Foundations of Sustainable Resource Management: the Legitimation Function

By **Anthony Lavers**

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Centre for Environmental Policy,
Faculty of Natural Sciences

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Declaration of originality

I confirm that this thesis is entirely my own work, and that I have referenced the actions and ideas of others wherever necessary.

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Abstract

The literature on management of common-pool resources and social-ecological systems is extensive. It covers at least 40 years of research. In that time, significant progress has been made in understanding the conditions and factors that characterise sustainable management schemes, particularly community-based schemes. This thesis attempts to build on this literature. Its core concern and unifying theme is the 'factors' that explain why some management systems are successful and others are not. Of course, the list of factors identified in existing literature is extensive. Some of these factors - socio-economic heterogeneity, for instance - are explored in significant depth. This thesis does not propose to contribute to our understanding of such factors. Instead, it focuses on one factor – legitimacy – which is recognised as important by a large number of researchers, but has been subject to only limited investigation in the field. The thesis adopts a multi-disciplinary and mixed methods approach to ask how resource management systems - and the organisations that design and operate them - gain legitimacy. Much of the research is based on two case studies of resource management systems in Argentina and the United States. One of these systems is in the process of being implemented, but has been the source of much dissatisfaction to date. The other system, a fisheries management plan, was introduced in 1995, and has changed the fortunes of fishermen and other stakeholders in mostly positive ways. These case studies are the point of departure for developing a more complete picture of the factors that underpin legitimacy in resource management contexts.

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Acronyms commonly used

CFP	Common Fisheries Policy
CPR	Common-pool resource
EC	European Commission
EEZ	Exclusive economic zone
EU	European Union
FARN	Fundación Ambiente y Recursos Naturales
ICES	International Council for the Exploration of the Sea
IFQ	Individual Fishing Quota
IPHC	International Pacific Halibut Commission
IRM	Integrated resource management
NMFS	National Marine Fisheries Service
NPFMC	North Pacific Fishery Management Council
OPDS	Buenos Aires Office for Sustainable Development
PIECAS	Plan Integral Estratégico para la Conservación y el Aprovechamiento Sostenible de la Región Delta del Paraná
QS	Quota share
SES	Social-ecological system
TAC	Total allowable catch
UN	United Nations

Chapter 1 Introduction

A key problem in the environmental sciences is to understand how natural resources – fish, forests, water and so on – can be exploited in a sustainable way. Considerable progress has been made in a number of fields. Economists have classified four types of goods – private, public, toll, and common-pool resources – and identified the incentives that individuals face when availing themselves of these goods (Ostrom, 2010). Common-pool resources (hereafter, CPRs) are of particular interest to environmental scholars because they include many of the resources that are most susceptible to exploitation – fish stocks, for instance. CPRs are characterised by two features: the difficulty of excluding others from using them (a feature they share with public goods); and high 'subtractability of use', the idea that the resources consumed by one individual cannot be consumed by another (a feature they share with private goods). These two characteristics provide rational, self-interested individuals with an incentive to exploit CPRs rather than conserve them, because forfeiting one's own consumption provides an opportunity for others to consume the resource. Furthermore, once the resource is consumed, it will no longer be available to others for their own consumption. The specific attributes of CPRs therefore drive their over-exploitation.

One way to address the perverse incentives presented by CPRs is to privatise the resource; another is to implement state control. This basic dichotomy was first presented by Garrett Hardin in his seminal 1968 essay 'The Tragedy of the Commons', and is evident in management schemes for CPRs across the world. However, subsequent research has uncovered substantial evidence for sustainable CPR management systems that do not fall into Hardin's simple private versus public (or 'markets' versus 'states') model (Ostrom, 1990; Ostrom, 2010). These resource management systems are based on institutions created by local communities, sometimes over a period of several hundred years (see, for example, McKean, 1992). Hardin's argument therefore overlooks the important role that institutional arrangements can play in resource management outcomes (Feeney et al., 1990; Young, 2002).

The research in this tradition therefore deals with the approaches to resource management that communities and organisations have taken. To a certain extent, it also deals with a related and equally important question – why do certain management systems work well, insofar as they produce economically and ecologically sustainable outcomes? In this thesis, I intend to explore various topics centred on this core question. In particular, I am interested in

identifying the 'factors' that characterise 'successful' natural resource management systems. At this stage, I should clarify what exactly I mean by these various terms. A resource management system (also referred to as a resource management initiative, plan, regime or scheme at various points in the thesis) is the regulatory and organisational framework that determines how a natural resource is used. Thus, it is analogous to the community institutions investigated by Ostrom and others. It also refers to a policy instrument like the European Union's (EU) Common Fisheries Policy (CFP), including organisations like the European Commission (EC) and the International Council for the Exploration of the Sea (ICES) that contribute directly to the CFP. The 'factors' which I mention are best thought of as the attributes or characteristics of the management system and the resources affected by the system. They shape the way the management system functions and therefore influence management outcomes. They provide at least part of the answer to the question, 'Why is a particular resource management system successful or unsuccessful (in economic and ecological terms)?' Factors therefore have explanatory power.

A simple example should illustrate further what I mean by 'factor'. Consider a well-known fisheries management system like the CFP. The CFP's regulatory framework determines how fish are allocated amongst European fishermen, and how, when and where these fishermen are allowed to catch those fish. One aspect of this regulatory framework is the mechanism that determines how annual quota is set. In the CFP's case, quota recommendations are first made by ICES, then passed on to the Commission for review, and finally brought before the Council of Fisheries Ministers for final agreement. In previous years, this process has been characterised by political wrangling. Quota recommendations have been watered down at each stage. Although this has appeased fishermen, it has meant that the quota for some fish stocks has exceeded biologically sustainable limits. Thus, politicisation is a factor that characterises the CFP and explains to some extent why it has failed to produce ecological sustainability in European fisheries. More subtly, the particular way in which the CFP's quota mechanism is arranged – with ICES the first step in a decision-making hierarchy that ends with the Council of Fisheries Ministers – is also a factor that can help us understand the CFP's failures. Indeed, it is possible that the manner in which the decision-making hierarchy is arranged is what leads to the politicisation observed during the quota setting process.

There is a danger of confusing the meaning of 'factor' as it is used in this thesis with other similar terms like 'variable'. To a certain extent, the two might be used interchangeably (although I do not do so). However, it is worth emphasising some of the differences that exist between 'variables' and 'factors' as they are understood here. Firstly, a factor – unlike a variable – does not necessarily vary within a management system or across people. For instance, the particular hierarchical structure of the CFP's quota mechanism (described above) is fixed. It is therefore not a variable precisely because it does not change (unless, of course, the CFP is reformed). Secondly, a factor can be present or absent as well as varying in degree. Conversely, a variable must have a value (usually numerical, but also categorical). But it is meaningless to assign values to many factors. For example, political economic considerations can often influence management outcomes, but do not lend themselves to categorisation or quantification. 'Factor' is therefore a broader term than 'variable', and more appropriate in summarising the range of things that influence resource management outcomes.

It is also important to distinguish between 'factors' and words like 'attribute', 'characteristic', 'criterion' and 'feature'. In this thesis, attributes, characteristics and features are used interchangeably to describe the nature of organisations, people, processes and resources. They do not have the same status as factors, however, in part because the things that they describe have less explanatory power than factors. 'Criteria' are used differently to attributes, characteristics and features, and refer to things that require satisfaction if a particular desired outcome is to be achieved. For instance, achieving effective cooperation may depend on the criterion of having regular communication between cooperating parties (Cardenas et al., 2011).

Thus, 'factors' like the ones that characterise the CFP's quota setting system may hold the key to designing, implementing and operating resource management systems that ensure natural resource sustainability and guarantee a long-term livelihood for those who depend on natural resources. Unsurprisingly, there is an extensive literature that focuses on a large range of important and putatively important factors (Wade, 1988; Ostrom, 1990; Baland and Platteau, 1996). Although this literature uses a variety of different terms for 'factors' – 'facilitating conditions', for instance, or 'contextual' and 'micro-situational' variables – the

focus is the same[1]. Indeed, the term 'factor' appears in other research projects (Agrawal, 2002). More importantly, the literature has 'yet to develop fully a theory of what makes for sustainable CPR management' (Agrawal, 2001). Contributing to the development of such a theory provides us with a point of departure for the research outlined in this thesis.

Through two case studies, I aim to identify and to understand in greater depth some of the factors that may influence the success or failure of resource management systems. The first case study focuses on a 'comprehensive environmental plan' (hereafter, 'PIECAS', to use its Spanish acronym) for the Paraná River delta in Argentina; the second case study is an investigation of an 'individual fishing quota' (IFQ) system for the Alaskan Pacific halibut (*Hippoglossus stenolepis*) fishery (hereafter, the halibut fishery or fishery). These two resource management plans are nested in and are part of wider social-ecological systems (SESs). A SES is an ecological system that is 'intricately linked with and affected by one or more social systems' (Anderies et al., 2004). It is possible that factors important to the success of a management system relate to both the ecological and social components of a SES. For instance, the life-cycle of a fish species – a factor that concerns the ecological side of a SES - has significant implications for the way in which the species is managed. The fish species may migrate across multiple jurisdictions, in which case the success of the management system in question may depend on the extent of jurisdictional coordination. Of course, if one considers factors nested in both the ecological and social components of a SES, the number of potentially important factors is significant. In this thesis, therefore, I limit the scope of research and focus on factors associated with the social systems in each SES. I pay less attention to factors related to the ecological side of SESs.

The resource management systems that form the case studies are themselves largely distinct in both biological and socio-economic terms, and therefore contrast one another. Crucially, however, the outcomes in the Argentine case study have to date been largely unsuccessful, while the outcomes in the Alaskan case study are generally regarded as a resounding success. Consequently, the plans represent suitable cases for the identification of factors associated with success or failure in resource management. Furthermore, they have a number of features in common. In both cases, the governance architecture of the management systems is similar. Equally, the perceptions of those affected by the resource management systems may have

[1] Arguably, the terminological diversity that characterises the CPR management literature is a weakness. It is often unclear what level of explanatory power an attribute has compared to a facilitating condition, say.

similar consequences for management outcomes irrespective of the differences in their socio-economic attributes. For instance, people's views on the legitimacy of government management authorities and the management plans themselves may shape outcomes in both the Paraná River delta and the Alaskan halibut fishery.

In the second half of the thesis, I build on the analysis presented in the two case studies and focus on a specific factor – legitimacy – that appears in both case studies. Legitimacy is recognised as an important factor in the CPR management literature (see, for instance, Ostrom, 1998; Tang and Tang, 2001; Berkes, 2002; Paavola, 2007; Pinkerton and John, 2008), but is only lightly explored. However, it has significant ramifications for compliance with management regulations (see, for instance, Karper and Lopes, 2014, although Ramcilovic-Suominen and Epstein (2015) find otherwise). It is also a factor that is relevant at multiple governance levels. For instance, it is as reasonable to talk about the legitimacy of international environmental regimes as it is the legitimacy of a community-based management system. Legitimacy is therefore a factor of interest whether a management system operates at a local, regional, national or international level.

Questions of legitimacy also tie in neatly with state involvement in management systems (and so are linked to Hardin's 'markets' versus 'states' model). In particular, state-led management of a CPR or SES brings into focus issues of political authority and power (Bernstein, 2005). The distribution of power in a state-led management system is certainly different to the distribution of power in self-governance situations (Paavola, 2007). As a result, it is perhaps fair to say that legitimacy is an inescapable and central concern whenever the state is involved in managing natural resources. Furthermore, there is a sense that a lack of legitimacy in state-run management systems opens the door to alternative management arrangements like private property allocation and community-led systems.

Thus, there are a number of good reasons to believe that legitimacy is an important but under-studied topic in the CPR and SES management literature. One area in which our understanding seems particularly limited is how or why a management system becomes legitimate or illegitimate. I therefore start the second half of the thesis by asking what characterises a legitimate versus illegitimate management process. My approach is similar to previous work in the CPR management and collective action literature on trust, which suggests that trust emerges when certain 'micro-situational attributes' are satisfied (Ostrom,

1998)[2]. In a related way, I argue that a legitimate process or legitimate rules emerge when certain criteria are satisfied. I develop a framework that identifies four specific criteria that, if present in a process or characterising a set of rules, increase the likelihood that they are perceived as legitimate. These criteria serve a 'legitimation function'. The framework is therefore a legitimation function framework.

The legitimation function is theoretical, although it is based in part on empirically derived findings from the literature. Nevertheless, the framework has more than mere theoretical value; it also helps us to understand legitimacy in empirical settings. Thus, I apply the framework to the two case studies in order to see if it explains the perceptions of legitimacy observed in both PIECAS and the fishery. Although it is difficult to prove that the satisfaction of the legitimation function is indeed the cause of people's perceptions of legitimacy in resource management systems, I believe that the picture developed in the framework has explanatory power and is a valuable contribution to a more complete theory of sustainable CPR management. The framework certainly improves the precision with which we talk about legitimacy in resource management contexts.

Understanding the relationship between legitimacy and the particular features of a resource management system is also important because it has policy implications that, at a practical level, justify this research. In particular, identifying specific criteria that, if satisfied, can make resource management systems legitimate may improve our ability to design and implement management systems with which stakeholders are likely to comply. But caution is required in applying these lessons because the conclusions on which they are based are drawn from two case studies rather than a more representative sample. The arrangements that produced positive results in one case study may therefore have negative outcomes in different settings (Young, 2002; pg. 10). Nonetheless, the suggestions made are an important first step toward a more complete understanding of legitimacy in resource management contexts and point to avenues for future research.

Thus, the uniting theme of this thesis is a concern with the specific factors that shape effective resource management. The thesis' contribution is to help us build a more complete picture of these factors, and one factor in particular - legitimacy. In this sense, the thesis may

[2] Using the definitions I outlined earlier in the introduction, these 'micro-situational attributes' might be considered criteria that require satisfaction if trust is to develop.

have predictive or diagnostic value. The legitimation function framework it develops may indicate why, in a practical sense, a resource management system is or is not legitimate. Equally, it may guide the efforts of resource managers in designing resource management systems that are likely to be legitimate. In light of this introduction, I now summarise the aim of each chapter that follows.

1.1 Chapter overview

Chapter 2 outlines the methodology used in this research project.

Chapter 3 is an attempt to identify factors that are associated with successful and unsuccessful outcomes in resource management schemes. The chapter begins with a description of the development and application of frameworks for analysing institutional arrangements concerned with the management of CPRs and SESs. These frameworks are useful in an analysis of resource management systems because they decompose the systems and the wider SESs in which they are nested into their constituent parts. The chapter applies one framework in particular - the SES framework (Ostrom, 2009a) - to PIECAS and the halibut fishery. Following the framework, each of the management systems is broken down into its component parts, in order that we might have a detailed description of each system that is grounded in the literature. Subsequently, I use qualitative data collected during field work in Argentina and the United States to identify the factors that have ostensibly contributed to the success and failure of, respectively, the fishery and PIECAS. Where possible, these factors are mapped to the SES framework. In some cases, however, an exact match is meaningless because the factor identified has explanatory power beyond the mere descriptive power of the 'variables' (Ostrom's term, used in much the same way that I use 'attributes' or 'features' in this thesis) in the framework. The implication is, perhaps, that the SES framework is not a diagnostic tool in the way originally conceived by Ostrom. The validity of the conclusions drawn from the qualitative data is corroborated as far as possible with survey data. The chapter closes with a hypothetical explanation for the outcomes in each plan that is based on these previously identified factors.

The chapter is limited insofar as it does not explicitly consider factors linked to the ecological systems in each case study. This is attributable in part to methodological constraints; the data used in the chapter are drawn from semi-structured interviews and surveys rather than the

ecological methods that would be more appropriate for identifying important ecological factors. Nonetheless, the chapter builds a detailed and plausible explanation of the outcomes observed in each case study. It also identifies a factor – legitimacy – that seems to play an important role in the resource management outcomes of interest.

Chapter 4 – 'Legitimation function – a framework' – takes as its starting point the identification in chapter 3 of legitimacy as a factor of apparent significance in the two case studies. It attempts to fill a gap in the literature, which has neglected to explore legitimacy in resource management contexts in real depth and left a number of unanswered questions. Most importantly, it is unclear how a resource management system becomes legitimate or illegitimate. The chapter addresses this research gap by developing a framework that suggests legitimacy is an outcome produced when certain criteria are satisfied during a process or in a set of rules. It argues that the satisfaction of these criteria makes it more likely that a resource management process will be legitimate, without actually guaranteeing legitimacy. The criteria are therefore necessary but minimum conditions for the emergence of legitimacy. I have identified four key criteria in the legitimation function: communication, participation, procedural fairness and trust. These criteria do not exist in isolation; instead, there is some interaction and overlap between the criteria that is reflected in the framework.

Of course, the legitimation function framework joins an already extensive literature on legitimacy, notably from Habermas (various works) and Weber (1922). Indeed, a possible charge against the framework is that it is analogous to existing work. However, I would like to emphasise the ways in which the legitimation function framework makes an original contribution of its own. Firstly, the context in which legitimacy is explored by authors like Gramsci, Habermas and Weber differs significantly from the context of this thesis. All three of these scholars explore themes in political philosophy and political theory. Habermas is concerned with the legitimacy and legitimation of political orders, while Weber discusses the 'grounds' on which 'legitimate domination' (that is, legitimate authority) rests. Similarly, Gramsci investigates hegemony and 'securing popular consent for the state's use of coercion' (Steedman, 2004). The philosophical slant of this work is in contrast to the functional perspective taken in the framework. The framework conceives of legitimacy as an outcome that is desirable and that is contingent on achieving specific criteria. These criteria are relevant to the practical elements of natural resource management in a way that abstract philosophical work is not.

The functional perspective implicit in the framework suggests that it is possible to be deliberative about legitimacy in a resource management context, even if legitimacy is relatively difficult to define and measure. Certainly, my observations in chapter 3 and my analysis in chapter 5 corroborate this point of view. As a result, it is feasible to consider legitimacy when designing a resource management system. Put another way, it is plausible to design legitimacy into a resource management system. This conclusion is perhaps surprising when cast against previous scholarly research that emphasises a range of factors other than legitimacy that should be included in a resource management system's design. Indeed, if we place the scholarly nature of this research in the context of the success or failure of resource management systems, it is a reasonable assumption that any such system that does not produce decisions that are legitimate – at least in the eyes of key stakeholders - will ultimately fail. As such, the ability of a resource management system to satisfy what I mean by the legitimation function is of first (rather than second) order importance. This is a conclusion that has not been drawn in other research projects, and arguably ought to be emphasised more strongly.

Chapter 5 uses the legitimation function framework developed in chapter 4 to understand the legitimacy (or lack thereof) of the two resource management case studies. The chapter shows how the features that characterise each resource management plan may have satisfied (or failed to satisfy) the four legitimation function criteria and therefore contributed to a perception that a plan was or was not legitimate. The assertions made in the chapter are based on a combination of document analysis, and interview and survey data. The chapter therefore relates empirically derived observations about the legitimation criteria in the two resource management systems to observed legitimacy outcomes, although it does not claim a full causal link between observations and outcomes.

Chapter 6 – 'The influence of exogenous factors on legitimacy' - addresses a problem with the legitimation function framework, namely that perceptions of a resource management system's legitimacy may have more to do with exogenous factors than the legitimation function criteria themselves. For instance, it is possible that previous negative experiences with government may colour one's view of subsequent government interventions to such an extent that they are all illegitimate. The case studies do not explore exogenous factors in any depth, and are therefore less useful in exploring the problem at hand. Instead, I employ a meta-analytic approach to ask whether particular exogenous factors characterise legitimate

and illegitimate resource management systems. An interesting finding that arises from the meta-analysis is that the extent to which a resource management system accounts for or reflects an exogenous factor is more important than then exogenous factor *per se* in shaping legitimacy. In this respect, the meta-analysis corroborates the idea first presented in chapter 4 that the design of a resource management system is crucial when it comes to legitimacy. Furthermore, it confirms that legitimacy itself is of fundamental importance to a resource management system and the outcomes it produces. Where legitimacy resonates in a particular management scheme, the scheme is more likely to be successful.

