environmental agencies, and evaluating the EPA's mediation program. Supervised a team of graduate assistants conducting research and phone interviews. Two publications resulted from research programs and further submissions are planned.

Graduate Assistant: Indiana University (August 1995 - June 1997)

Assisted university faculty in teaching introductory public policy courses and a graduate statistics course. Responsibilities included: planning and leading discussion sections, promoting and facilitating study sessions, monitoring and encouraging group projects, developing and grading homework, group projects, and tests, and mentoring first-time teaching assistants. Honed my own teaching style while observing different professors' approach to teaching the same introductory course.

Program Analyst: SciComm Inc. (October 1993 - August 1995)

Achieved higher levels of responsibility culminating in management of major deliverables. Activities included writing, researching, and editing EPA reports and training packages -- including guidance for Federal agencies on compliance with major environmental law, regulations, and executive orders. Worked on projects such as developing congressional briefing packages, tracking EPA enforcement activities, and preparing federal environmental spending projections.

Graduate Assistant: Baylor University (August 1991 - August 1993)

Developed, led and graded discussion sections of environmental studies and social science course, instructed an introductory level environmental science lab on topics ranging from ecology to pollution and conservation.

Planning Intern: City of Waco Planning Department (Spring 1992)

Assisted in development of comprehensive alley plan for Waco.

Summer Assistant: World Bank Law Library (Summers 1988, 1989)

Researched lawyers' inquiries using both conventional and electronic library resources.

Research Grants

National Science Foundation Dissertation Improvement Grant (1999-2000)

Awarded \$8,300 to support dissertation research from the Political Science section of the NSF.

Indiana University Graduate School Doctoral Student Grant-in-Aid of Research (1999)

Awarded \$1000 to support dissertation research

Franklin and Marshall College Charles J.G. Mavaud Travel Grant: (1990)

Awarded \$3,000 travel grant to conduct undergraduate honors thesis research in London.

Publications

Tracy Yandle and Christopher M. Dewees. Forthcoming. "Privatizing the Commons ... Twelve Years Later: Fishers' Experiences with New Zealand's Market-Based Fisheries Management." Chapter in Nives Dolsak and Elinor Ostrom (eds.) *The Commons in the New Millennium*. Forthcoming.

Tracy Yandle. 2000. "The Impact of Governing and Economic Institutions on Energy Systems: A Case Study of the Federal Republic of Germany and the German Democratic Republic." *Journal of Energy and Development*. 24(1):17-37.

Rosemary O'Leary and Tracy Yandle. 2000. "Environmental Management at the Millennium: The Use of Environmental Dispute Resolution by State Governments." *Journal of Public Administration Research and Theory* 10(1):137-155.

Rosemary O'Leary, Tracy Yandle and Tamilyn Moore. 1999. "The State of the States in Environmental Dispute Resolution" *Ohio State Journal of Dispute Resolution*. 14(2):515-613.

Tracy Yandle and Dudley Burton. 1996. "Re-examining Environmental Justice: Race, Poverty, and Hazardous Waste Landfill Siting in Metropolitan Texas." *Social Science Quarterly's* 77(3):477-492.

Tracy Yandle and Dudley Burton. 1996. "Methodological Approaches to Environmental Justice: a Rejoinder" *Social Science Quarterly* 77(3): 520-527

Conferences

Conference Panel Presentations:

Western Political Science Association (San Jose, CA, March 2000)

Midwestern Political Science Association (Chicago, IL, April 2000)

"Market-Based Regulation and Devolution in Common-Pool Natural Resource Management: The Case of New Zealand's Commercial Fisheries." Sole author.

International Association for the Study of Common Property (Bloomington, IN, May 2000)

International Institute of Fisheries Economics and Trade (Corvallis, OR, July 2000)

"New Zealand's Quota Management System: Changes in the Auckland Fishing Community Through the First 14 Years"
Co-authored with Christopher M. Dewees

American Political Science Association (Washington, DC, August 2000)

Fifth National Public Management Research Conference (College Station, TX, December 1999)

"Environmental Management in the New Millennium: The Use of Alternative Dispute Resolution by State Governments"
Co-authored with Rosemary O'Leary

Association for Public Policy Analysis and Management (New York, October 1998)

"Examining Institutional Arrangements for Fishery Management: Regulation, ITQs and Community-Based Management" Co-authored with Mark Imperial.