Chapter 7 concludes the thesis. In addition to summarising the research project's main findings chapter-by-chapter, I reflect on the important of non-technical factors like legitimacy in resource management. I also consider the policy ramifications of my conclusions. Although the legitimation function framework might superficially appear a panacea for legitimacy problems in resource management systems, I caution that it can be misused. In particular, it can be used by resource management organisations as a justification for management decisions, even if those decisions are in reality questionable from both a legitimacy perspective and a sustainability perspective. Overall, however, I hesitate to draw an overriding conclusion. If there is one, it is perhaps that the sum of the chapters points toward the utmost importance of legitimacy and appropriate design in resource management system. Continuing to build on our understanding of what constitutes a legitimate and well-designed system would therefore seem a worthwhile path to pursue by the research community at large.

Chapter 2 Methodology

The aim of this chapter is to describe not only the procedure used to produce this thesis, but also the trajectory that the thesis followed during its development. The chapter therefore details the processes used to generate and interpret data, as well as the intellectual pathway along which the thesis travelled. I begin by outlining this pathway, in part because it provides some context with which to understand the research's subsequent evolution.

2.1 Developing the thesis

The common thread throughout the 'journey' that this thesis represents was an interest in the relative performance of different resource management systems. It is puzzling that some resource management systems are apparently so superior to others, especially when one considers that the basic approaches to managing natural resources (command-and-control, market-based approaches and community-organised approaches) are well-established. Furthermore, obvious explanations for differences in performance like variations in human capital are unsatisfactory. For instance, the CFP is widely regarded as a model of how not to manage fisheries resources, even though the EC has extraordinary human capital.

In the context of these themes, I initially undertook a wide-ranging literature review. I investigated a variety of approaches to managing natural resources, including command-and-control and market-based approaches like water markets. As the literature review progressed, I became interested in integrated resource management (IRM) schemes. IRM schemes appeared to offer a solution to the sustainability problems from which other, more traditional approaches continued to suffer (Bellamy et al., 1998). Moreover, IRM was a form of management which the United Nations (UN) in particular had promoted heavily. Thus, there seemed to be good reason to concentrate on IRM and to try to understand what factors made for successful IRM. Given the claims made about IRM, I believed that successful IRM schemes were likely to be superior to existing approaches like command-and-control.

Initially, I carried out a review of the IRM literature. As the review progressed, I found that I was analysing case literature on integrated catchment management (ICM) and integrated water resource management (IWRM). In this vein, I attempted to identify factors that seemed to characterise successful IRM schemes. My analysis led me to develop a set of 16 broad factors that were found in successful cases. I used a meta-analytic approach that inspired

some of my subsequent research. The overriding conclusion from the analysis of these case studies was that IRM did not actually constitute a meaningful or novel approach to natural resource management. Instead, IRM seemed to be a 'buzzword' that could be applied to conventional centralised or market-based approaches to water management (or in some cases, no tangible management at all). Far from being a superior approach or a panacea to problems with existing forms of management, I concluded that IRM was too abstract and poorly defined to produce positive, specific and tangible outcomes.

My conclusions led me to believe that it was worth pursuing research in traditional resource management approaches. Nevertheless, there were a number of positive outcomes from my investigations in IRM. Firstly, my analysis of IRM case studies had given me an impression of the factors that might contribute to successful resource management systems. The picture developed informed the interview questions I asked during my field research. Secondly, a paper on the research was accepted for presentation at the 13th International Conference on Environmental Science and Technology in Athens, Greece. Finally, and most importantly, the dead-end that IRM research represented encouraged me to pursue a different path for the thesis. I decided to adopt a case study approach, which ultimately led me to PIECAS and the halibut fishery. Appendix A contains an abridged version of the original IRM research.

Case study research was still consistent with my primary research objective (to identify and to understand the factors that characterise successful versus unsuccessful resource management systems). I aimed to offer an explanation for the outcomes observed in each case. The results of this research are presented in chapter 3. Through the case studies, I was able to identify a set of factors that had significant explanatory power. It also pointed toward another avenue for research - were there lessons that I could draw from the case studies and existing literature about the 'minimum criteria' that a resource management system had to satisfy to be successful? These criteria represented the lowest threshold which a resource management system had to clear in order to lead to sustainable outcomes. They were therefore not necessarily sufficient for sustainable resource management.

I quickly realised that this research initiative was problematic. Firstly, there was disagreement on the minimum criteria themselves. For instance, I initially suggested that not paying resource managers and establishing fixed terms for their service was one way to avoid politicisation of resource management decisions. However, without an income from resource

management, one has to consider what motivation resource managers have to make good decisions. In addition, fixed terms mean that there is no long-term accountability for the decisions that are made. Secondly, it was difficult to develop a list that was comprehensive and in which the criteria identified were indisputably required for sustainable resource management. Finally, I was introduced to Ostrom's SES framework and her design principles (Ostrom, 1990; Ostrom, 2009a). These design principles are characteristics that help to explain the success of long-lived and enduring resource management institutions (Ostrom, 1990). I concluded that this literature represented a better approach to understanding underpinning 'success' criteria than the minimum criteria framework.

The observations I had made during my field work also suggested that focusing on a single factor might prove as worthwhile as focusing on a comprehensive assessment of factors in the manner of the minimum criteria framework. Legitimacy had played an important role in both PIECAS and the fishery, and in addition it was not included in Ostrom's design principles or the SES framework. Furthermore, the superficial treatment afforded legitimacy in the literature suggested that there was a research gap around legitimacy in resource management contexts. These observations were a point of departure for the investigation into legitimacy that makes up the second half of the thesis. There were three clear research questions to consider:

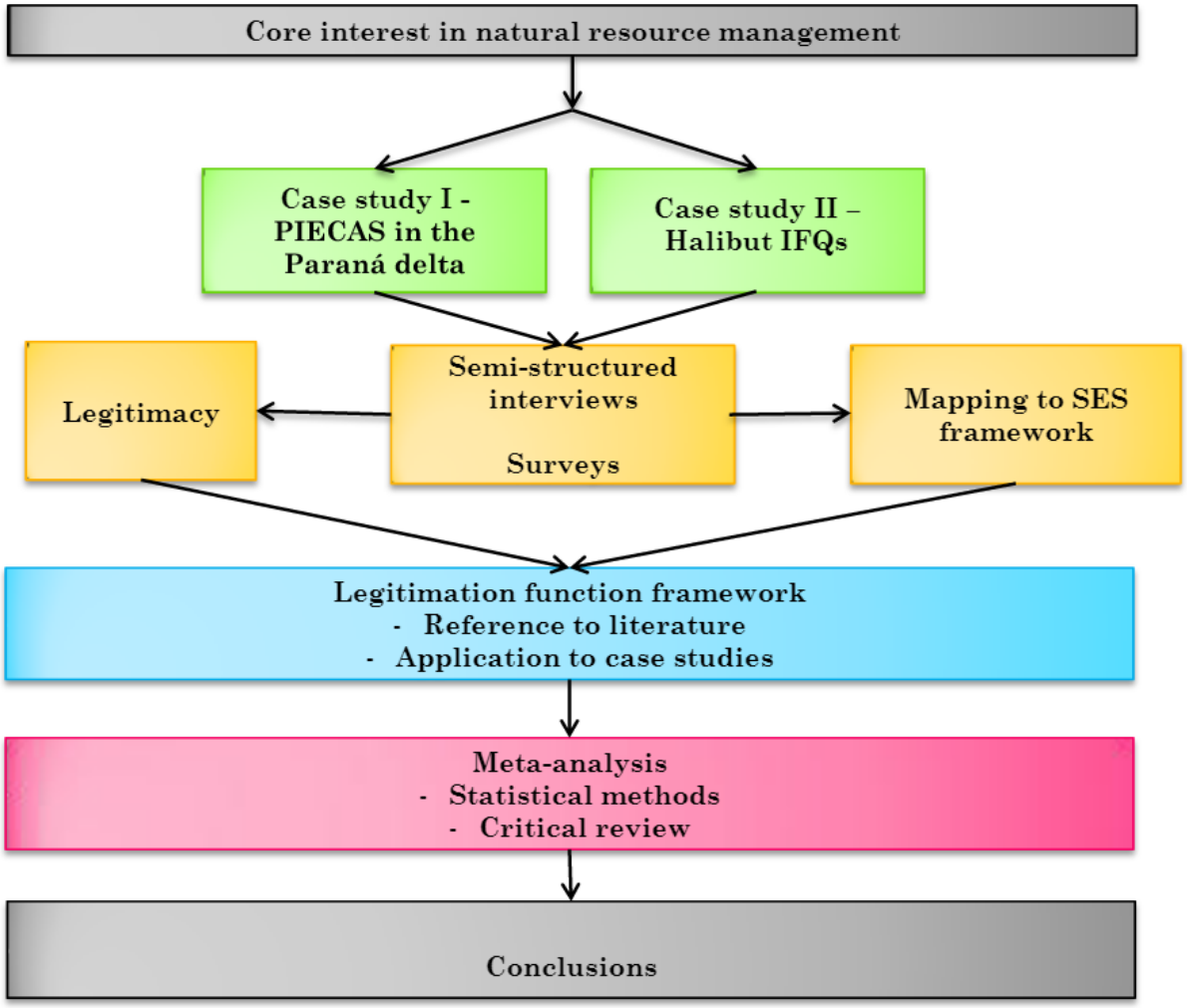
1. What, if any, criteria must be satisfied to make a resource management system legitimate?
2. Do both case studies satisfy the criteria that make a resource management system legitimate?
3. The legitimacy of a resource management system may depend on factors exogenous to the management system itself. Are there particular exogenous factors that characterise legitimate or illegitimate resource management systems?

Chapters 4, 5 and 6 address each of these questions in turn. Chapter 4 develops a framework (the legitimation function framework) that helps us to understand the criteria that underpin legitimate (or illegitimate) resource management systems. The legitimation function framework is validated by reference to existing literature rather than data, as the theorised legitimation criteria have not been previously analysed by reference to case study evidence. The legitimation function framework is used in chapter 5 in dialogue with interview data and

survey data to demonstrate why perceptions of legitimacy in the two case studies differ significantly. Chapter 6 explores the third and final research question, and suggests that exogenous factors can affect legitimacy when they are reflected in management systems.

Figure 1 below outlines the broad methodological structure of the thesis. The methodology has three components: case studies, which are found in chapter 3; a theoretical analysis of legitimacy and legitimation in chapters 4 and 5; and a meta-analysis in chapter 6.

Figure 1. Methodology schematic.



2.2 Case study selection and justification

Choosing locations for fieldwork was shaped by considerations related to the thesis' research question, and by more prosaic reasons like the accessibility of interviewees and the avoidance of unresolvable language barriers in view of the resources available for the research. The

primary criterion for case study selection was that the resource management systems under analysis had produced outcomes that were contributing in either a positive or negative way to the sustainability of the resource under management. In this context, a successful system was one where a CPR or SES was being exploited sustainably. The rationale for focusing on the sustainability of the resource was that other criteria for success – the perception that a system was benefitting stakeholders, for instance – were not necessarily conducive to the long-term health of a system and the people who relied upon it. Stakeholders might believe that a resource management system was highly successful because it had increased their incomes, say, even though the system was leading to the destruction of the very resource upon which their incomes depended.

In choosing case studies, I was conscious of avoiding 'perfectly' successful resource management schemes. There is a tendency in the literature to focus almost exclusively on instances of success, even though cases of failure are likely to provide as many valuable lessons. Furthermore, the selection of perfectly successful schemes is unrepresentative and would not have tackled evidence of what characterises schemes that are moving in an apparently unsustainable direction (of which there are doubtless a significant number). As such, I chose case studies that I anticipated were likely to be 'imperfect'. These resource management systems had challenging backdrops and demanding management objectives. What evidence there was suggested that the US IFQ scheme had had some successes, while PIECAS had had limited success and a number of difficulties and setbacks. Thus, I did not select schemes that were complete successes or complete failures.

The types of CPR or SES under management, or indeed the type of management system, were less important as selection criteria. The rationale for this was twofold: firstly, I was interested in seeing whether there were factors that were common to resource management systems irrespective of the type of resource or system; and secondly, I did not believe that a comparative case study approach would necessarily contribute to a greater understanding of the factors that underpinned successful or unsuccessful resource management systems any more than a simple case study approach. Identifying common factors in otherwise distinct systems was one way to overcome the lack of generalizability that usually applies to case studies, because the presence of these factors could not be attributed to one specific resource or management approach. This is not to say that the findings from the case studies are generalizable. Instead, it suggests that there is an increased likelihood that these factors are a

fundamental component of resource management systems generally, rather than a component of fisheries management systems, say, or wetlands management.

In addition, I felt it was important that I spoke the language of the people involved in my cases. I believed that too much would be lost in translation during interviews if I had to rely on an interpreter. That limited possible cases to the English and Spanish speaking worlds. Secondly, I needed to choose cases where it would be possible to contact and interview a wide range of stakeholders. This required cases where I had local contacts and/or stakeholders' contact details were easy to find.

With these criteria in mind, a number of potential cases emerged. However, two cases – PIECAS in the Paraná delta and the US IFQ halibut fishery – appeared to be good matches. PIECAS was an interesting example of a resource management system in which success and failure hung in the balance. The plan was relatively new, and it might therefore prove difficult to discern specific outcomes attributable to it. But it was clear that the plan's design process had been challenging and had not yet led to the development of specific measures to prevent degradation of the delta's wetlands. Moreover, there was a sense that the plan was in stasis; efforts at pushing it forward to implementation appeared to have stalled or were apparently receiving little attention. PIECAS therefore seemed to be a suitable example of a resource management system that faced a number of obstacles but might still prove successful in due course. Finally, I was put in touch with an environmental NGO in Buenos Aires who had worked in the Paraná delta and would be able to provide me with the contact details of stakeholders involved in the plan. I therefore had a sample of stakeholders for interview whom I could approach without too much difficulty. These stakeholders were all Spanish speakers, and so I would be able to interview them in their own language.

The second case study – IFQ management in the halibut fishery – was generally recognised in the fisheries management literature as a successful management system that had improved outcomes in the fishery relative to the previous derby fishery system (see Grimm et al., 2012). This view was based in part on the dramatic transformation that a move to IFQ management had engendered in the fishery. (More details on the impact of IFQs follow in chapter 3, section 5.) Most of the changes in the fishery were positive, including an increased likelihood of stock sustainability. However, the introduction of IFQs had also had a harmful socio-economic impact on rural communities in Alaska. Many people in these communities

relied on fishing but had been forced to leave the industry on account of economic pressures produced by IFQs. Halibut IFQs were therefore an imperfect solution to the fishery's problems, even though the balance of success or failure probably tended toward success. In addition, I was confident that I would be able to find people for interview because the literature and common-sense indicated which organisations and stakeholders I should approach. For instance, it was obvious that I would ideally speak to fishermen and fish processors during the fieldwork. The contact details of many of these people were easily accessible through the Internet. Finally, doing research in the United States meant that there were no language barriers to overcome.

Many of the features that made the American halibut fishery an attractive case also applied to the Canadian halibut fishery. My decision to focus on the American rather than the Canadian halibut fishery was due to the greater ease of contacting stakeholders in the former than the latter. I had contacts at the University of Washington in Seattle, which coincidentally was the homeport for part of the halibut fleet and the city in which the International Pacific Halibut Commission (IPHC, one of the fishery's key management organisations) was headquartered.

The halibut fishery had one other feature that made it an attractive case study: it had undergone a natural experiment when the management system changed from a derby approach to an IFQ approach. Changes in the fishery subsequent to this management shift were likely to be attributable to the new management system, rather than other factors like climate which would presumably have stayed constant. It would therefore be possible to compare changes in the management systems and to connect these changes to newly observed outcomes. In turn, this comparison might reveal something about the factors that were contributing to these outcomes. Thus, the natural experiment that had taken place in the fishery provided an additional means to understand the factors that had contributed to the IFQ system's success.

Of course, the two cases imposed limitations on the research strategy. Although (as mentioned) I was less interested in a comparative analysis, the two cases were so different that it ruled out a comparative approach entirely. PIECAS is a 'comprehensive' management plan for a large river delta and wetland system, while IFQ management concerns a single-stock fishery. Naturally there are key differences in the biodiversity and ecology of both systems, and in the demographic and socio-economic characteristics of associated

communities. There are also important institutional differences between Argentina and the United States, particularly in respect of rule of law (weak in the former, generally strong in the latter) and institutional stability. For instance, Argentina has a more recently troubled past than the United States, with a military dictatorship between 1976 and 1983 that was responsible for the deaths of tens of thousands of Argentine civilians.

However, the two cases were similar in one important respect – the structure of the governance architecture in both resource management systems was comparable. This idea is explored further in chapter 3, but in general terms both PIECAS and IFQ management involve analogous organisations that operate at equivalent governance levels. Indeed, the similarity in governance architecture provides further justification for the case study selections. Issues of governance and scale link PIECAS and the fishery and in that sense make the systems more relevant to one another than might originally appear to be the case.

2.3 Stakeholder identification

Interviewees were selected by targeted sampling. For interviews relating to PIECAS, I contacted an environmental NGO based in Buenos Aires and asked them to name other individuals involved in PIECAS or individuals with expertise in the delta (Oppenheim, 2000). The environmental NGO initially contacted was the 'Fundación Ambiente y Recursos Naturales' ('FARN'). FARN is one of the largest environmental NGOs in Argentina. Between July 2009 and December 2010, it led an environmental project in the delta in collaboration with the National Environment Secretariat (the Argentine government's environmental bureaucracy), local universities and other NGOs.[3] Arguably, FARN's size and prior experience in the delta meant they were well placed to identify other stakeholders for interview.

For interviews relating to the halibut fishery case study, I contacted an academic at the University of Washington's School of Aquatic and Fishery Science who had previously researched IFQs. I also contacted scientific staff at the IPHC. As with FARN, these interviewees were well placed to advise me on other people to approach for interview because of their expertise in the fisheries of Alaska and the Pacific north-west.

[3] More information is available (in Spanish) from: http://www.farn.org.ar/areas/conservacion/delta-del-parana

Of course, there are limitations with the targeted sampling methodology employed. Most importantly, the choice of 'seed' interviewees can introduce a bias that shapes the identity of subsequent interviewees. This bias may explain the relative over-sampling of NGO respondents and academics in the PIECAS case study and the halibut fishery case study, respectively. However, other studies have found that non-governmental actors are the primary participants in the Paraná delta's governance subsystem specifically (see, for instance, Scholz et al., 2014). More generally, targeted sampling was an appropriate method given my unfamiliarity with both study areas and the identity of relevant stakeholders.

Another issue with the targeted sampling used in both case studies is that the final sample size for both case studies is small (n = 14 in the Paraná delta and n = 12 in the fishery) and unrepresentative. The sampling procedure is also difficult to replicate. These limitations are, to a certain extent, unavoidable in qualitative research. The number of respondents one can approach for interview is constrained by time and the respondent's willingness to be interviewed. Indeed, targeted sampling is serendipitous in terms of who is identified for interview and who replies. Furthermore, it is not always possible to estimate with confidence what sample size constitutes a representative sample. These issues all applied to the targeted sampling used in both case studies.

2.4 Data collection

Data for both case studies were collected using qualitative methods, including semi-structured interviews, participant observation and secondary sources. For PIECAS, I conducted 13 semi-structured interviews with key stakeholders or experts on the delta in April and May 2013. Most of these interviews took place in Buenos Aires, Argentina, although five were held in La Plata, the Lechiguanas Islands and Rosario. I subsequently carried out 2 more semi-structured telephone interviews in June 2014 from London. One of these interviewees I had previously interviewed in Argentina; the other was a new interviewee. For the halibut fishery case study, I conducted 11 semi-structured interviews in June and July 2013 in Seattle, United States. One further telephone interview took place in June 2014, from London.

Semi-structured interviews typically begin with general or open questions, before moving toward more specific issues. These issues are raised either because they are included in pre-

planned questions, or because the interviewee has mentioned them. Interview questions therefore serve as a guideline for the flow of the interview, without constraining the conversation in any way. Thus, the interview proceeds in concert with the interviewer's questions and the topics discussed by the interviewee.

I followed this format in all the semi-structured interviews I conducted. I had prepared questions in advance of the interviews. Given my lack of knowledge of both case study systems, formulating appropriate interview questions was challenging. However, I had developed an understanding of at least some of the factors that contribute to the success or failure of a resource management system during my early research on IWRM (see section 2.1). The ideas developed during that research provided me with an impression of important factors in resource management contexts around which I could base my questions. In addition, my reading prior to the fieldwork had indicated which were the key organisations involved in each management scheme. This reading also shaped the development of the interview questions. I attempted to ask each of these questions during the interview, but I asked questions that were unplanned and that depended on the stakeholder's expertise and on the subject of conversation too. Moreover, I was careful to allow stakeholders to talk about topics as they saw fit. Thus, both interviewer and interviewee were provided with the flexibility to discuss other relevant issues. The result was that the interview data provided me with detail on a broad range of topics. This, in turn, helped me to develop a more complete picture of management challenges and processes in both the delta and the fishery. The interview questions for each case study can be found in Appendix A, noting that other dialogue and evidence flowed from *ad hoc* directions initiated by the interviewee.

Most interviews were recorded and subsequently transcribed, and notes were taken at each. In some cases, however, it was not possible to record interviews because they took place outside or in noisy environments where the quality of recording was affected. This was especially true in Argentina, where I often met people in cafés or, in one case, spent the day with them on an island in the Paraná River. Where this occurred, the notes taken at the interview were used as data in their own right. Of course, there is a possibility that note-taking during interviews introduced bias into the data. An effort is therefore made to distinguish between data from recorded and unrecorded interviews in the results. The former are quoted as direct speech; the latter are quoted as indirect speech. Modal interview length

was 1.5 hours; the longest interview lasted just over 2.25 hours. Tables 1 and 2 below list each interviewee, their profession, and their location (where appropriate).

Table 1. PIECAS interviewees.

Interviewee	Profession	Location
♯1	Academic, University of San Martin	Buenos Aires
♯2	Academic, University of San Martin	Buenos Aires
♯3	NGO employee	La Plata
♯4	NGO employee	Rosario
♯5	NGO employee	Paraná
♯6	NGO employee	Rosario
♯7	NGO employee	Buenos Aires
♯8	NGO employee	Buenos Aires
♯9	Employee at forestry organisation	Buenos Aires/Zarate
♯10	Ministry of Agriculture	Buenos Aires
♯11	National Environment and Sustainable Development Secretariat	Buenos Aires
♯12	Buenos Aires Province Office for Sustainable Development (OPDS)	La Plata
♯13	National Agronomy Institute	Campana
♯14	Ministry of Environment and Sustainable Development, Santa Fe Province	Santa Fe

Table 2. Halibut fishery interviewees.

Interviewee	Profession
A	Academic, University of Washington
B	Academic, University of Washington
C	Academic, University of Washington
D	Academic, University of Washington
E	Retired fisherman
F	Executive Director, IPHC
G	Quantitative scientist, IPHC
H	Biologist, IPHC

Interviewee	Profession
I	Pacific Seafood Processors Association
J	Fishing Vessel Owners Association
K	Marine Conversation Alliance (NGO)
L	Fisherman, Alaska Longline Fishermen's Association

I supplemented the interviews with observations made in the field. In Argentina, I attended two meetings where stakeholders discussed topics of relevance to the delta's management. The first meeting took place at the University of Buenos Aires' Agronomy department and discussed insect pests in the delta. The second meeting was convened at the Buenos Aires Province Office for Sustainable Development (OPDS) in La Plata. Various topics were covered, including an initiative for 'sustainable cooperatives' in the delta and efforts to integrate PROSAP (a government body focused on agriculture) with PIECAS. In addition, I was fortunate enough to organise a tour of the middle delta courtesy of a local beekeeper who took me to meet people in the area. As part of that tour, all by boat, I visited a local school and a family of subsistence fishermen. The trip was hugely valuable because it gave me an impression both of the delta's size and remoteness, and the circumstances of many of the people living there.

In Seattle, I collected data at the Nordic Heritage Museum in Seattle, and during informal conversations with fishermen in the Seattle Fishermen's Terminal. These conversations covered a range of topics, including the problems that younger fishermen had encountered as a result of IFQs (notably barriers to entry into the fishery), the high price of halibut quota (one of the causes of barriers to entry) and their views of management organisations. I also made use of data in a 'Report to the Committee to Review IFQs' (Alverson, 1997) and of documents online.

2.4.1 Cross-sectional survey data

In addition to the qualitative interview data, I used cross-sectional survey data on people's perceptions of water management in the Paraná delta to inform my analysis of PIECAS. The data were generously provided by researchers at the University of Wisconsin-Milwaukee, and were collected with surveys administered in 2010, 2012 and 2014. I thank Dr. Ramiro Berardo in particular for providing access to the data, which were collected with the support

of the National Science Foundation (SES-0921461). These surveys were qualitative in nature and covered a large range of stakeholders in the delta, including academics, NGO employees, and public and private sector employees.

The cross-sectional survey data are used both to validate some of the assertions made by interviewees in the PIECAS case study, and to support the argument in chapter 5 concerning the extent to which both case resource management systems satisfy the conditions that make a process legitimate. The data were analysed with Microsoft Excel. In most cases, I sampled those respondents who were involved in PIECAS (n = 26 in 2010, n = 34 in 2012, n = 23 in 2014) and produced bar charts to illustrate the data. I also used two-sample T-tests with unequal variances to determine whether there was a significant difference in stakeholder's perceptions of procedural fairness in PIECAS depending on the rate of their participation in the plan. The results of that statistical analysis are presented in chapter 5.

Of course, the cross-sectional data were collected separately to this research and are not therefore an exact match for the questions explored in chapter 5 and the thesis generally. Nonetheless, they provide valuable detail on stakeholder perceptions of PIECAS and therefore merit inclusion in the analysis as proxies. Furthermore, they have several advantages compared to the qualitative data. Firstly, they are drawn from a large sample and therefore have the advantage of being more representative than the interview data. In addition, the overall sample is large enough (n = 177 in 2010; n = 183 in 2012; n = 202 in 2014) to allow the use of inferential statistics. Finally, although the data are cross-sectional in character, they were collected in 2010, 2012 and 2014. We can therefore track changes in perceptions over time and attempt to link changes in those perceptions to changes in PIECAS's features.

In addition to these data, I prepared two surveys – one for PIECAS, the other for halibut IFQs – which were sent to stakeholders in both systems in 2014. For PIECAS, I contacted stakeholders who I had previously interviewed and asked them to recommend other stakeholders or colleagues who might be interested in taking the survey. I then contacted these people via email with a URL to the survey. I also requested that they pass the survey on to other colleagues if they were able. For the fishery, I contacted two fishery organisations – the Deep Sea Fishermen's Union, based in Seattle, and the Alaska Longline Fishermen's Association, based in Homer, Alaska. I asked that these organisations send out

the fishery survey to their members. I do not know in a definitive sense the total number of people these surveys reached, but I estimate it was in the range of 40 to 100 people. Without a specific figure for the number of people contacted, I have been unable to calculate a response rate. However, I believe that response rates were below 10% because the total number of respondents was low in both surveys. Only 9 people responded to the PIECAS survey, of whom three I had already interviewed (interviewees ♯8, ♯9 and ♯13). For the fishery survey, 12 people replied, of whom I had previously interviewed one (interviewee L). Tables 3 and 4 below outline the survey respondents and their affiliations.

Table 3. PIECAS survey respondents.

Respondent	Profession
Interviewee ♯8	NGO employee
Interviewee ♯9	Employee at forestry organisation
Respondent C	Employee at forestry organisation
Respondent D	NGO employee
Respondent E	Buenos Aires Directorate of Forests and Forestation
Respondent F	Farmer; President, Council of Delta Farmers
Respondent G	NGO employee
Interviewee ♯13	Researcher, National Agronomy Institute
Respondent I	Advisor to Papel Prensa, S.A., and Arauco Argentina

Table 4. Halibut fishery survey respondents.

Respondent	Profession	Affiliation
Interviewee L	Fisherman	Alaska Longline Fishermen's Association
Respondent 2	Fisherman	Alaska Longline Fishermen's Association
Respondent 3	Fisherman	
Respondent 4	Fisherman	
Respondent 5	Fisherman	
Respondent 6	Fisherman	
Respondent 7	Fisherman; NGO employee	The Nature Conservancy
Respondent 8	Fisherman	
Respondent 9	Fisherman	

Respondent	Profession	Affiliation
Respondent 10	Fisherman	
Respondent 11	Fisherman	
Respondent 12	Fisherman	Deep Sea Fishermen's Union

2.4.2 Meta-analytic data

The final source of data in the thesis was derived from a meta-analysis of studies in the fisheries management literature. The meta-analysis methodology is distinct from the approach taken in the case studies. It is covered in significantly more detail in chapter 6, the chapter produced as a result of the analysis. Nevertheless, it is worth briefly summarising the meta-analytic approach taken at this stage. From an original sample of 593 papers focusing on fisheries management, I selected a significantly smaller sample of 26 papers that I subsequently coded. The coding first involved determining whether or not the resource management systems studied in a particular paper were legitimate. Secondly, it required characterising the presence or absence of 15 exogenous factors that might putatively have an effect on legitimacy. The data produced were both qualitative and quantitative.

2.5 Interpreting the data

A key part of the methodology in this thesis – especially in the two exploratory case studies - is a framework developed by Ostrom (2009a) to understand social-ecological systems. Both the halibut fishery and the Paraná delta are social-ecological systems. The framework informs the analysis in both case studies, and again later when I explore legitimacy in resource management systems.

Using the framework to guide the case study analysis had a number of advantages. Firstly, it facilitated what was proving to be a complex task. In particular, it grounded the analysis in a set of variables that reflected the actual constituent parts of SESs. Categorising the interview data on my own was more *ad hoc* and subjective, and therefore less likely to represent accurately the components making up a SES. Secondly, Ostrom's framework is made up only of variables that previous research had shown were important to sustainability in social-

ecological systems.[4] Thus, using the framework in my own research would ensure that my findings were comparable to the existing literature. Furthermore, the framework's extensive empirical foundation increased my confidence that the variables identified therein, and the relationships between variables, were indeed important to a SES's sustainability.

Ostrom's framework is a component of the methodology not just in the case studies, but in the exploration of legitimacy that flows from them. In chapters 3 and 4, legitimacy is seen as an attribute of many second- and third-level variables in Ostrom's framework. (Note again that variable is the term Ostrom uses in her framework. My doing so should not suggest that legitimacy is no longer a factor in the way I defined it in the introduction.) Legitimacy is a factor that provides second- and lower-level variables with some explanatory power. Moreover, the legitimation function framework developed in chapter 4 fits neatly within Ostrom's framework; it represents a 'framework within a framework'. The legitimation function framework decomposes legitimacy into criteria that require satisfaction if legitimacy is to emerge. In Ostrom's language, legitimacy is broken down into third- and fourth-level variables (although the criteria I identify have explanatory power that some second, third and fourth-level variables do not). Chapter 4 therefore extends Ostrom's framework beyond the second-level variables it presently includes.

In chapters 3 and 4, then, Ostrom's framework guides the analysis by providing for consideration a set of variables that appear to be important in shaping the sustainability of SESs. In some cases, the factors I identify in the case studies map neatly to these variables. Furthermore, the framework gives some indication of the way that variables are related to and influence one another. This may tell us something about the way in which the factors in the case studies interact. Thus, Ostrom's framework is a key part of the theory that informed the development of knowledge in this thesis.

2.6 Criteria for judging the quality of research

Yin (2009) developed a set of criteria that are useful in assessing the quality of case study research. According to Yin, there are four tests that effective case study research satisfies. These tests are outlined below (following Glatzel, 2013):

[4] I have used 'variables' in this discussion in part because that is the term used by Ostrom to describe the component parts of her framework. In addition, not all of these variables are factors with explanatory power in the way understood throughout this thesis.

Test	Methodology
Construction validity	Triangulation Review of draft findings by key informants
Internal validity	Explanation-building Address alternative explanations Pattern-matching
External validity	Use theory and replication
Reliability	Rigour of the case study protocol Develop case study database

Construction validity

I attempted to satisfy the construction validity criterion of effective case study research by 'triangulating' – using converging lines of evidence to support my findings. Yin (2009) describes four types of triangulation: the use of multiple sources of data; the inclusion of multiple investigators in the research process; the use of theory; and the use of multiple data collection methods. This research satisfies at least three of these triangulation techniques. I use multiple sources of data in both my case studies: qualitative interview data, survey data, documents pertaining both to PIECAS and the fishery's IFQ management system, and observations made during conversations and travels in the field. In this respect, I also employ multiple data collection techniques. Finally, I use existing evidence and theory in the literature to corroborate my arguments. Existing work in the CPR management field is especially important in this respect. The other triangulation method – including multiple investigators in the research – was difficult to achieve because I carried out my fieldwork alone. However, I did collaborate with researchers at the University of Wisconsin-Milwaukee, and the product of that collaboration informed my analysis significantly.

In addition to triangulation, I asked two of the stakeholders I interviewed during my fieldwork to review the analysis in chapter 3. One of these stakeholders was Argentine and reviewed the PIECAS case study; the other was a halibut fisher and reviewed the halibut fishery case study.

Internal validity

I attempted to validate my own research ('internal validity') by considering a range of alternative explanations to my findings, especially in chapter 3. I also matched putative explanations to existing results in the literature ('pattern-matching', to use Yin's term).

External validity

One limitation of this research is that many of the ideas I develop require external validation. I go some way toward demonstrating the utility of the legitimation function framework presented in chapter 4 by applying it to PIECAS and the fishery and showing that it helps us understand in detail why legitimacy in the two systems differs significantly. However, only additional research can confirm or reject the generalizability of my ideas. Furthermore, the conclusions drawn in chapter 3 are case-specific and should only be generalised with caution. Nonetheless, it is intuitive that at least some of the factors identified in chapter 3 are relevant to other resource management systems because they concern features that are found in many, if not most SESs. For instance, one of the difficulties facing PIECAS is the delta's fragmented legislative environment. Fragmented legislative environments are possible wherever SESs straddle multiple provincial or national borders, of which there are presumably a significant number.

Reliability

Following Yin, the reliability of my research depends in part on the rigour with which I developed and carried out my case study protocol. Although there are several areas where I believe I could have made improvements, the overall protocol matched the standards found in other doctoral theses (see, for instance, Gezelius, 2002; Glatzel, 2013). Furthermore, and perhaps more importantly, the data used in the thesis were collected using well-developed methods, and, in the case of the interview data, were based on the views of reasonable people with an intimate understanding of the SESs and management systems under analysis.

2.7 Methodology summary

This chapter should provide a clear outline of the trajectory this thesis followed during its development, and the rationale underpinning this trajectory. Moreover, it elaborates the

methodological choices made during the research. Many of these choices are consistent with other research projects in the natural resource management field. However, the methodology has original elements in a number of areas. Most importantly, the legitimation function framework and its application to PIECAS and the halibut fishery is novel. Other research on legitimacy (see, for instance, Tyler, 2001a) uses a methodological approach that correlates perceptions of legitimacy with potentially important criteria like trust, or simply analyses legitimacy in abstract terms. The method in this thesis is distinct from this previous work. A framework approach to legitimacy in resource management contexts therefore constitutes an original contribution in its own right. Furthermore, the framework arguably constitutes an original extension to Ostrom's SES framework. In particular, the core idea implicit in Ostrom's framework – that seemingly complex SESs can be reduced into component parts and therefore made more intelligible – is applied to legitimacy. Finally, the recognition in Ostrom's framework that SES components interact is evident in the legitimation function framework as well. The four criteria that make up the legitimation function influence one another in a variety of ways, and the framework demonstrates that interplay neatly.

Another aspect of the methodology that has some originality is the way in which the case studies are used. Rather than forming the sole component of the methodology – like most research projects – the case studies here are exploratory. The observations made in the case studies inspire subsequent research extensions like the legitimation function framework. Thus, the case studies are not used to test the impact of theoretically relevant factors. Instead, they are used to ascertain which factors might be of theoretical interest in the first place. It is interesting that this exploratory method led me to legitimacy as a key factor in successful resource management, given that it is frequently but superficially covered in the CPR management literature.

Chapter 3 Two resource management case studies.

Keywords: communication, legitimacy, organisations, participation, social-ecological systems.

Many natural resources that require sustainable management to avoid exhaustion are part of wider social-ecological systems (SESs). For instance, a fish stock like the Pacific halibut stock is nested in a larger system that includes social components (a fishing fleet, say) and ecological components (the productivity of the stock, for example). These SESs are complex, and as a result difficult to understand and to manage (Cox, 2011).

In recognition of the complexity inherent in SESs, scholars have developed a number of frameworks that facilitate analysis of SESs. Frameworks are the 'most general forms of theoretical analysis'; they identify a set of variables that can be used in diagnostic or prescriptive analyses (Ostrom, 2011a). These variables should be relevant to any theory describing a particular phenomenon (*ibid*). Frameworks are therefore descriptive tools above all, but can also help in formulating research questions.

Although a number of frameworks focused on SESs and CPR management have emerged over time, two have proved particularly valuable to scholars investigating environmental and other policy questions. The first is the Institutional Analysis and Development (IAD) framework; the second is the SES framework, which is seen as an extension of the IAD framework (Bal, 2014). The SES framework first appeared in two papers by Ostrom (2007; 2009a), and has since been used by a number of scholars. For example, Nagendra (2007) drew on the SES framework to examine drivers of change in Nepalese forests, and Gutiérrez et al. (2011) applied it to identify attributes that appear to lead to successful outcomes in co-managed fisheries. Fleischman et al. (2010) used the framework to classify features that influence disturbance and responses to that disturbance in five communities in Indiana (United States) that own forested lands.

The SES framework conceives of SESs as comprising four 'first-level' subsystems: resource systems, resource units, governance systems, and actors (or 'resource users' in older versions of the framework). These subsystems interact insofar as they influence outcomes in other subsystems and in the SES as a whole. Each subsystem is itself made up of 'second-level

variables', which in turn are composed of third-level and deeper variables (Ostrom, 2009a). ('Variables' is the specific term used by Ostrom, and should not be confused with 'factors' as understood in this thesis.) The SES framework therefore decomposes complex systems into a hierarchy of variables that are progressively more detailed each level down (Cox, 2011). In addition, the framework reflects the economic, social and political environment in which SESs are placed by considering these 'external variables' and their impact on first-level subsystems. Ultimately, the framework is meant to be exhaustive in that it should be possible to classify any variable at some level of the framework (McGinnis, 2010). The variables identified essentially provide a descriptive list of the constituent parts of a SES.

However, the SES framework is limited precisely because it is a purely descriptive tool. Thus, the framework cannot help explain the outcomes observed in SESs, nor can it tell us anything about the factors that are important to producing successful outcomes in a resource management system. Additional frameworks and theories that complement the SES framework are needed if one is to draw meaningful conclusions about the outcomes from, say, a resource management system focused on a SES. A second criticism of the framework is that it provides little guidance in cases where putatively novel second- or lower-level variables are identified. It is unclear if researchers should assume that new variables fall under existing ones, or whether new variables should be added to the framework. Perhaps the only indication that novel variables do merit inclusion in the framework is that the framework is unlikely to be exhaustive in the sense implied by McGinnis. A final criticism is that the framework does not address the issue of changes brought about by interactions in a SES (Bal, 2014). Do interactions change existing sub-variables, or do they generate new sub-variables?

Despite these shortcomings, the SES framework is valuable in three ways in particular. Firstly, it provides the researcher with a list of variables that can be used to organize his or her data in a way that is consistent with other studies also making use of the framework. The framework should therefore help make the findings of research in different disciplines more relevant to and more comparable with one another. Secondly, the framework can be used to structure comprehensive descriptions of particular SESs. For instance, Ostrom (2011b) applied the framework in order to understand irrigation systems in the American West at the turn of the 19th Century. Used in this way, the framework categorises otherwise complex systems and in so doing makes them intelligible. Finally, the framework can assist

researchers in developing research questions by identifying specific variables that might merit investigation.