Association for Public Policy Analysis and Management (New York, October 1998)

"Environmental Justice Research as a Contribution to Policy Research and Theory: Progress Made, Challenges Remaining."
Sole author.

Environmental Justice: Global Ethics for the 21st Century (Melbourne, Australia - October 1997)

"The Impact of Socialist and Capitalist Structures on Energy Systems Development: A case study of the Federal Republic and Democratic Republic of Germany" Invited sole author.

Conference Poster Presentations:

American Political Science Association (Washington, DC, August 2000)

"Market-Based Regulation and Devolution in Common-Pool Natural Resource Management: The Case of New Zealand's Commercial Fisheries." Sole presenter.

Air and Waste Management Association (Denver, CO, June 1993)

"Race, Poverty, and Hazardous Waste Landfill Siting in Metropolitan Texas." Sole presenter.

Panel Chair/Discussant:

International Association for the Study of Common Property (Bloomington, IN, May 2000)

Discussant for "Emergence and Conflict in Evolution of Fisheries Institutions"

Environmental Justice: Global Ethics for the 21st Century (Melbourne, Australia - October 1997)

Panel Chair for "Different National Institutions and Environmental Justice I"

Honors and Awards:

Excellence in Doctoral Research Award, School of Public and Environmental Affairs (2001)

Recognized for research conducted while graduate student in SPEA. \$500 award to support future research

Visiting Scientist, University of Auckland (New Zealand) (1999)

Granted "Visiting Scientist/Staff" rank by the School of Environmental and Marine Science (SEMS) while SEMS hosted me during dissertation field research.

College of Arts and Sciences Travel Support Award (\$300 in 1997, \$100 in 1998)

National Capital Area Federation of Garden Clubs' Harris Scholarship (1996-1997 Academic Year)

Awarded \$1,000 to support second year of Ph.D. program.

Honors Masters Degree (1993)

Third person in Departmental history to receive Departmental Honors for Masters Thesis.

Service:

Referee: *Social Science Quarterly*

Elected Ph.D. Representative to Dean's Student Advisory Committee: Indiana University (1997-1998 Academic Year)

Graduate Student Representative to Public Policy Ph.D. Steering Committee: Indiana University (1996-1997 Academic Year)

Graduate Student Organization Health Insurance Committee: Indiana University (January 1996 – May 1997)

Speakers Bureau Volunteer: The Nature Conservancy of Maryland (December 1993 – August 1995)

Graduate Student Representative to Departmental Steering Committee: Baylor University (1992-1993 Academic Year)

Alumni Admissions Volunteer: Franklin and Marshall College (1991 – Present)

Guest Lecture/Speaker:

Speaker at the Rotary Club of Tauranga Te Papa: "Commercial Fishing under The Quota Management System" (April 1999)

Speaker at University of Auckland, School of Environmental and Marine Sciences 1999 Public Seminar Series: "Individual Tradable Quotas and Devolution – Can Markets and Companies Manage Commercial Fisheries?" (August 1999)

Affiliations:

American Political Science Association
American Society for Public Administration
American Fisheries Society

Association for Public Policy Analysis and Management
International Association for the Study of Common Property

References:

Professor Elinor Ostrom:
(dissertation chair)
Workshop in Political Theory and Policy Analysis
513 North Park Street
Indiana University
Bloomington, IN 47405
ostrom@indiana.edu

Professor Rosemary O'Leary:
(dissertation committee member and co-author)
Maxwell School of Citizenship and Public Affairs
215 Eggers Hall
Syracuse University
Syracuse, NY 13244-1020
roleary@syr.edu

Professor Norm Furniss:
(dissertation committee member)
Political Science Department
Woodburn Hall
Indiana University
Bloomington, IN 47405
furniss@indiana.edu

Associate Professor Lisa B. Bingham:
(Director, Indiana Conflict Resolution Institute)
Room 340
School of Public and Environmental Affairs
Indiana University
Bloomington, IN 47405
lbingham@indiana.edu

Dr. Frank Vilardo
(Director, Undergraduate Programs, teaching reference)
Room 260
School of Public and Environmental Affairs
Indiana University
Bloomington, IN 47405
vilardo@indiana.edu