In this chapter, I use the SES framework to guide an analysis of PIECAS and the halibut fishery. The chapter's overall aim is to identify in broad terms the factors that have contributed to the success and failure, respectively, of these resource management schemes. Some of these factors may constitute second-, third- or lower level variables in Ostrom's framework. A secondary aim is to hypothesise how these factors have led to these outcomes. The SES framework plays an important role throughout the chapter; it is used to organize the data collected for each case study, and to provide a detailed description of the SESs involved in each management scheme. The former is made possible by 'mapping', where appropriate, the factors identified in each case study to second-level variables already included in the framework. However, not all of the factors identified map to second-level variables in the framework. For instance, legitimacy – one of a number of factors that seem to underpin the different outcomes produced by each resource management scheme - is not a second-level variable in the sense implied by Ostrom's framework, because it has explanatory power in a way that otherwise descriptive second-level variables do not. Thus, there is a distinction between factors that have explanatory power and variables in Ostrom's framework – the latter are simply the elements of a SES. The former are, of course, more interesting in the context of this thesis and this chapter because we are concerned with the factors that are important to successful or unsuccessful outcomes in resource management systems.

The two government-led resource management schemes that form the unit of analysis for this and subsequent chapters are the 'Comprehensive Strategic Plan for the Conservation and Sustainability of the Paraná River delta' ('PIECAS'), and a market-based management plan for the Alaskan Pacific halibut fishery. PIECAS was developed by the Argentine government in 2008, following serious agricultural fires in the Paraná delta. However, its development has been fraught with difficulty since its inception. Indeed, the plan has many of the characteristics of a weakly institutionalised governance system (Berardo and Lubell, 2016) and is only just beginning to advance to a stage where implementation is feasible. Thus, the chapter attempts to identify the factors that have caused PIECAS's design to proceed so slowly.

Management of the halibut fishery is based on 'individual fishing quotas' ('IFQs'). Like PIECAS, IFQ management in the fishery was borne out of crisis – but unlike PIECAS, the fishery's governance is strongly institutionalised. It was introduced in 1995 in response to significant difficulties arising from a management plan based on limited-entry and total allowable catch ('TAC')[5] limits. The introduction of IFQs has by and large been a success; it has improved a number of key sustainability metrics relevant to the fishery (see Olson, 2011, for a commentary on the benefits attributable to IFQs in the halibut fishery). However, IFQs have also had a significant socio-economic impact, especially in rural communities in the Gulf of Alaska. I aim to understand the factors that might explain the relative success of IFQs compared to the problems encountered in the limited entry fishery.

The two case studies are exploratory in nature, and the conclusions drawn should be assessed in this context. Furthermore, the two SESs in each case study are too dissimilar to justify a comparative study, although as mentioned in chapter 2 both cases are united by analogous governance architectures. Nevertheless, the findings from the two cases are mutually validating, especially in respect of the importance of legitimacy in resource management systems. The chapter proceeds as follows: in section 3.1, I briefly review framework approaches for the study of CPR management and SESs. Section 3.2 describes PIECAS and the Paraná River delta, and presents the results of my study; likewise, the halibut fishery and associated results from the case study are outlined in section 3.3. The results for each case study comprise the factors that I identify as playing an important role in the success and failure of each management system (the halibut IFQ system, and PIECAS). As the analysis uses Ostrom's framework for guidance, I map these factors against the second-level variables included in the framework where it is appropriate to do so. However, as I explain above, some of the factors identified are not purely descriptive and therefore do not map easily to the framework. Instead, some of these factors may actually fit more closely with Ostrom's ideas on design principles (see Ostrom, 1990). The chapter concludes with section 3.4.

[5] A TAC is the total amount of fish that a fishing fleet can catch in a given management region. For instance, the TAC applicable to the Alaskan halibut fleet in 2013 was 21,810,800 Imperial pounds (lbs) – NOAA Fisheries Service, 2013.

3.1 The Institutional Analysis and Development Framework and other frameworks for analysing institutional arrangements and social-ecological systems.

Frameworks identify the structural variables that are present in most, if not all institutional arrangements, and the interaction between these variables (Ostrom, 2011a). A number of frameworks have been developed over several decades of research. Here, I briefly outline the framework approach to analysing CPRs and SESs. Although this summary is not comprehensive, it should clarify the basic tenets that characterise most CPR and SES frameworks and help demonstrate how the SES framework is a useful tool for categorising the factors identified in the two case studies presented in this thesis.

A notable example amongst the various frameworks used by scholars in analysing institutions, CPRs and club or public goods is the IAD framework developed at the Workshop in Political Theory and Policy Analysis at Indiana University, Bloomington by Nobel Prize winner Elinor Ostrom and colleagues (Ostrom, 1990). The focal point of the IAD framework is an 'action situation'. Action situations are the 'social spaces in which individuals interact, exchange goods and services, solve problems, dominate one another, or fight…' (Ostrom, 2011a). A pattern of interactions and outcomes flows from any given action situation. An action situation itself has various constituent parts, most notably the actors involved in the action situation and their particular attributes. These actors occupy specific positions, and in turn actions are assigned to these positions. Information about positions, and control over positions, are linked to the outcomes that flow from actions attributable to a position.

Figure 2 below (based on Ostrom, 2011a) illustrates the internal structure of an action situation.

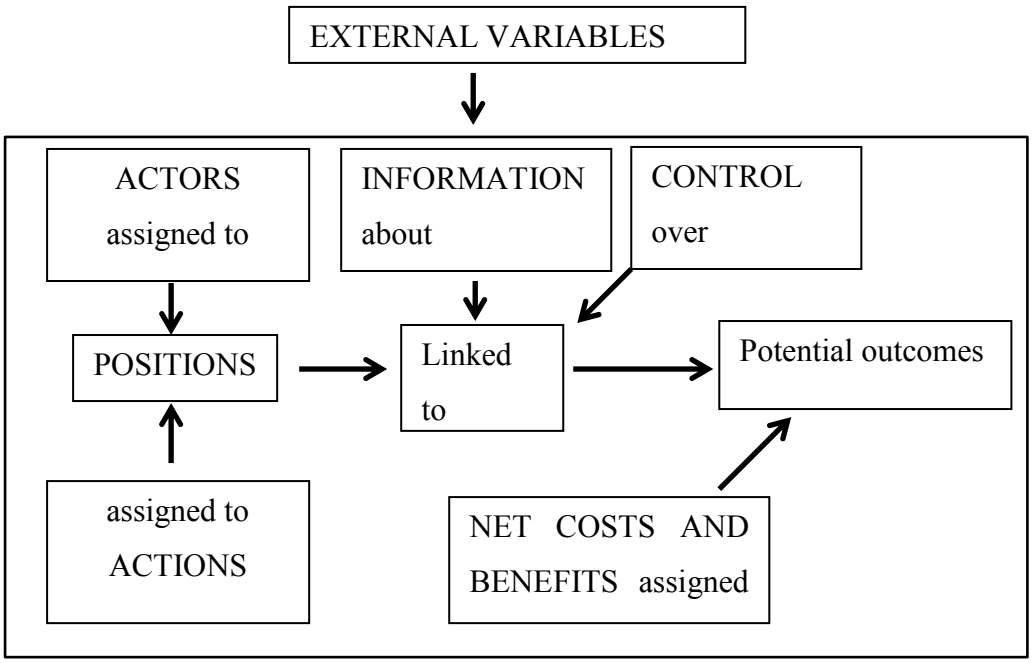


Figure 2. The structure of an action situation.

The IAD framework has been used widely in a number of contexts, including studies of metropolitan public services, governance systems, donor-sponsored infrastructure development projects and international political regimes (Rudd, 2003). For example, Bushouse (2011) used it to investigate the delivery of child day care services. Andersson (2004) applied the framework to formulate a series of hypotheses concerning effective decentralised forest governance, which were then tested using data from Bolivian municipalities.

In addition to the IAD framework, a number of scholars have developed other frameworks to analyse situations that involve CPRs and tragedies of the commons. For instance, Oakerson (1992) developed a framework for analysing commons. He saw commons as comprising four constituent attributes: the physical characteristics of the resource, and the technology used in its appropriation; the decision-making arrangements that influence how resource users relate to each other and other people; the patterns of interaction that arise from the choices individuals make in the context of the resource's physical attributes, available technology, and the rules governing resource use; and, finally, the outcomes produced by the interaction

of the other three attributes. In addition, Oakerson recognised that commons are nested in a wider social and political context without explicitly including this context in his framework.

Elsewhere, Anderies et al. (2004) developed a framework for analysing SESs that is closely related to Oakerson's version but also clearly embedded in the IAD framework. Their framework splits SESs into four components: the resource itself; resource users; 'public infrastructure', and public infrastructure providers. Public infrastructure has two elements: 'physical capital' which includes 'hard' engineering infrastructure like irrigation canals; and 'social capital', which comprises the institutional rules that govern resource use, the monitoring and enforcement of those rules, and research and innovation that keep the system functional even as circumstances change. Public infrastructure providers receive contributions – labour, taxes – and create policy that determines how those contributions are invested in the construction, operation and maintenance of public infrastructure.

Like Oakerson, Anderries et al. suggest that outcomes in CPR management are also conditional on the 'external environment'. They define the external environment broadly; it covers biophysical variables and disturbances like climate change, earthquakes and floods, but also socio-economic changes: economic growth or recession, population growth and political change. They argue that biophysical factors affect the resource, while socio-economic variables primarily influence resource users and their behaviour. The external environment in their framework is therefore similar to the recognition by Oakerson that the social and political context in which CPR management is placed is important to management outcomes.

Crucially, Anderies et al., Oakerson, and Ostrom do not distinguish between 'factors' (as I understand them) and variables in their frameworks. They therefore omit characteristics like legitimacy, which are found to play a significant role in both the case studies examined here (see section 3.2.9 and section 3.3.9). This omission, coupled with the observation that legitimacy is important to the halibut IFQ regime and PIECAS, leads to a more thorough exploration of legitimacy in chapters 4, 5 and 6. On this point, it is posited that resource management systems that are not subscribed to as legitimate by key stakeholders will struggle, perhaps unnecessarily, in achieving their objectives.

3.2 Study I: Policy design and implementation challenges in PIECAS

3.2.1 The study location and the development of PIECAS

The Paraná River is the second-largest river in South America, smaller only than the Amazon. It flows some 5,000km from its headwaters in south-eastern Brazil. Its drainage basin is 3 million km^2 in area and spreads across Paraguay and parts of Argentina, Bolivia and Brazil. In its lower section, the Paraná joins the Paraguay River and forms an extensive delta – the Paraná delta, which is the area under PIECAS's management. The river itself finally converges with the Uruguay River to form the River Plate, or Río de la Plata, which flows into the Atlantic Ocean in central-eastern Argentina.

The Paraná delta drains a watershed some 22,587 km^2 in area (Secretaria de Ambiente y Desarrollo Sustentable, 2008) and extends 320km through three Argentine provinces – Buenos Aires, Entre Ríos and Santa Fe. It is informally divided into three distinct sections: the upper, middle and lower delta (Secretaria de Ambiente y Desarrollo Sustentable, 2008). The upper delta lies between the cities of Diamante in Entre Ríos and Villa Constitución in Santa Fe; the middle delta falls between Villa Constitución and Ibicuy in Entre Ríos; and the lower delta occupies the remaining area, from Ibicuy to where the river joins the River Plate. The deltaic region is noteworthy both for its biodiversity and – paradoxically perhaps - for the scale of agriculture within and around it. There are some 700 plant species, 260 bird species and a further 172 fish species in the area (Secretaría de Ambiente y Desarrollo Sustentable, 2008). In respect of agriculture, grain exports from Buenos Aires province alone were valued at some US$416 million in 2012 (Buenos Aires Provincia, 2013). The Paraná River is a vital conduit for the transportation of this grain to international markets. Anecdotally, I observed tankers being filled with grain at the town of San Pedro in the middle delta before making their way toward the Atlantic Ocean and foreign markets.

The three provinces that straddle the delta make up the most heavily populated parts of Argentina. Indeed, Argentina's largest city – the capital, Buenos Aires - is located adjacent to the lower delta. The environmental impact of the city has been largely negative. There has been a sharp increase in the development of tourism projects and private neighbourhoods in the area, as well as encroachment by illegal settlements (Zagare, 2012). In the upper and middle delta, cattle farming and other agriculture has had and continues to have a significant environmental impact. Construction of dykes to drain naturally flooding fields is common, as

is slash-and-burn that removes native vegetation in order to clear pasture for grazing cattle. Other problems include over-harvesting of certain fish species, and dredging of river channels to ensure that the delta remains navigable to commercial shipping.

Many of these environmental problems have been exacerbated by a number of factors. At one level, pressure on land and other resources in the delta has increased. For instance, the rise in soybean prices on global markets has encouraged farmers to convert land adjacent to the delta that was previously used for livestock farming to soybean cultivation. This change has pushed cattle farming into the delta's marginal lands. As a result, the head of cattle in the area has increased significantly over the last 15 years. Figures from Baigún et al. (2008) suggest that cattle numbers rose from 160,000 head in 1997 to 1,500,000 in 2007. At another level, the delta lacks a coherent legal framework to regulate access to, and use of, its natural resources. Regulations at a provincial level are fragmented and even contradictory. Furthermore, the Argentine constitution provides few incentives for provinces to coordinate governance of their shared natural resources (Berardo et al., 2013).

More generally, policy-making in Argentina is of lower quality than many other countries (Spiller and Tommasi, 2003). It is frequently incoherent and inconsistent. Standards at the bureaucracies charged with developing policy are low. Indeed, Rauch and Evans (2000) ranked Argentina in the bottom five of 35 developing countries for bureaucratic quality. Efforts to address environmental problems in the delta are therefore nested in a less than ideal policy space.

These factors make the delta vulnerable to environmental crises. In April 2008, one such crisis struck the region. Slash-and-burn fires started by farmers in the Entre Ríos section of the delta burned out of control. The fires were fanned by strong winds and a long drought. Hundreds of thousands of hectares of land were burned. In addition, smoke from the fires hung over the area for a number of weeks and affected visibility as far south as Montevideo (BBC, 2008). Air quality and visibility in Buenos Aires deteriorated rapidly, with the smoke thick enough to prompt closure of the city's airports and motorways (BBC, 2008). The fires sparked widespread debate on the delta's environmental problems amongst the public and policy-makers, and opened a policy window that allowed governmental and non-governmental actors to promote their own individual agendas.

One response to the crisis was an initiative by the National Environment and Sustainable Development Secretariat (Argentina's top environmental bureaucracy, hereafter referred to as the 'Environment Secretariat' or 'Secretariat') to create a legal framework for the management of the delta's natural resources. The first step in this process was the signing of a Letter of Intent by the federal government and the provincial governments of Buenos Aires, Entre Ríos and Santa Fe in 2008. The Letter of Intent bound those governments to design PIECAS.

As its name suggests, PIECAS is an environmental management plan for the delta. In broad terms, it aims to improve environmental management in the delta by harmonising (or 'integrating') environmental legislation, encouraging public participation, and finding solutions to the problems caused by slash-and-burn and draining wetlands (Berardo et al., 2015). More specifically, the plan has four principal objectives:

1. To protect, to conserve and to take advantage of biodiversity and natural resources in the area in a sustainable manner.
2. To maintain or to restore the structure and the ecological function of the Paraná delta's strategic ecosystem;
3. To promote its sustainable development;
4. To ensure the participation of all actors in contributing to the government's legal framework.

It is clear that objective 4 calls for participatory contributions from actors involved or interested in PIECAS. This is noteworthy in the context of the research subsequently introduced in the thesis. In particular, a variation of objective 4 is seen as an explicit component of legitimate resource management systems and therefore serves a 'legitimation function'. I explore these ideas further in chapter 4.

PIECAS also aims to fulfil Argentina's international responsibilities under the Convention on Biological Diversity (CBD) and the RAMSAR Wetlands Convention (Secretaria de Ambiente y Desarrollo Sustentable, 2008). PIECAS should also contribute to achieving domestic responsibilities that Argentina is bound to under UNESCO's Man and Biosphere Programme (Secretaria de Ambiente y Desarrollo Sustentable, 2008).

Following the Letter of Intent, the process of designing PIECAS got underway. In 2009, the 'High Level Inter-jurisdictional Committee for Sustainable Development in the Paraná delta' (hereafter, the 'High Level Committee' or 'Committee') was created. The High Level Committee is comprised of one delegate from each of the three deltaic provincial governments (Buenos Aires, Entre Ríos and Santa Fe), as well as a federal government delegate. The Committee was tasked with developing an environmental report that would serve as the foundation on which PIECAS would be designed and subsequently implemented. In addition, a 'Strategic Environmental Evaluation' (SEE) was performed with the aim of complementing the High Level Committee's environmental report and identifying problems policy-makers might face in designing and implementing PIECAS. It was completed in November 2011 with input from academics and NGOs, but not local government. More recently (August 2013), the High Level Committee announced[6] it was going to send a draft bill containing a finalised version of PIECAS and a set of minimum standards for the delta's conservation and sustainable development to the Argentine Congress for debate. As of August 2014, however, the draft bill is yet to reach Congress and has not been made publicly available. Nevertheless, the pending nature of the draft bill has not stopped the formation of PIECAS because the Letter of Intent is seen as a sufficient basis for moving the plan forward.

In general, and in spite of the High Level Committee's recent announcement, the process of designing PIECAS has been fraught with difficulty since the Letter of Intent was signed in 2008. In many respects, the plan's progress toward implementation is in stasis. The aim of this study was to understand the factors that underpin this stasis. The remainder of this section proceeds as follows: firstly, I follow Ostrom (2011b) and use her SES framework (2009a – see section 3.1) to describe the Paraná delta SES; and secondly, I use the interview and survey data to suggest which factors have contributed to the plan's difficulties. The factors I identify are mapped to Ostrom's framework, where possible. Those factors that are not present in the current framework and have explanatory power beyond that captured by existing second-level variables are of particular interest.

[6] 'Avances en el ordenamiento ambiental de la Región DELTA del Paraná'. (2013) National Secretariat of Environment and Sustainable Development. [Online.] Available at: http://www.ambiente.gov.ar/?idarticulo=12149

3.2.2 Understanding the Paraná delta and PIECAS using the SES framework

Tables 5, 6, 7, 8 and 9 break down the Paraná delta into the four subsystems that constitute a SES, following Ostrom's framework. Each of these first-level subsystems is then further decomposed into second-level variables. Second-level variables are identified either from existing literature on the Paraná delta, my observations in the field, or the interview data (or a combination thereof). The tables are therefore a first step in the process of mapping the characteristics of PIECAS and the delta to Ostrom's framework. The tables also demonstrate how the framework is a descriptive rather than explanatory tool. The second-level variables included tell us something about the way in which PIECAS is organised, and about the delta's environmental characteristics. However, they tell us little if anything about the factors that are important to PIECAS's success. I continue the mapping in section 3.2.10 when describing the factors underpinning PIECAS's unsuccessful performance to date.

Table 5. Description of the Paraná delta's resource subsystems.

Resource systems	Description
Type of resource system	Riverine habitat, wetland
Location	Eastern Argentina
Size of resource system	Large – 300km as the crow flies
Productivity of system	Varied, but generally low
Clarity of watershed boundaries	Clear
Human-constructed facilities	Bridges and roads, dykes
Predictability of system dynamics	Predictable flooding events

Table 6. Description of resource units in the Paraná delta.

Resource units (various)	Description
Types of resource units	Agricultural pasture, fish, wetlands
Economic value of pasture	Low
Economic value of fish stocks	Low
Economic value of wetlands	Low

Table 7. Description of actors in the Paraná delta.

Actors		Description
(Subsistence) farmers and fishermen:		
	Economic status	Varied, from poor to very wealthy
	Knowledge of SES	Varied; many farmers involved in workshops to educate themselves about, for instance, insect pests.
Federal officials:		
	Knowledge of SES	Varied; frequently incomplete
Provincial officials:		
	Knowledge of SES	Varied; frequently incomplete
Municipal officials:		
	Knowledge of SES	Varied; probably better than federal or provincial officials.

Table 8. Description of the Paraná delta's governance subsystem.

Governance system (PIECAS)	Description
Government organisations	PIECAS High Level Committee National Environment Secretariat Provincial environmental departments (i.e. OPDS)
Non-governmental organisations	Environmental NGOs (i.e. FARN)
Property rights systems	Mostly open access or state-owned lands
Operational rules	Undefined
Collective choice rules	Defined by and mediated through the High Level Committee.
Constitutional rules	Argentine constitution; Articles 41 and 124 key.
Monitoring and sanctioning processes	Weak or non-existent

Table 9. Interactions taking place in the delta under PIECAS's auspices.

Interactions	Description
Deliberation processes	High Level Committee meetings (government officials only)

Interactions	Description
Conflicts among users	Tension between agricultural stakeholders and officials
Self-organising activities	Meeting and workshops amongst agricultural producers and NGOs

Several of the delta's features stand out in tables 5 to 9. Firstly, the delta is very large (table 5) and comprises a patchwork of different land uses. Some areas are relatively untouched wetland; other areas are degraded by the effect of agriculture and infrastructure. My own observations in the delta are certainly consistent with this description. Secondly, the actors present in the delta – many of whom are active participants in PIECAS or are directly affected by the scheme – are heterogeneous. A gamut of individuals, from subsistence fishermen to wealthy real estate developers, all have an interest in the delta (table 7). Finally, table 8 suggests that the operational rules that determine how a resource management system works day to day are presently undefined in PIECAS. Of course, this may reflect the plan's ongoing development – that is, operational rules are yet to be designed and will be in due course. However, given that six years have elapsed since the plan's inception, it is reasonable to argue that there should at least be a basic framework in place for those rules. In the section that follows, I explore this and other factors that interviewees believed to be an explanation for PIECAS's failures to date.

3.2.3 Factors underpinning PIECAS's problems

The lack of well-defined operational rules in PIECAS is, of course, a strong indication that PIECAS is not yet at a stage where it can be implemented in any practical sense. It means that PIECAS cannot regulate use of the delta's resources (its wetlands, say). For instance, PIECAS in its present form does not determine who can use resources in the delta and when they can use those resources. Clearly, this is tantamount to PIECAS lacking 'teeth' as a resource management system. In particular, PIECAS cannot yet regulate agricultural slash-and-burn fires in the delta, a surprising state of affairs given that PIECAS was developed in response to the agricultural fires that swept uncontrolled through the delta in 2008.

As long as these operational rules remain undefined, PIECAS will not progress to a stage where it is ready for implementation. Without well-defined rules, the plan will certainly not contribute in a positive way to the sustainability of the delta. However, it is insufficient to

claim that the lack of rules is itself a contributory factor in PIECAS's difficulties. Instead, it is arguably a symptom of deeper, underlying problems. Interestingly, the interview data give some indication of a potential reason for the lack of rules, namely that PIECAS's core objectives were themselves too broad to allow for the development of focused and actionable rules. Interviewee ♯11, for instance, said that

"First of all, the objectives are to protect, conserve and to take advantage of components of the delta's biodiversity and natural resources in a sustainable way. Also to restore ecological function in the Paraná delta's ecosystem; to promote sustainable development; and to ensure the participation of stakeholders. But they're very general. And then in the Letter of Intent that we asked for, it talks about voluntary actions to achieve these objectives. Um…in particular I want to say that they're very broad… Perhaps too broad."

Similarly, interviewee ♯12 argued that, although objectives were clear at a 'macro-level', the best that one could hope for with PIECAS was to see the establishment of a 'general management framework' or 'minimal management conditions' – *"a support framework to regulate decisions* [that concern the delta]*."* Although these comments do not explicitly identify broadly defined management objectives as a problem for PIECAS's development – indeed, the opposite might be true – it is striking that interviewee ♯12 felt that the final shape PIECAS would take would itself be general and concern 'minimum conditions' rather than the regulation of specific activities.

These comments provide limited evidence, but they do at least point to the possibility that PIECAS suffers from management objectives that are broad and therefore difficult to operationalise. The stasis in which the plan finds itself may be attributable in part to the problems that stem from these objectives. Analysing the objectives themselves supports the idea that they are not achievable in any practical sense, insofar as there are no specific tools that can obviously contribute to meeting them. For instance, the goal of promoting sustainable development (while laudable) is essentially meaningless in the absence of a defined implementation strategy because it (sustainable development) can mean different things and be achieved in several different ways. Thus, placing an objective like sustainable development at the core of PIECAS does not clarify the particular management regulations or tools needed to achieve the objective. It provides PIECAS officials with no real clarity or guidance for designing PIECAS.

This critique applies to PIECAS's other objectives, not just the goal of promoting sustainable development. The aim of protecting, conserving, and taking advantage of the delta's natural resources, and of restoring the delta's ecological function, is more tangible than promoting sustainable development, but it remains unclear how exactly the High Level Committee can achieve those goals. For instance, conserving the delta may require the establishment of protected areas free from human interference; but equally, it may constitute the introduction of legislation that bans the draining of wetlands for agricultural pasture, say. Indeed, it is notable that neither of these objectives defines the particular resource(s) or ecological processes that require management. Presumably this is left to the discretion of the High Level Committee. But in so doing, the High Level Committee is left with a range of management options, any of which might prove beneficial to the delta.

PIECAS's final objective – to ensure the participation of stakeholders – is, perhaps, clearer than the plan's other goals, insofar as the High Level Committee is obliged to include stakeholders in management processes. It also resonates with satisfaction of the legitimation function (see chapter 4). But on further consideration, it leaves the High Level Committee with significant discretion and unanswered questions. In particular, the objective fails to define what 'participation' means in PIECAS. Does it constitute meetings that are open to the general public, or does it simply entail the High Level Committee keeping stakeholders up to date on PIECAS's development? In this respect, the objective provides no guidance on the role that stakeholders can play in PIECAS.

Each of these problems creates uncertainty about basic features of PIECAS's design. An overall conclusion from the analysis is that fundamental aspects of the plan – which resources fall under its remit, what limitations on resource use are intended, the stakeholders to which it will apply – require further elaboration. So too do the relevant, detailed implementation strategies that would pertain to PIECAS's objectives. In their present form, however, the plan's core objectives are not actually detailed enough to shape PIECAS's development in a meaningful way. As a result, PIECAS has struggled to progress significantly since its inception. Arguably, making decisions about core stipulations like the ones described above will be the first step in pushing the plan toward a point where implementation is feasible.

3.2.4 Legislative fragmentation in the delta

A number of the stakeholders interviewed during my field research suggested that PIECAS's difficulties were attributable to the delta's complex legislative environment. Legislation in the delta corresponds to two second-level variables in Ostrom's framework: constitutional rules, and collective-choice rules (see table 8). However, of more interest than the legislation itself are the attributes of that legislation and their impact on various aspects of PIECAS's development.

One attribute of the delta's legislative environment is that it is highly fragmented at both a constitutional and collective-choice level. Arguably, PIECAS has been strongly affected by this fragmentation. For instance, the Argentine Constitution defines the constitutional rules that influence and are relevant to PIECAS. Under the Constitution[7], provinces are responsible for all those activities that are not delegated to the State. In particular, Article 124 states that natural resources in a province's territory are under the exclusive jurisdiction of the province rather than the State (Nonna, 2002; Berardo et al., 2013)[8]. Each province will have a body charged with applying existing regulations and coordinating environmental policy generally (Nonna, *ibid*). Of course, attitudes and legislation regarding the use of natural resources are shaped by the particular objectives of provincial governments.

Despite the apparently clear separation of responsibility for natural resources between federal and provincial government outlined in the Constitution, questions remain about the balance of authority and responsibility between the two levels of government. For instance, Article 41 of the Constitution provides the Argentine people with the right to a healthy environment. There are various provisions under Article 41 that imply that both levels of government will protect this right, and also conserve biodiversity and provide for the use of natural resources in a rational way. Article 41 authorizes federal government to develop minimum standards to achieve these goals, ostensibly without affecting provincial authority for environmental affairs (Nolon, 1996). But in practice, this stipulation means that jurisdiction for environmental issues is shared. It has led to the development of environmental regulation that overlaps at the federal and provincial level. This overlap applies to water quality

[7] The Argentine Constitution was amended in 1994, in response to international economic pressure and the output from the 1992 Earth Summit in Rio de Janeiro.

[8] Article 124 of the Constitution states that 'provinces have original jurisdiction over natural resources in their territories' ('Coresponde a las provincias el dominio originario de los recursos naturales existentes en sus territorios').

regulation and other environmental issues, and has caused 'redundancy and confusion' (Nolon, *ibid*). The constitutional rules that are part of the delta's governance subsystem and that affect PIECAS therefore have two important effects: they delegate responsibility for natural resources to provinces, but they also blur the lines of responsibility for addressing environmental problems between federal and provincial governments. The delta's fragmented legislative environment therefore has roots in the Argentine Constitution.

More generally, the responsibility for natural resources that the Argentine Constitution places in the hands of provinces is problematic to PIECAS because it exposes the plan to provincial politics. For instance, different provincial governments often have representatives from different political parties. Interviewee ♯5 mentioned that the *"provinces that make up the plan* [PIECAS] *have governments of different political parties."* An examination of the existing provincial governments in the delta corroborates this claim. For example, the governor of Entre Ríos (Sergio Urriburri) is a member of the Peronist Justicialist Party, while the governor of Santa Fe (Antonio Bonfatti) belongs to the Socialist Party. An inter-provincial agreement like PIECAS is therefore exposed to the political and environmental objectives of individual provincial governments. But if federal government assumed responsibility for managing the delta's resources, thereby avoiding provincial interest politics, it would contravene the Constitution.

This problem is exacerbated by the presence of different political parties in the High Level Committee. The Committee is the collective-choice arena in which decisions about PIECAS's development are made. Each Committee member from Buenos Aires, Entre Ríos and Santa Fe will bring with them the interests of the parties they represent. These interests may be contradictory or mutually exclusive. Clearly this is not an insurmountable problem, but it adds a layer of complexity to the collective decision-making that takes place in the Committee. Perhaps leaving the work of the Committee to individual appointees selected both by government and by stakeholders for their scientific expertise rather than their political affiliations would reduce such complexity.

Legislative fragmentation is also caused by the different approaches to regulating environmental issues taken by each of the provinces with territory in the delta (Buenos Aires, Entre Ríos and Santa Fe). Each province has environmental frameworks that in some cases differ one from the other or are even conflicting. Although PIECAS is arguably an attempt to

develop a form of harmonized legislation that will address differences in provincial legislation, the plan itself needs to be consistent with existing provincial regulation. Interviewee ♯12 gave one example that illustrates the point neatly. In 1977, during the years of the military junta in Argentina, Decree 8912/77[9] ('Decreto Ley 8912/77 de Ordenamiento Territorial y Uso del Suelo en la Provincia de Buenos Aires') gave municipalities in Buenos Aires province authority over environmental management and planning. Municipalities in Buenos Aires province are therefore responsible for land use decisions in both rural and urban areas that fall within their jurisdiction.

However, authority for environmental management and planning decisions in Entre Ríos and Santa Fe is not vested at the municipal level. Instead, the provincial governments themselves take those decisions. Municipalities draft environmental management plans that are then passed on to the provincial government for approval. For instance, both houses in Entre Ríos' provincial government[10] recently passed an environmental management plan for native forests in the province (Government of Entre Ríos, 2014). The different approaches to environmental management in the provinces are problematic for PIECAS because the plan must meet the minimum standards developed by regulations in each municipality in Buenos Aires, and the other two provinces (Entre Ríos and Santa Fe). Furthermore, PIECAS cannot contradict existing regulation at either a municipal level (in Buenos Aires) or provincial level (in Entre Ríos and Santa Fe).

Decree 8912/77 is especially problematic because there are 135 municipalities in Buenos Aires province, of which Campana, San Fernando, San Pedro, Tigre, Varadero and Zarate have territory in the delta. (Interviewee ♯10 mentioned that Campana and San Fernando are the two municipalities of greatest relevance to the delta's islands.) Interviewee ♯12 noted that each of these municipalities have different economic interests, whether agriculture, forestry or real estate development. PIECAS requires harmonization with the environmental regulations developed by each of these municipalities. But harmonization is challenging because of the number of municipalities and other actors in the delta, the way in which their varying interests shape environmental regulation, and the dynamic nature of municipal

[9] Decree 8912/77 governs 'the environmental management and planning of the Province [of Buenos Aires], and regulates the use, occupation, subdivision and fitting of the Province's land' (Government of Buenos Aires, no date).

[10] Buenos Aires, Entre Ríos and Santa Fe all have bicameral legislatures, with a Senate and a Chamber of Deputies.

politics. To complicate matters further, interviewee ♯12 pointed out that municipalities had not been involved from the beginning of the PIECAS design process. There had therefore been a delay in addressing the difficulties presented by legislative fragmentation. Indeed, interviewee ♯12 said that PIECAS officials had only started to deal with the issue recently. Interviewee ♯12 believed that these problems would have been avoided entirely with better planning. (I return to the steps leading to and taken during PIECAS's development in section 3.2.5.)

Interviewee ♯12's comments were echoed by interviewee ♯10. Without discussing Decree 8912/77 specifically, interviewee ♯10 noted that

"I think there's also a jurisdictional theme, because the delta is made up of three provinces and, amongst them, municipalities. It's pretty complicated to develop a plan that speaks to, let's say, all of the municipalities and provinces… Each municipality is doing in parallel its own environmental management plan for the islands. And, in turn, the provinces are also developing, in an isolated and parallel way, environmental management plans for their sections of the delta. And there's no inter-communication between the municipalities and provinces, nor between the provinces…"

More specifically, interviewee ♯10 gave an example of legislative fragmentation in action in the delta:

"[San Fernando and Campana] *are pushing on with their own environmental management and conservation plans. In turn, the OPDS* [the Buenos Aires Office for Sustainable Development]*, which is the principal body for sustainable development in the province of Buenos Aires, also has an environmental management project. In turn, there's PIECAS, and various other examples of similar interventions in the islands. And each one is working with, let's say, a closed door."*

With these various environmental and legislative projects taking place, interviewee ♯10 argued that PIECAS's design problems were attributable to the failure to adopt an 'integrated' approach to environmental management in the delta:

"It seems to me that the plan doesn't have a focus that's integrated. It has a focus that's…I don't know…environmental. I don't know if that's the word. But it has a focus that doesn't…they're doing it such that it can't be carried out. The problem is that there isn't an integrated plan for development in the delta. That's the word. There are isolated projects like PIECAS, environmental management projects for native forests, environmental management projects for land use, at a municipal, provincial and national level, all working separately, without an integrated master plan."

Further evidence of the failure to work in an integrated way was provided by interviewee ♯11. Interviewee ♯11 mentioned that

"It's [PIECAS's design] *very slow and difficult because there's no exercise of working between provinces. We're…it's a federal country, but relatively new federalism. The change to the Constitution in 1994 said that provinces are responsible for the management of their natural resources. So, everything to do with natural resources, by agreements – the national government can't impose them* [agreements]. *Let's say, you've got to look for consensus amongst the entire group."*

These remarks emphasise two important points. Firstly, the delta's fragmented legislative landscape presents harmonization challenges for the officials charged with designing PIECAS (that is, the High Level Committee, who may bring with them the political agendas of their respective parties – see page 61 above). The range of other organisations, interests and activities taking place in the delta exacerbates the harmonization problem. Secondly, PIECAS appears not to have addressed satisfactorily the challenge that harmonization represents. Interviewee ♯10's focus on the lack of an 'integrated' approach suggests that PIECAS officials have failed to integrate PIECAS with the delta's existing legislative framework. As interviewee ♯10 points out, PIECAS is an 'isolated project'. The plan is therefore less likely to deal effectively with the challenges posed by the delta's fragmented legislative system.

Interestingly, the problems PIECAS has experienced with legislative fragmentation and inter-jurisdictional harmonization are typical of public policy in Argentina generally. For example, Spiller and Tommasi (2003) note that 'inter-jurisdictional interactions are fairly non-cooperative and poorly coordinated'. Furthermore, they suggest that 'in Argentina each

sector has its own way of being regulated, reflecting the discretion and lack of coordination among the sector Secretariats' (which presumably includes the National Environment Secretariat and associated provincial environment bodies).

Summarising legislative fragmentation in the delta

Three key points have been made in the preceding discussion. The first is that features of the Argentine Constitution, especially Articles 41 and 124, have created a legislative environment in the delta and Argentina more generally that is complex, fragmented and at times redundant. These articles represent constitutional rules in Ostrom's framework. In the delta, each province has a different approach to regulating environmental problems. In Entre Ríos and Santa Fe, authority over environmental decision-making follows the Constitution and is in the hands of the provincial government. In Buenos Aires, as a result of Decree 8912/77, this authority is vested at the municipal level. Environmental regulation in the delta is therefore a patchwork of rules developed by different levels of government. These rules may not necessarily complement one another. Legislative fragmentation of this kind is an attribute of, amongst others, the constitutional rules and property-rights systems that Ostrom includes as second-level variables in her framework.

As an inter-provincial agreement, PIECAS cannot contravene these rules, nor fail to meet the minimum standards established by them. But designing PIECAS so that it is consistent with each existing environmental regulation in the delta is a significant challenge and one that the plan has failed to meet.

Secondly, the constitutional vesting of authority for natural resources at a provincial level leaves inter-provincial agreements like PIECAS vulnerable to provincial realpolitik. Federal government cannot bypass these provincial political interests and manage the delta itself because doing so would contravene the Constitution. PIECAS must therefore satisfy or at least not contradict the political priorities of the parties involved in the plan. In Buenos Aires, this argument applies to municipalities too, as a result of Decree 8912/77.

Thirdly, PIECAS has failed to address the problems posed by legislative fragmentation because it lacks an 'integrated' approach; that is, there is insufficient cooperation between provinces to address legislative fragmentation. Municipal officials, who could have assisted

the High Level Committee in developing PIECAS in such a way that it is consistent with municipal regulations, were absent at the earliest stages of the plan's design (interviewee ♯12). The High Level Committee itself meets infrequently. PIECAS is therefore 'isolated' (interviewee ♯10) and there has been inadequate coordination to account for legislative fragmentation in the delta. Arguably, PIECAS has been poorly planned overall. I turn to this theme briefly in the following section.

3.2.5 PIECAS's early development

In section 3.2.4, I noted that interviewee ♯12 believed problems arising from Decree 8912/77 could have been avoided if PIECAS had been better planned. Interviewee ♯12 was not alone in thinking that at least some aspects of PIECAS were poorly thought out. Interviewee ♯2, for instance, felt that PIECAS was *"absolutely inoperable"* and that there is a 'disconnect between what PIECAS plans and the reality on the ground in the delta'. Interviewee ♯6 thought that many people involved in PIECAS had a poor understanding of the delta. Interviewee ♯10 was more scathing, remarking that

"I think first they gave the plan its name, and they were still developing the plan…! I don't know if I'm explaining myself. The first thing that appeared was the 'Comprehensive strategic…' I don't know what all the letters in PIECAS stand for. Written or planned by someone who doesn't know anything about the delta's islands. When a project is all about integration and conservation in the delta, and you don't know anything about the delta, you're going to make water[11]*. Do you understand the expression? You're going to trip up on a mountain of things that you hadn't foreseen, because you don't know the area."*

Evidently, interviewee ♯10 shared the concerns expressed by interviewees ♯2, ♯6 and ♯12. Taken together, their comments suggest that the people involved in designing PIECAS may have had an insufficiently nuanced view of the delta, or that they lacked the expertise or familiarity required to put together a plan appropriate to the area. Furthermore, there is the implication that PIECAS has encountered difficulties in part because the plan's decision-makers failed to take into account the complexity of the region when they were making decisions at an early stage of the plan's development. However, it is harder to determine from the interview data why PIECAS has been poorly planned. One interesting possibility is

[11] 'Hacer agua' (to make water in English) is a Spanish expression without a direct translation in English, but approximately it means 'to spring a leak'.

that the particular sequence of events that led to PIECAS's establishment were rushed and motivated by political rather than environmental concerns, with direct consequences for the plan's effectiveness and legitimacy.

The impression from the interview data is that PIECAS was indeed politically motivated, insofar as the plan demonstrated that politicians were attempting to address the crisis presented by the fires in the delta. Interviewee ♯5, for instance, suggested that PIECAS was a *"preventative response, if not born out of necessity in front of a crisis."* Similarly, interviewee ♯4 believed that PIECAS was 'required' in response to the fires. Interviewee ♯3 echoed this comment, saying that PIECAS was a 'political response' to the fires. Interviewee ♯9 suggested that a fundamental problem with PIECAS was that it was not developed out of genuine environmental conviction. Instead, the plan was 'politically convenient'. Interviewee ♯1 believed that, without the fires and the crisis they caused, PIECAS would never have been developed in the first place.

One implication of these comments is that PIECAS is as much political as it is environmental. By political, I mean that PIECAS was established in part as a means by which politicians could divert attention away from themselves and by which they could act in the short-term on the delta's environmental problems. There are a number of reasons to interpret PIECAS in this way. Firstly, the effect that the fires had on Buenos Aires – with smoke posing a public health risk to the city's inhabitants – temporarily focused the media's gaze on the delta. The attention generated forced policy-makers to discuss the issue of environmental management in the delta, and provided governmental and non-governmental actors an opportunity to advance their own interests (Berardo et al., 2015). Policy-makers were presumably under pressure from the citizens of cities like Buenos Aires and Rosario to demonstrate that they had the situation under control, and moreover that they had a strategy for preventing future fires in the delta. In this sense, PIECAS was a political as well as an environmental tool. The political priority was to be seen to be responding to the fires, with the feasibility of the plan and its longer-term environmental outcomes of less immediate concern. Under these circumstances, it is unsurprising that PIECAS's early development may have been poorly planned. Preliminary decisions about the structure of PIECAS and its aims and objectives may not necessarily have facilitated its implementation or the likelihood of it having a positive impact on the delta. Instead, the manner in which the plan was conceived was expedient to the political imperative of the moment. Its development was

politically motivated and, as interviewee ♯9 points out, 'politically convenient'. Moreover, once the fires and the attention they generated had died down, so too did political interest in the delta and PIECAS (interviewee ♯12).

The problems from which PIECAS is presently suffering may therefore have roots in the events that led to its establishment. The fires gave rise to a short-term but severe political crisis that required a political response. PIECAS represented an ideal solution. The probability of its succeeding as an environmental management plan was of secondary importance, and so the manner in which it was designed may have lacked the care and thought required to make its implementation feasible. Similarly, the likelihood that PIECAS was (or is) seen as legitimate may have been influenced by the seemingly hurried and politically motivated circumstances of its inception. Certainly, the haste and lack of care apparently taken in designing PIECAS would have made it difficult to satisfy the conditions that might lead to legitimacy. In this respect, it is interesting that the Letter of Intent that was the first step in PIECAS's design process was signed in September 2008 – a mere 5 months after the fires and the political pressure that came with them (Secretaria de Ambiente y Desarrollo Sustentable, 2008). Planning an effective, legitimate environmental management regime in such a short space of time was bound to be difficult, especially given the legislative and ecological complexity of the delta.

Mapping these two factors (a lack of understanding of the delta on the part of PIECAS's decision-makers, and a political rather than environmental motive skewing the plan's development) to Ostrom's framework is difficult. Nevertheless, it is perhaps possible to argue that both factors are features of the leadership shown by decision-makers and their knowledge of the delta SES. Leadership and knowledge of the SES in question are both second-level variables in the 'users' subsystem of Ostrom's classification. But the crucial point is that both factors have explanatory power, rather than representing constituent parts of a SES.

Arguably, one consequence of PIECAS's poorly planned and possibly rushed development was that participation in the plan was skewed in a number of ways. Interviewee ♯12's comment on the failure to include municipal officials in the design process (mentioned above) is a good example of the participation problems that have characterised the plan to

date. I focus on participation as a factor in the difficulties PIECAS has experienced in the section below.

3.2.6 Participation in PIECAS

One of the topics discussed most forcefully by interviewees is that participation in PIECAS has not been as inclusive as one might reasonably expect or even deem necessary. Interviewee ♯12, for instance, emphasised that PIECAS 'has not been participative'. Indeed, some stakeholder groups – most notably agricultural stakeholders – have until recently found themselves absent entirely from the plan. Whether or not this is intentional is unclear. However, the absence of certain stakeholder groups has had a detrimental effect on PIECAS's design. Firstly, participation problems have shaped perceptions of PIECAS in a negative way. In particular, some stakeholders – especially agricultural stakeholders – believe that the plan lacks legitimacy, a failing that they attribute in part to these participation problems. These observations are especially interesting in the context of this thesis. In chapter 4, I argue that there is an explicit link between a resource management system's legitimacy, and participation in that system.

Secondly, the failure to have stakeholders participating in PIECAS who are representative of the communities and activities taking place in the delta has affected PIECAS's design insofar as it is not commensurate with the reality of life in the delta (a comment made by interviewee ♯2 – see section 3.2.5 above). The argument here is that the High Level Committee has lacked the expertise or understanding required to make the plan relevant to the delta. Input from stakeholders with expertise of the delta would have helped the High Level Committee overcome these limitations.

Opinions on participation in PIECAS varied from interviewee to interviewee. Interviewees ♯9, ♯10 and ♯13 (all agricultural stakeholders) were critical of the plan because of its failure to include farmers and other groups with agricultural interests in the design process. Unsurprisingly, perhaps, these interviewees felt that farming was a key activity in the delta. They believed that the High Level Committee's failure to establish dialogue with farmers was evidence that it was ignoring farming interests and their importance, economically and socially, to the region. Another part of the problem, they argued, was that PIECAS's vision for the delta was influenced heavily by environmental NGOs, who had a 'utopian vision' for

the delta (interviewee ♯9) that was unrealistic and not in keeping with the heavy agricultural production in the area.

Interviewees ♯4, ♯9, ♯12 and ♯13 suggested that improving participation in PIECAS was a key element in addressing the plan's problems and that its absence explained some of the failures outlined above. They argued that widening the scope of participation to include agricultural and other stakeholders was necessary to make PIECAS appropriate to the delta. The plan could not have a purely environmental focus, interviewee ♯12 suggested, because the delta was no longer a pristine environment. Changing its focus to encompass the full breadth of activities and interests in the delta could be achieved by including other, non-environmental groups in the plan. Furthermore, broadening participation would make PIECAS representative of the delta's diverse interests and communities. Interviewee ♯4 felt that it would 'make sure other dynamics are allowed' in the plan. Both of these points were seen to be of the highest importance; indeed, interviewee ♯12 believed that the plan was 'doomed to failure' if it did not address participation problems. Participation should not therefore be regarded as trivial to PIECAS's success. Even if limited participation is symptomatic of deeper, underlying flaws in the plan's design, it has become in and of itself a significant factor in the plan's difficulties – including its overly environmental focus, its failure to represent adequately the delta's varied interest groups, and its legitimacy.

Interviewee ♯12 also focused on participation in PIECAS's High Level Committee. The High Level Committee's current composition – three officials from each provincial government in the delta and one federal official from the National Environment Secretariat – was a weakness, interviewee ♯12 believed. There was a need to include municipal officials, in order to deal with the complexities imposed by Decree 8912/77. Interviewee ♯12 also thought that extending membership of the High Level Committee to other federal government ministries, especially the Ministry of Agriculture and Ministry of Infrastructure, would help ensure that PIECAS is harmonized with projects sponsored by both these ministries, which interviewee ♯12 stressed had not been incorporated or considered in PIECAS's design. (I return to the High Level Committee's membership and its implications for legitimacy in chapter 5.)

The survey data also provide some interesting information on participation in PIECAS. They largely reiterate the interview data. Although small sample size is once again a problem,

none of the 9 respondents to the survey participated in PIECAS on a daily basis. Indeed, most respondents (6 in total) participated only on an annual basis (2) or did not participate at all (4). Furthermore, only two respondents believed that participating in meetings at PIECAS was easy in any way. The majority of respondents suggested that participating in meetings was not very easy, or that it was not actually possible to participate in meetings at all.

As a result of the small sample size, these data are perhaps not as interesting as the comments that accompany them. These comments provide an insight into participation in PIECAS. For instance, respondent I complained that there was 'very little diffusion of information' about PIECAS meetings. Respondent F noted that 'the meetings are not open'. Respondent C said that 'We have asked to participate, but they [the High Level Committee] have told us that they [the meetings] are closed. I understand that only national or provincial government entities participate'. Interviewee ♯9 noted that 'We don't know anything about the development of these meetings'.

These short comments were accompanied by longer, more informative comments from interviewees ♯8 and ♯13. Interviewee ♯8 said that

'We have wanted to be involved for the last couple of years, but there's been no formal invitation to my organisation to participate in the meetings. We requested information on the meetings but we got a scant reply from PIECAS.'

Equally, interviewee ♯13 noted that

'PIECAS's authorities only meet with representatives from municipal and provincial Environment Secretariats, and they're much more predisposed to meet with environmental NGOs than with productive organisations in the delta like cooperatives, farming associations, civil society groups in the delta, municipal agricultural secretariats, and national and provincial forestry directorates'.

There are perhaps two overriding points to make from these data. The first is that participating in PIECAS through meetings is not straightforward. There are no procedures to follow, and appeals to the High Level Committee are apparently ignored. Indeed, some respondents appear to believe that these meetings are closed to them entirely. Secondly,

where stakeholders are able to participate, some only do so infrequently. How their participation can shape the plan when it is infrequent is unclear, however.

Another implication raised by the limited and restricted participation that characterises PIECAS concerns issues of fairness, and in particular procedural fairness. Even though resource allocation decisions have not yet taken place in PIECAS, and thus there are no fairness issues about the distribution of resources and benefits that the plan has produced, there are questions about the fairness of including some stakeholders in the plan at the expense of others. For instance, it is difficult to argue that the exclusion of agricultural stakeholders – many of whom have families who have lived and worked in the delta for generations – is fair. Their prolonged absence from the plan raises fundamental concerns about the procedures PIECAS has followed during its development.

The final point in this discussion is that, in the year that elapsed between my first interviews and subsequent interviews in London, progress had been made in addressing PIECAS's participation problems. Interviewee ♯9 described this change:

"We continued working with the people from PIECAS and with the people from the National Environment Secretariat, including municipalities. And the same things that we told you [last year]*, we told them, and they started at least to take us into account as actors in the delta, as actors in the delta's watershed… It has given us the possibility of having an opening that we didn't have previously…. And I think it's a point in favour, and a very important step. That…at least they understand, or are ready to listen to our position, and to understand the position of actors who are in, and have been in the delta for some time."*

It is not yet possible to attribute any progress in finally implementing PIECAS to this change. However, it will be interesting to see whether broader participation brings about the improvements envisaged by interviewee ♯9, ♯10 and ♯12, especially in respect of harmonization. This is a worthwhile avenue for future research because it may demonstrate (or otherwise) the importance of participation in the success of resource management plans more generally.

3.2.7 Communicating PIECAS

If participation has been a factor in the difficulties that PIECS has encountered, then there is also evidence from the interview data that poor communication has hindered the plan's development. Interviewee ♯9 in particular suggested that communication was neither clear nor frequent enough, and as a result interviewee ♯9 and other agricultural stakeholders still felt more distant from PIECAS than they would have liked. More seriously, interviewee ♯9 did not know enough about the plan from the information relayed by the High Level Committee. This produced uncertainty, prevented long-term decision-making and most importantly a lack of trust in the Committee, according to interview ♯9.

Elsewhere in the interview data, interviewee ♯4 felt that there had been few instances of 'constructive dialogue' during the plan's development. More seriously, a lack of effective communication meant that *"no one knows about PIECAS"*. Similarly, interviewee ♯10 noted that agriculturalists see PIECAS as a threat because *"they fear what they don't know."* These stakeholders *"don't know about the plan, and they don't know what is being talked about at meetings."*

The survey data provide additional useful information on communication in PIECAS. Respondents F and C and interviewees ♯8, ♯9 and ♯13, all believed that communication between the High Level Committee and stakeholders in the delta had been ineffective and unclear. Indeed, on a scale of 0 to 10, where 0 meant that communication had been, respectively, ineffective and unclear, the highest score given by these respondents and interviewees was only 3 for effectiveness (interviewee ♯8) and 5 for clarity (interviewee ♯13). Interviewee ♯9 and respondent C both assigned scores of 0 for the effectiveness and clarity of communication. Perhaps more strikingly, respondent I did not know about the High Level Committee. Interviewee I also noted that 'there is no communication on PIECAS' and that 'except for very few stakeholders in the delta, no one knows or knew about PIECAS'.

Interviewee ♯13 expanded on the answers given in the survey, suggesting that

'There is very little communication. The strategy of communicating solely amongst the environmental lobby has generated mistrust and even fear amongst businesses, agricultural producers and people living in the delta. Only communicating on environmental issues, or

not communicating at all, is a message that says there is no interest and that nothing is going to be done for those stakeholders or those problems (economic and social problems)'.

These negative views were balanced by much more positive assessments of communication in PIECAS from respondents D and G (both of whom worked for NGOs). Respondent D gave scores of 7 for both effectiveness and clarity; respondent G assigned scores of 8. Respondent G also provided some interesting detail to his/her answer. According to respondent G, communication had been 'good but perhaps it would be even better to formalize an exact contact point with NGOs to strengthen the links between them'.

The survey data also shine light on perceptions of the honesty with which the High Level Committee communicated. Unlike effectiveness or clarity, assessments of honesty were generally positive. Only interviewee ♯9 believed that communication from the High Level Committee to stakeholders in the delta was dishonest. Most respondents and interviewees suggested that communications were either honest (interviewee ♯13 and respondents D, E, and G) or honest from time to time (interviewee ♯8 and respondent F).

Despite the generally negative sentiment around communication, there was some evidence to suggest that new participation opportunities afforded to agricultural stakeholders by the High Level Committee had opened a window for dialogue (interviewee ♯9):

"The fact of having an opportunity for dialogue, and to be able to engage with them [the High Level Committee], *and to find us open – just as they were open – I think has given us the possibility of doing things a little better, and they're prepared to change certain positions that they had… When…there was dialogue, and we saw that we didn't actually disagree that much, things…my understanding is that they're changing."*

Furthermore, this dialogue was effective in that it filled gaps in the High Level Committee's knowledge of the delta:

"We engaged in dialogue that was very, very useful. He [Garcia de Garcias, an official at the National Environment Secretariat in charge of PIECAS] *told us that there were some aspects of the delta that he didn't know, and he thanked us for approaching him. And from there, at*

least a door had opened for us to engage in dialogue – the chance to [inaudible] *and give him our arguments."*

(It is worth noting that, despite the relatively optimistic tone adopted by interviewee ♯9 in the conversation quoted above, interviewee ♯9's answers in the survey were overwhelmingly negative. It is hard to explain the discrepancy. The survey was administered after the interview, and it is possible that interviewee ♯9's opinions had changed in the intervening months.)

These data strongly suggest that communication in PIECAS – especially communication between the High Level Committee and the delta's stakeholders – is not as clear or generally effective as desirable. However, it is more difficult to discern the impact that ineffective communication has had on PIECAS's development. Arguably, it is likely to be similar to those stemming from participation problems. Poor communication and participation have skewed PIECAS's outlook to one that is primarily environmental, even though the delta is an economically active area and characterised by diverse land-use practices. A lack of input from agricultural and other stakeholders actively living and working in the delta has shaped the plan in such a way that it may not be appropriate to the region. Poor communication has also had an impact on the plan's scope and the trajectory of its development. Interviewee ♯9 summarised the problems arising from poor communication (and participation) neatly:

"... it's also certain that if we end up making PIECAS a plan that is non-applicable because it doesn't contemplate the reality of what is happening in the delta today, the regulation will end up being an infliction on everyone, because nobody can apply it. And those things have happened a lot in the delta."

In terms of Ostrom's framework, both communication and participation are attributes of the interactions between stakeholders in the delta. Ostrom includes two second-level variables of which I suggest effective communication and participation in PIECAS are usefully seen as attributes: information sharing among users, and deliberation processes. Information sharing is made possible by communicating, and only then by communicating clearly and effectively. In PIECAS's case, these attributes of communication – clarity and effectiveness - are inadequate (although the honesty of communication is satisfactory). For the second variable – deliberation processes, participation should arguably play a key role. PIECAS fares poorly

in terms of participation in the High Level Committee, for instance, or in meetings hosted by the National Environment Secretariat. (This theme is explored in more depth in chapter 5.) Deliberation processes in PIECAS are therefore characterised by the involvement of a narrow and even restricted range of stakeholders. These are attributes that describe the nature of deliberation processes in PIECAS.

It is noted that any resource management system involves some level of communication in the sense that people talk to one another casually. The communication which is implicit in a second-level variable like information sharing is arguably more formal. The same applies to participation in deliberation processes. The effectiveness of information sharing and deliberation processes depends largely on attributes like clarity, honesty and frequency (amongst others). The presence or absence of these variables is important; but once they are present, the attributes that I describe have a significant bearing on the impact they have on resource management systems. This analysis adds a level of granularity and meaning to Ostrom's SES framework that is currently missing.

There is one final point to make in respect of communication in PIECAS. As I argue in the preceding paragraph, informal communication is a feature of everyday life. 'Chit chat' is common in any resource management system. Conversely, formal communication (and participation) processes of the kind identified by Ostrom are rarer. More importantly, these processes have meaning by reference to, for instance, procedural fairness, their translation into decisions that reflect stakeholder inputs, and the trust they engender in the management system and management authorities. Interviewee ♯13's complaint that the High Level Committee communicated only with environmentalists is especially interesting in light of this last point, because interviewee ♯13 explicitly stated that communication with such a narrow focus had led to 'mistrust' and even 'fear' amongst businesses, farmers and people living in the delta. Communication is therefore crucial to issues like trust, procedural fairness and representation in decision-making. I return to these themes in chapter 4, focusing particularly on the impact that communication has on legitimacy.

3.2.8 Political economy as a factor in PIECAS's failures

Some interviewees – notably interviewees at environmental NGOs – believed that PIECAS's failures were attributable to the efforts of certain stakeholders to obstruct the plan. These

stakeholders anticipated that PIECAS would have an effect on politically sensitive economic activities in the delta. In short, the interviewees suggested that political economic factors were at play in PIECAS's difficulties. According to these interviewees, certain groups in the delta have determined that PIECAS is detrimental to their interests, and have subsequently lobbied provincial and federal government to block the plan's development and delay its ultimate implementation. The problems that PIECAS is experiencing may therefore have less to do with the manner in which the plan is being designed, or the environment in which it is placed, and more with the response of the economic and political interests that it may disrupt.

Interviewees employed at environmental NGOs believed that the lobby who were threatened by PIECAS were 'agricultural or industrial interests' (interviewee ♯4). Interviewee ♯5 made a similar claim, noting that

"These regulations [like PIECAS] *sometimes get in the way of infrastructure regulation, infrastructure developments. They can block the development of real estate in marginal locations. All of these works are works typically associated with big business. And so the situation of weak governance in the delta favours certain sectors. And these sectors generally are associated with, or can have an important political lobby."*

However, it is difficult to attribute PIECAS's failings to the lobbying efforts of agricultural and/or industrial stakeholders. An interpretation along those lines is inconsistent with the absence of agricultural stakeholders from the plan. Instead, their apparent exclusion would suggest that the High Level Committee is intentionally blocking their input. This would certainly contradict the hypothesis that federal and provincial government are hindering PIECAS's design and implementation in order to satisfy the interests of agricultural stakeholders.

Nevertheless, other political considerations may represent factors that have contributed to PIECAS's difficulties. In particular, several stakeholders pointed out that environmental policy in Argentina generally is of secondary importance to economic policy. Furthermore, the power of the National Environment Secretariat is limited compared to the Ministry of Agriculture, say, or the Ministry of Infrastructure. For example, interviewee ♯7 believed that the *"National Environment Secretariat, that coordinates the plan, doesn't have a lot of power."* In addition, interviewee ♯7 remarked that *"obviously the Ministry of Agriculture*

has a lot more weight than the National Environment Secretariat." Similarly, interviewee ♯1 suggested that strengthening the Secretariat's voice within government would help PIECAS. In general, the Secretariat had a *"limited capacity"* to promote environmental management issues. Interviewee ♯1 hoped that the *"Secretariat would have more voice in management."* Interviewee ♯5 noted that there was a "*marked absence in the exercise of the power of policy* [in the delta]." Moreover, the slow rate at which PIECAS was being introduced was due in part to a lack of *"interest on the part of government in pushing forward that process. One doesn't notice that…there's an honest interest in pushing forward that process…"*

Collectively, these comments give the impression that PIECAS and environmental management in the delta generally lack the political support enjoyed by economic policy. This is hardly surprising. The latter is seen to promote social welfare more effectively than the former. In this respect, the comparatively limited power wielded by the National Environment Secretariat is also predictable. However, it is likely that the relative unimportance in government of environmental issues has contributed to PIECAS's problems in a significant way. In particular, political support for PIECAS probably dissipated after the fires in 2008, and so the willingness of federal government and provincial governments to take on the political risk associated with implementing PIECAS has decreased. That political risk is meaningful because there are apparently powerful lobbies like real estate with interests in the delta (even if the agricultural lobby, usually powerful elsewhere, does not appear to be playing an important role in obstructing PIECAS). At its core, PIECAS is a political initiative and therefore requires political support to see it accepted by both houses of federal and provincial government. Support may be contingent on the attitudes that lobbies have to the plan. Without such support, and given the general antipathy toward environmental policy in Argentina, it is unsurprising that little progress has been made in implementing PIECAS.

The broad political economic factors identified are attributes of at least two of the second-level variables identified in Ostrom's framework. The lobbying that at least some interviewees believed was taking place falls within the 'lobbying activities' second-level variable. Equally, the general political economic climate in Argentina is a feature of the external political settings that Ostrom includes in the framework. Ostrom specifically mentions 'political stability' as an external second-level variable. It is not clear whether these political economic factors are aspects of political stability. There is a sense that government processes in Argentina do not always follow due process as strictly as they

should because of political economic factors. As a result, there is a tendency toward political instability (consider, for instance, the Argentine government's default on its debt in 2002).

Finally, there is an interesting interaction between these political economic factors and the aforementioned problems with participation. The interview data suggest that there is a tension between political influence over PIECAS and the plan's design and ultimate implementation. Of course, participation is one way to counteract political influence – but as seen, participation in PIECAS is not as inclusive or representative as perhaps it might. The other way to overcome political influence is to establish clear rules that limit the power of lobbyists to influence the decision-making process; but again, the lack of operational rules in PIECAS means that such rules do not exist. The two elements that could mitigate the impact of political economic factors are therefore missing in PIECAS.

3.2.9 PIECAS's legitimacy

A final factor that may explain PIECAS's difficulties is the perception that the plan lacks legitimacy. Legitimacy has an important role once a resource management plan is actually implemented through its effect on compliance (see, for instance, Nielsen, 2003), but it may also be significant at the design stage because it shapes support for a plan. For instance, a management plan that is considered illegitimate is unlikely to have buy-in from stakeholders, which in turn will increase the political costs associated with its implementation. Indeed, a plan totally lacking legitimacy is almost by definition politically unviable, unless the form of government is tyranny. Legitimacy is therefore a factor that determines how interests coalesce in favour or in opposition to a resource management plan.

The interview and survey data suggest that, by and large, PIECAS lacks legitimacy. Interviewee ♯10, for instance, said that PIECAS is *"totally, totally"* illegitimate. Interviewee ♯1 similarly noted that *"it lacks legitimacy."* Interviewee ♯12 also believed that PIECAS lacks legitimacy, and linked this to poor communication. In addition, interviewee ♯12 felt that more participation in the plan would be helpful; a significant challenge for the plan's legitimacy was to *"recognise local participation."* Finally, interviewee ♯5 also suggested that PIECAS lacks legitimacy. Like interviewee ♯12, interviewee ♯5 attributed this to poor communication and limited opportunities for participation. Interviewee ♯5 focused on PIECAS meetings, for example, noting that few had been held and that those that had taken

place were largely ineffective. The emphasis that interviewees ♯5 and ♯12 placed on communication and participation is worth highlighting. It suggests that, in the Paraná delta at least, communication and participation are linked in some way to perceptions of legitimacy. As I have mentioned elsewhere, this connection is explored further in chapter 4.

Despite these strong views, a number of interviewees suggested that perceptions of PIECAS's legitimacy varied between different stakeholder groups. Interviewee ♯3, for instance, said that views on legitimacy depended on the group in question, and that some groups were more aware of PIECAS than others. (Presumably those groups who are unaware of PIECAS do not have a firm opinion on its legitimacy.) Similarly, interviewee ♯4 argued that, in a purely legal sense, PIECAS had legitimacy because it had been conceived and was being designed by democratically elected officials. Nonetheless, in recognition perhaps of the participation problems that PIECAS has experienced, interviewee ♯4 suggested that PIECAS requires a 'more democratic process' in respect of its legitimacy.

The survey data provide a similar picture of PIECAS's legitimacy as the interview data. Respondent C believed that PIECAS had no legitimacy for the moment, while respondent F suggested it lacks legitimacy entirely. Interviewee ♯9 also suggested that PIECAS lacks legitimacy. Interviewee ♯13 believed that PIECAS had no legitimacy for the moment. Interestingly, respondents C and F and interviewees ♯9 and ♯13 had connections to agriculture in the delta. Respondent C worked for the Argentine Forestry Association (AFOA, to give its Spanish acronym) and respondent F was a farmer. Conversely, respondents D, E, G and interviewee ♯8 all believed that PIECAS was legitimate. These respondents worked either at NGOs (respondents D and G, interviewee ♯8) or in provincial government (respondent E). Finally, respondent I argued that legitimacy was of secondary concern to PIECAS given that no environmental or social measures had yet been taken under PIECAS.

Some of these answers were coupled with comments that provide additional detail on the factors that might underpin these perceptions of legitimacy. For instance, respondent D – who believed that PIECAS was legitimate – noted that the 'provincial governments don't apply decisions and so weaken legitimacy'. Respondent D commented further that 'the officials who represent the provinces in PIECAS have limited decision-making power in their provincial state structure'. Interviewee ♯13 argued that, although the existence of PIECAS

was important, a failure to 'contemplate other realities and to consult the remaining interests [in the delta] in order to create answers and policies for real problems (environmental, economic and social)' detracts from PIECAS's legitimacy and may even 'turn [PIECAS] into a threat for certain sectors'.

It is evident from the interview and the survey data that perceptions of PIECAS's legitimacy vary. Some groups consider that PIECAS lacks legitimacy, while others believe that PIECAS is totally legitimate. Nonetheless, it is striking that those interviewees who argued that the plan lacks legitimacy represented a range of professions. Academics (interviewee ♯1), agricultural stakeholders (interviewees ♯9, ♯10 and ♯13, respondents C and F), officials from the High Level Committee (interviewee ♯12), and environmental NGOs (interviewee ♯5) all suggested that PIECAS is in some way illegitimate. It is perhaps an indication that PIECAS' legitimacy is not widely and firmly established. Furthermore, there is a sense that the stakeholders with the strongest reason for being interested in PIECAS – agricultural stakeholders and government officials on the High Level Committee – are the ones most likely to question PIECAS' legitimacy.

Where the interview and survey data are less useful is in providing information on the specific effect that legitimacy may have had on the PIECAS design process. With limited data, it is difficult to support the idea that negative perceptions of legitimacy are an important factor in explaining PIECAS's difficulties. Nevertheless, it is interesting that a link was made between legitimacy and communication and participation in the plan. As argued in sections 3.2.6 and sections 3.2.7, poor participation and communication have had a detrimental impact on PIECAS because it has given the plan an overly environmental outlook and therefore caused a loss of support from stakeholders who recognise that PIECAS cannot be purely environmental because the delta is a mixed-use area. It is possible that there is a chain connecting this poor communication and participation to a lack of legitimacy, with a lack of legitimacy in turn leading to a loss of support. Although this cause-and-effect relationship remains speculative at best, it does explain how poor communication and participation can lead to a wider loss of support. Conversely, it is difficult to intuit how communication and participation alone could directly cause a loss of support for PIECAS.

Thus, legitimacy may have explanatory power in helping us to understand PIECAS's failures. As a result, it is not a second-level variable in Ostrom's framework. Instead, it is a factor that

tells us something important about a great many of the second-level variables listed in the framework. For instance, legitimacy is an attribute of constitutional, collective-choice and operational rules that has a measureable impact on the effectiveness of those rules (through its role in shaping compliance). It is an important feature of leadership, because a leader's authority is grounded in his legitimacy. Stakeholders can also perceive government and non-government organisations (also second-level variables) as legitimate or illegitimate. In government-led resource management systems like PIECAS, the legitimacy of government organisations is vital because it may determine whether the management system itself is legitimate. Consider, for instance, a resource management system implemented by a government department that has lost all legitimacy amongst affected stakeholders. The resource management system by extension will lack legitimacy of its own (see, for instance, King, 2011, and chapter 6). Finally, legitimacy is an attribute of at least one of the external settings mentioned by Ostrom: existing government resource policy may or may not have legitimacy.

Given the number of second-level variables that can be described as legitimate or illegitimate - especially in the governance subsystem of a SES - it is clear that legitimacy has significant explanatory power and provides us with a better understanding of many of the second-level variables listed by Ostrom. What is less obvious is how legitimacy emerges in a resource management system. Although Ostrom's SES framework cannot address this question (indeed, the framework does not analyse legitimacy at all), some of the second-level variables identified (deliberation processes, for instance) are plausibly linked to legitimacy. Furthermore, the interview and survey data provide us with some clues about the conditions that allow legitimacy to emerge. In PIECAS, for instance, legitimacy was linked to communication and participation processes by interviewees ♯5 and ♯12. Interviewee ♯4 believed it corresponded to the legality of a resource management system. Interviewee ♯13 discussed how a failure to take into account different perspectives on the delta had detracted from PIECAS' legitimacy. These observations are important to the analysis in chapters 4, 5 and 6.

3.2.10 Summarising the factors that explain PIECAS's difficulties

It is clear from the preceding discussion that the problems from which PIECAS has suffered – primarily the failure to implement the plan, despite six years passing since its establishment

– are underpinned by a variety of factors. Although it is at times difficult to determine whether some factors are causes of the plan's problems, and others symptoms, I believe it is likely the factors outlined are indeed contributing in some way to the plan's difficulties. Arguably, the most significant factor in the plan's stasis is the complexity of the delta's legislative environment. The vesting of responsibility for natural resources at the provincial level outlined in Article 124 of the Argentine Constitution creates a fragmented legislative landscape, with each province in the delta regulating on environmental issues in slightly different ways. Evidently, designing PIECAS so that it is consistent with each of these provincial legislative frameworks is challenging; and to date, PIECAS has not apparently succeeded in meeting that challenge. The situation is complicated further by Decree 8912/77 in Buenos Aires province, which provides municipalities, rather than the Buenos Aires provincial government, with the authority to manage natural resources. Decree 8912/77 therefore adds an extra layer of law with which PIECAS must align.

A factor that is potentially connected to legislative fragmentation in the delta is PIECAS's overly broad objectives. Arguably, these objectives are not achievable in any practical sense. They have therefore exacerbated the difficulties presented by the delta's legislative environment because they provide the High Level Committee with little if any guidance on the particular regulatory tools that could be used to achieve them.

In addition to these constraints on PIECAS's development, the events and steps leading up to the plan's inception may have played a role in the plan's current difficulties. In particular, PIECAS appears to have been a politically motivated response to the fires that swept through the delta in 2008. As a result, political support for the plan was directly correlated to the political costs associated with the fires. Once the fires died down, and the costs of inaction were reduced, political support for the plan decreased. Indeed, PIECAS arguably continues to suffer from insufficient political interest. Conversely, it is reasonable to assume that the plan is more likely to have been successful if there was genuine political conviction that an environmental strategy for the delta was important and necessary.

The lack of political support from which PIECAS may suffer is also attributable to the secondary importance of environmental policy in Argentina compared to economic policy. Although it is not surprising that economic issues are of greater concern to the Argentine government than environmental issues, it does mean that PIECAS is unlikely to be seen as a

priority by either federal or provincial government. Furthermore, the federal government department responsible for designing and implementing PIECAS – the National Environment Secretariat – lacks power relative to ministries like the Ministry of Agriculture. The officials designing PIECAS therefore have less voice in government than their counterparts at Agriculture and Infrastructure, say. This too may contribute to a lack of political support for PIECAS.

Finally, there are aspects of the manner in which PIECAS has developed over the last six years that have led to disillusionment with the plan. In particular, the High Level Committee has poorly communicated the plan's design. Opportunities for participation in the plan have been limited. Certain groups have until recently remained conspicuously absent from the plan, notably agricultural stakeholders. Poor communication and scant participation have arguably affected the plan in two ways. Firstly, they have limited the input of stakeholders who do not necessarily have an environmental outlook. As a result, PIECAS may have objectives that are overly environmental and not commensurate with the range of economic activities taking place in the delta. In turn, PIECAS may prove inappropriate to the delta, and in that respect have unintended and/or harmful consequences.

Secondly, PIECAS's problems with communication and participation may have caused the plan to lose legitimacy with stakeholders in the delta. A loss or lack of legitimacy is problematic both for future compliance and for current support for the plan. The latter is an important factor because it shapes political coalitions for or against PIECAS, and therefore increases or decreases the political costs associated with implementing the plan. If, for instance, PIECAS did not have widespread support amongst the stakeholders who were likely to be affected by it, then government's appetite to implement the plan would be significantly reduced.

This discussion on legitimacy is also important in the context of the remainder of the thesis. The interview and survey data suggest that there is a link between legitimacy and communication and participation. Indeed, communication and participation can be seen as criteria that, if satisfied, would have increased the likelihood that PIECAS was perceived as legitimate. Communication and participation would therefore have served a legitimation function in PIECAS. The legitimation function framework is outlined in chapter 4.

Table 10 below summarises the factors that appear to be contributing to the difficulties that PIECAS is experiencing, and where appropriate maps these factors to second-level variables in Ostrom's framework, or maps them as attributes of second-level variables.

Table 10. Factors underpinning PIECAS's failings to date.

Factor	Attribute/corresponding second-level variable
Legislative fragmentation	Attribute of constitutional, collective-choice, operational and property-rights rules.
Un-implementable objectives	Attribute of constitutional, collective-choice and operational rules.
Decision-makers lack a profound understanding of the delta	Attribute of knowledge of SES/leadership.
Plan's development was politically motivated/ convenient	Attribute of leadership
Lack of clear, effective communication	Attribute of information sharing between stakeholders
Limited and/or restricted participation	Attribute of deliberation processes between stakeholders
Political economic factors	Attribute of lobbying activities/external political settings
Lack of legitimacy	Attribute of government organisations, and constitutional, collective-choice and operational rules.

3.3 Study II – Successful management in the Alaskan Pacific halibut fishery

I now turn to an examination of the factors that appear to underpin the largely successful management of the Alaskan Pacific halibut fishery. The fishery makes a valuable case study because its fortunes have ebbed and flowed over the last 25 years. In particular, it was in a state of crisis prior to the introduction of IFQs in 1995. A natural experiment therefore took place when the management plan changed, in that most of the fishery's key attributes remained constant save for the management plan itself. Although attribution remains difficult, the experiment does at least give one greater confidence that outcomes post the introduction of IFQs are indeed linked to IFQs themselves. For more details, see chapter 2.

3.3.1 The fish and the fishery

Pacific halibut (*Hippoglossus stenolepis*) are flatfish of the family Pleuronectidae. They are a long-lived species, and can reach large sizes; older specimens weigh up to 250kg, although most halibut caught in Alaskan and Canadian fisheries weigh between 5 and 30kg (Bell, 1981). They are found in the coastal waters of the Pacific north-west, ranging from northern California to the Bering Sea. They are most heavily concentrated in waters off Alaska and British Columbia (Casey et al., 1995).

There are three key organisations involved in the Alaskan halibut fishery: the International Pacific Halibut Commission (IPHC); the North Pacific Fishery Management Council (NPFMC); and the National Marine Fisheries Service (NMFS). The NPFMC and NMFS were created by the 1976 Magnuson-Stevens Fishery Conservation and Management Act. The NPFMC is charged with managing halibut and other species within the United States' 200-mile Exclusive Economic Zone (EEZ). The NPFMC develops fishery regulations for Alaskan waters, which are then approved by the NMFS (representing the federal government). In the case of the halibut fishery, the NPFMC works closely with the IPHC. The IPHC provides information on the state of the halibut stock through stock assessments, as well as conservation measures – including harvest limits - in ten statistical regions across the Gulf of Alaska, Aleutian Islands and eastern Bering Sea. The NPFMC then chooses how to allocate the harvest limits determined by the IPHC. Figure 3 below shows the position of the 10 IPHC regulatory regions.

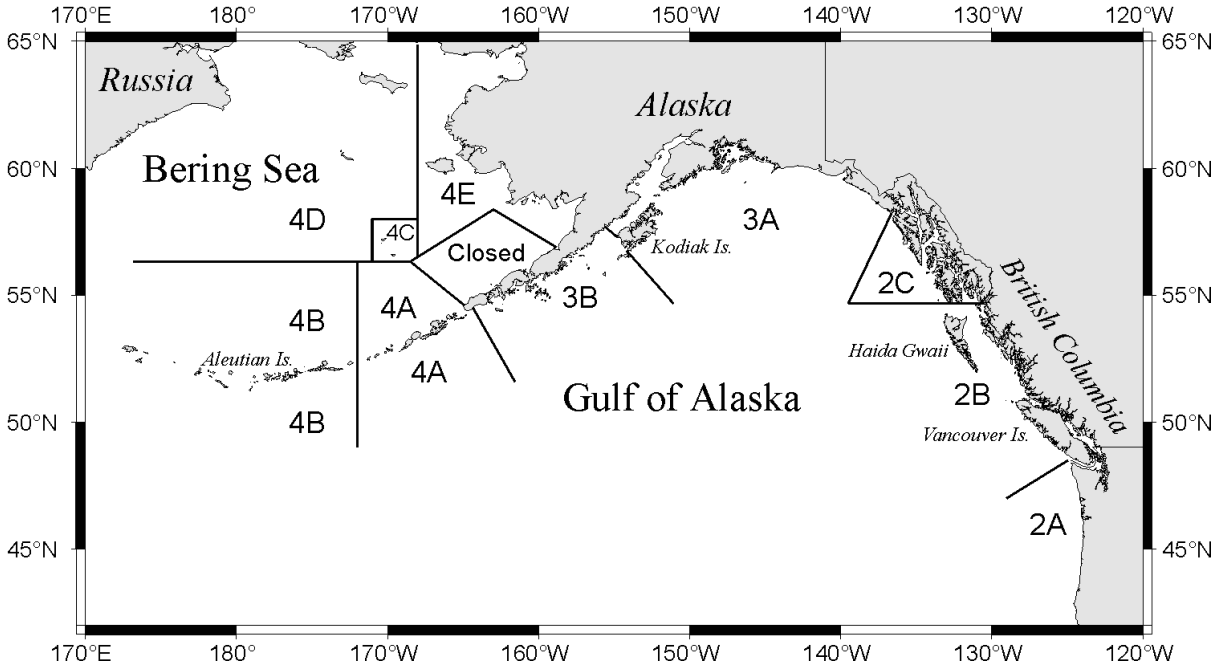


Figure 3. IPHC regulatory areas. (Source: NMFS.)

The IPHC significantly pre-dates the NPFMC and NMFS. Its history is noteworthy. It was established after apparent over-fishing of the halibut stock at the turn of the 19th Century. The first commercial halibut fisheries developed in British Columbia (Canada) and Washington state (United States) in the 1880s, before spreading to south-eastern and south-central Alaska and the Aleutian Islands (*ibid*). As early as 1914 – some thirty years after the development of a halibut fishery - it appeared that stocks were declining (IPHC, 2014a). In response to these declines, regulation was introduced under the 1923 Halibut Convention between Canada and the United States. The Convention provided for a 3 month long close season during the winter, as well as regulation on halibut caught accidentally during the close season (IPHC, 2014a). The Convention also led to the establishment of the International Fisheries Commission, which later became the IPHC.

Under the IPHC's recommendations, the halibut stock rebuilt. However, two factors led to the re-emergence of over-fishing in the fishery from about 1950 onward, and also established structural flaws that caused serious problems in the 1980s and 1990s. Firstly, increased stock abundance led to an increase in catch limits, which in turn attracted more and more vessels to the fishery (Criddle, 2012). The effect was compound by the ease with which vessels could join the fishery. There were no restrictions on entry, except for vessel registration and fishing permits. Entry into the fishery was also facilitated by increases in the price of halibut in the

1970s, which encouraged fishermen previously involved in salmon gillnet and trawl fisheries to switch to halibut fishing. A limited entry programme in the salmon fisheries was a further incentive to move into halibut fishing (Hartley and Fina, 2001a). Secondly, managers were unable to prevent foreign vessels that were fishing outside United States territorial waters from over-harvesting halibut. Prior to 1966, territorial waters only extended 3 nautical miles (hereafter, miles) from the coast. Post-1966, they reached 12 miles, but it was only in 1976 that the United States assumed full regulatory authority over all fishing in its EEZ (Criddle, 2012).

In an attempt to address stock declines, fishery managers introduced a TAC, imposed gear restrictions, and limited the length of the fishing season. For the latter, the IPHC designated an opening date for each regulatory region under its jurisdiction. It would then close the season when it appeared that the TAC was on the verge of being harvested. However, it proved difficult to monitor catches during the open season; frequently, the TAC was exceeded before the IPHC had finished counting the catch. As a result, TAC overages were common (Hartley and Fina, 2001a). The problem was exacerbated by the increasing number of participants in the fishery, who were encouraged to join by the incentives outlined above. In response to these difficulties, the IPHC progressively shortened the fishing season. The rationale was that shorter seasons would give fishermen less time to exceed the TAC. Thus, in 1975, the fishing season totalled 125 days. By 1985, it was only 25 days long; and by 1994, the season was a mere 3 days for most vessels in the American fleet, with fishing in some regulatory areas restricted to 24 hour periods (Fina, 2011; IPHC, 2014a).

However, shortening the fishing season had a number of unintended consequences. In particular, it magnified the effects of the perverse incentives created by TACs. TACs incentivise fishermen to compete against one another for catch (or more properly, a share of the fleet-wide TAC), because the fish caught by one fisherman cannot be caught by another fisherman. (This is a property of CPRs termed ‘subtractibility of use’ by Ostrom – see the introduction to the thesis.) This incentive is made worse by the time constraints imposed on fishermen in a shortened season. Fishermen have a limited amount of time in which to catch the fish on which their livelihoods depend. They are therefore not just competing against themselves for a share of the TAC; they are also racing against time. In the halibut fishery, the combination of incentives created by TACs and progressively shorter fishing seasons led to the emergence of ‘halibut ‘derbies’ or a ‘race to fish’.

The halibut derbies led to a number of serious problems in the fishery. Alverson (1997), Hartley and Fina (2001a) and Grimm et al. (2012) have detailed these problems extensively, and the discussion that follows is based heavily on their work. Above all, halibut derbies compromised the safety of halibut fishermen. Firstly, the opening day of the fishing season was arbitrary from the point of view of weather. Both fishery managers and fishermen had no way of knowing what the weather would be like on the opening day. In a typical fishery with relatively long seasons, the state of the weather on the opening day is not problematic because fishermen can choose to postpone their operations until the weather improves. However, in the shortened seasons that characterised the halibut fishery in the 1990s, fishermen had no operational flexibility. They were obliged to put to sea even in dangerous conditions, because the season might finish before the weather turned and before they had had an opportunity to catch any fish. Secondly, the limited amount of time available in a shortened season meant that any pauses in fishing carried a significant opportunity cost. Fishermen therefore fished round-the-clock and in all weathers.

Unsurprisingly, the halibut fishery during the derbies was a dangerous place to work. A comparison of the average number of IFQ search and rescue missions undertaken by the United States Coastguard Service demonstrates how dangerous the fishery had become. Grimm et al. (2012) suggest that there was an average of 27 search and rescue missions per season before the introduction of IFQs. In comparison, there was an average of 5 search rescue missions per season between 1999 and 2012 for both the halibut and sablefish fisheries (NOAA, 2012). Furthermore, figures from Alverson (1997) show that there were 2 to 3 fatalities a year during the halibut derbies, with six fatalities in 1992 alone. Conversely, there were an average 0.7 fatalities between 1999 and 2012 in the halibut and sablefish fisheries (NOAA, 2012).

The high opportunity costs characteristic of the halibut derbies also influenced fishing practices. In order to maximize catches during the limited window open to fishing, fishermen would often set more fishing gear than they could retrieve before the season ended. Any gear that had not been hauled in before the season closed was abandoned. In addition, gear would become entangled because so many vessels (4,000 to 6,000) were fishing at the same time (Alverson, 1997). The derby fisheries were therefore characterised by significant gear losses, with losses valued in the region of $2.0 to $2.4 million annually (*ibid*). In addition, abandoned or entangled gears continued to catch fish, because halibut and other species

would hook themselves on abandoned gear and subsequently die. Lost gear therefore contributed to high fish mortality and over-harvesting problems. 'Deadloss' from unretrieved gear was estimated to be between 2 million and 2.5 million tonnes in 1990 and 1991, respectively (Hartley and Fina, 2001a).

High halibut mortality was also driven by harvesting in excess of the TAC (a perverse and tragic outcome, given that shortened seasons were meant to reduce TAC overages). The problem was that regulating the length of the fishing season was actually a crude tool for achieving a pre-determined TAC. It was difficult to predict when the TAC had been reached, and so over-shooting (and under-shooting) of the catch limit was common (Hartley and Fina, 2001a). Indeed, Grimm et al. (2012) suggest that catches in excess of the TAC averaged between 5% and 10% during the derby fishery years.

Finally, the halibut derbies affected the quality of the halibut brought to port, to the detriment both of consumers and fishermen. One problem was that halibut were poorly handled and inappropriately stored during the rush to maximize catches, affecting product quality. Furthermore, a consequence of the shortened seasons was that halibut were delivered to ports for processing at roughly the same time. With so many participants in the fishery (as shown above, some 4,000 to 6,000 vessels), there was in effect over-supply of halibut and insufficient demand to sell it all fresh. Thus, the majority of the fish that were caught were subsequently frozen, even though frozen halibut is less desirable to consumers and fetches a lower price than fresh halibut. Both consumers and fishermen suffered. Fishermen had the added problem of being unable to bargain with processors for better prices for their catch, because the number of fishermen selling halibut was large relative to the number of buyers (the processors). Processors essentially formed an oligopsony.

Another ramification of halibut over-supply was the development of an excessively capitalized processing sector. Given that halibut were delivered at roughly the same time, the processing sector needed enough equipment to handle a high volume of halibut in a short space of time. The processing sector's investment decisions were made with these requirements in mind. However, longer seasons would reduce the amount of processing equipment necessary and leave processors with stranded capital. The introduction of IFQs led to the realisation of just this problem.

In light of these difficulties, it is reasonable to argue that the fishery was in a state of crisis by the time a move to IFQs was sanctioned. From a social (safety), economic (gear losses, low product quality, oligopsony in the processing sector), and ecological (TAC overages, deadloss) perspective, the derby system was failing. It was certainly unsustainable. The transformation that IFQs have engendered is in many ways remarkable, although they have also had some harmful social impacts. I now turn to describing IFQ management in the halibut fishery, and the steps that led to their introduction.

3.3.2 IFQ management in the halibut fishery

At the time that the fishery was experiencing the difficulties discussed above, the Canadian Department of Fisheries and Ocean (DFO) was in the process of introducing an individual vessel quota (IVQ) system for the British Columbia halibut fishery. The Canadians' decision to move to IVQs was in response to problems that were largely similar to those being suffered in the Alaskan fishery (Casey et al., 1995). The effects of IVQs on the British Columbia halibut fishery were dramatic: the season lengthened to 245 days (or 9 months); there were increased sales of fresh fish; product quality improved; and fishermen enjoyed increased processing options (Herrmann and Criddle, 2006). Furthermore, the spread between ex-vessel halibut prices in British Columbia and Alaska jumped from US$0.32 per pound before 1990 to US$0.95 per pound between 1991 and 1994 – after IVQs had been implemented in British Columbia but prior to IFQs' introduction in Alaska (*ibid*).

The positive experience with IVQs in Canada, and recognition that something had to change in the Alaskan halibut fishery, prompted the Americans to introduce an IFQ system in 1995. The basic principle on which IFQ management is based is that holders of 'quota shares' are entitled to a fraction of the TAC set for a given regulatory region (Hartley and Fina, 2001b). Quota shares (QS) were initially allocated in 1994, and were based on the average amount of halibut active participants in the fishery had caught in a qualifying period between 1988 and 1990. One pound (lb) of halibut was equal to one quota share. The quota shares that any individual fisherman owns are then used to calculate an annual IFQ, or the pounds of halibut that a fisherman is allowed to harvest in a given fishing season. The annual IFQ is calculated using the following equation (QSP is the 'quota share pool', or the total amount of quota issued in a specific regulatory region):

(QS/QSP) x TAC = annual IFQ

There are different classes of quota share, depending on the regulatory region and vessel type to which they apply. The IFQ that flows from QS issued for one particular regulatory region cannot be used in another regulatory region. QS holders can sell their rights, although there were and are restrictions on trading and ownership to avoid quota consolidation and changes in fleet structure. For instance, in the Aleutian Islands and Bering Sea, QS ownership is capped at 1.5% of the total QSP in both areas. In the Gulf of Alaska and southeast Alaska regulatory regions, ownership cannot exceed 0.5%. Furthermore, QS holders must be on-board the vessel that catches their allocated halibut (Carothers, 2008a). The exception to this provision is one quota share class ('A' shares, or 'freezer' shares), which applies to vessels that can process their catch at sea. Finally, only American citizens, corporations or partnerships are eligible to own QS.

Almost 20 years after their introduction, the IFQ reforms are by and large regarded as a success. Many of the apparently intractable problems that affected the halibut derbies have been solved or mitigated by IFQs. For instance, and perhaps most importantly, the length of the halibut season increased; it now stands at 244 days (NOAA, 2014), a dramatic transformation compared to the two or three-day seasons that took place in 1994. As a result, fishermen's safety has improved significantly. In addition, gear losses and 'deadloss' from abandoned gear have been reduced. Finally, for those fishermen who were allocated quota and so were able to participate in the IFQ fishery, the reforms have provided a significant windfall. Many fishermen now make 'low six figures' compared to the 'poverty wages' of the halibut derbies (interviewee J).

Nevertheless, it is disingenuous to claim that the IFQ reforms have been an unqualified success. In particular, they have had serious socio-economic consequences (Carothers, 2008b). Quota share has consolidated in the hands of a narrowing pool of fishermen and organisations. For instance, NOAA (2012) noted that there were fewer quota share holders in 2012 than there were when quota was initially allocated in 1994. The total number of holders fell from 4,827 in 1994 to 1,482 in 2012, a 69% reduction.

In addition, the impact on small, rural communities has been significant. Quota share has flowed out of these communities, even though fishing has traditionally represented an

important component of the local economy (Carothers, 2013). The number of halibut and sablefish IFQ holders in small Gulf of Alaska communities decreased 46% between 1995 and 2011 (NOAA, 2013). With few alternative economic opportunities, there is justifiable concern about unemployment in rural communities and its associated socio-economic impacts (*ibid*). Furthermore, the dollar value of the quota shares that have migrated out of rural communities is significant. For instance, a block of 1300 quota shares for statistical region 2C in the Gulf of Alaska was worth $66,300 in mid-2015 (Alaska Broker, 2015). A block of quota share of this size represents approximately 20% of the 2015 average per-vessel catch of halibut (and 2015 was a 'poor' year in which only 68% of the fleet-wide TAC was caught – NOAA, 2015). The loss of quota share therefore represents a serious reduction in the financial assets owned by these communities.

Another problem that has emerged with IFQ management is significant barriers to entry for new participants in the fishery. Above all, this has affected younger fishermen. One aspect of the problem lies in the high value of IFQs. As the figures above demonstrate, a block of quota share is now expensive enough that it is difficult for younger fishermen to raise the capital required to buy it in sufficient quantity to justify fishing. The cost of entry into the fishery is therefore an inter-generational issue and requires attention from managers.

Finally, the structure of the IFQ reforms has led to the emergence of 'hired skippers' – skippers who are hired to fish QS belonging to another fishermen. The 'owner on board' restriction that accompanies QS ownership was conceived of as a way to avoid situations where QS owners are not actually active participants in the fishery. Nonetheless, the impact that hired skippers have on the fishery is significant. In 2012, for instance, hired skippers caught 45.5% of the entire halibut TAC (NOAA, 2012). These numbers have largely remained steady over the last 15 years; the average percentage of the halibut TAC caught by hired skippers between 2000 and 2010 was 44.78% (data are missing for 2007). However, it is worth noting that the number of hired skippers who do not own QS themselves has fallen between 2000 and 2012, from 41.2% to 29.6% (figures are calculated from NOAA reports between 2000 and 2010).

Overall, then, the IFQ reforms achieved many of their stated goals. Most importantly, they ended the halibut derbies and the problems associated with a race to fish. They have benefitted consumers, and some fishermen have seen their incomes rise. Nevertheless, the

socio-economic consequences of IFQs, especially in rural Alaskan communities, have been significant. It is a source of continued concern for the fishery's management authorities and participants alike.

3.3.3 Understanding the fishery and IFQ management using Ostrom's SES framework

As with the Paraná delta and PIECAS, I use Ostrom's SES framework to break down the fishery into its constituent subsystems. Tables 11, 12, 13, and 14 below describe the fishery subsystem by subsystem.

Table 11. Description of the fishery's resource subsystem.

Resource subsystem	Description
Type of resource system	Fishery
Location	Coastal waters off Alaska, United States
Size of resource system	Large – several thousand km^2
Productivity of system	Productive
Clarity of fishery boundaries	Clear – well-defined EEZ
Human-constructed facilities	Ports, processing plants
Predictability of system dynamics	Difficult to predict, but sophisticated means of doing so.

Table 12. Description of the resource units in the fishery.

Resource units	Description
Types of resource unit	Pacific halibut, *Hippoglosus stenolepis*
Economic value of fish stock	From \$2.72 to \$6.29 per pound (2014 prices)[12]
Resource unit mobility	Mobile

[12] Source: NOAA Fisheries Alaska. *Average ex-vessel prices*. [Online] Available from: www.alaskafisheires.noaa.gov/ram/halibut_multiyr.xls. The spread between maximum and minimum prices increased between 2013 and 2014.

Table 13. Description of actors in the fishery.

Actors ('users') subsystem	Description
Fishermen:	
Socio-economic status	Varied, from poor to very wealthy
Knowledge of SES	Profound, even if not couched in scientific language
History of use	Long history of use; often community-based.
Leadership	In some cases, intimately involved in fisheries management.
Fisheries management officials – NMFS:	
Knowledge of SES	Criticised for poor knowledge
Fisheries management officials – NPFMC:	
Knowledge of SES	Very strong, both in scientific and traditional terms.
Fisheries management officials – IPHC:	
Knowledge of SES	Very strong, especially in scientific terms (outstanding fisheries science background).
Non-governmental organisations:	
Knowledge of SES	Varied; in some cases, run by fishermen and therefore strong.

Table 14. Description of the fishery's governance subsystem

Governance subsystem	Description
Government organisations	National Marine Fisheries Service (NMFS) North Pacific Fisheries Management Council (NPFMC)
International organisations	International Pacific Halibut Commission (IPHC)
Non-governmental organisations	Numerous; for instance, Alaska Longline Fishermen's Association
Property rights systems	Pseudo-property rights in the form of a 'privilege' to the resource; can be revoked or renewed at the discretion of the United States government.
Operational rules	Quota share-based IFQ allocations; IFQ limits on catches; closed seasons; management fee

Governance subsystem	Description
Collective choice rules	IPHC 'Commission' recommends TAC and management measures; NPFMC 'Council' implements measures; NMFS oversees measures
Constitutional rules	Magnuson-Stevens Fishery Conservation Act and Management Act 1976 Halibut Act 1982
Monitoring processes	Thorough and extensive; IPHC collects ecological data; NMFS collects fishery data
Sanctioning processes	Thorough and extensive

3.3.4 Factors underpinning the success of IFQ management in the halibut fishery

The dramatic turnaround that the fishery experienced following the introduction of IFQs suggests that many of the changes observed were attributable to the characteristics of IFQs themselves. Indeed, many interviewees I spoke to during my field work agreed that IFQs were simply the right tool for the problem at hand. For instance, interviewee D said that *"ITQs aren't the cure-all, but they're really good at ending the race to fish. So if that's your problem, that's your tool."* The fishery's general success since 1995 is therefore attributable in part to the choice to use IFQs instead of other management tools. Again, interviewee D argued that, *"it was a good match of a policy tool to the problem."* Interestingly, other alternatives had been considered by the NPFMC to address the fishery's problems, namely licence limitations and annual fishing allocations (Carothers, 2008a). These proposals were rejected by the NPFMC because they were deemed not to address economic overcapitalization and to be an administrative burden, respectively (NOAA, 1993).

The decision to reject licence limitations and annual fishing allocations is instructive because it demonstrates that the NPFMC had a clear understanding of the root of the problems from which the fishery was suffering. Indeed, a NOAA report (NOAA, 1993; pg. 59380) noted that, 'The economics of the halibut and sablefish fishery were a central concern to the Council [the NPFMC] and a motivating influence to develop the IFQ programme. Six of the ten conservation and management problems identified by the Council are economic problems'. Thus, it is evident that the Council had spent some time defining and

understanding the nature of the problem confronting them. It had specified ten key problems (allocation conflicts, gear conflicts, deadloss from lost gear, by-catch loss, discard mortality, excess harvesting capacity, product wholesomeness, safety, economic stability in the fisheries and fishing communities, and rural coastal community development of a small boat fleet). It also had a grasp of the management tools available and the likelihood that they would solve these problems.

The NPFMC had an advantage in this respect because of the Canadian experience with IVQs in British Columbia. There was clear evidence from British Columbia that IVQs were effective in ending the race to fish. Furthermore, other fisheries provided additional information on the impacts the NPFMC could expect if it introduced IFQs into the halibut fishery. New Zealand, for instance, had transitioned to ITQ management in October 1986 (Annala, 1996). The NPFMC therefore had up to eight years' worth of data to consider for the fishery's IFQ programme, and some of these data were directly comparable to the halibut fishery itself.

The Canadian experience with IVQs was probably especially valuable to the NPFMC given that it was essentially the same fishery. Indeed, interviewee A believed that there had been a 'leadership effect' from the British Columbia fishery. Similarly, interviewee C noted that, *"…this was something where everyone pretty much had a look at British Columbia and said, 'Wow, it's working so well up there, we should do the same thing'."* Although not a major factor contributing to the IFQ programme's success, it is nonetheless important that the NPFMC had evidence from British Columbia and elsewhere about how best to design an IFQ programme and how to avoid problems like quota consolidation. It is likely that existing experience with IFQs facilitated the design process. In short, the NPFMC was aware of the types of impacts IFQs might have, and also had some idea about the ways in which an IFQ management system might be designed. Furthermore, the subsequent success of IFQs reinforced the value of operating a resource management plan along such lines, which in turn begat further success. A virtuous, mutually-reinforcing circle was established.

The idea that IFQs were the right tool for the problem at hand has explanatory rather than descriptive power, and is therefore clearly not a second-level variable in Ostrom's framework. Furthermore, it is not an attribute of any existing second-level variables. The leadership effect from British Columbia's experience with IFQs is easier to map to the

framework. It maps neatly to 'leadership' in the users subsystem, although it is perhaps worth emphasising that successful leadership is the key. A further important subtlety is that leadership in the sense implied in my discussion refers to the overall experience in British Columbia as the key element in persuading managers in the Alaskan halibut fishery that IFQs were a sensible management tool. Leadership from one or a handful of Canadian officials or stakeholders (encouraging the Americans to adopt IFQs, for instance) may have been important, but there are no data to corroborate this.

3.3.5 The development of the IFQ programme

In a related way, the manner in which the NPFMC developed the IFQ programme was arguably a key factor in the management plan's future success. The NPFMC had two advantages in designing the programme: the first, mentioned above, was the wealth of previous experience with ITQs; the second was the near consensus amongst fishery stakeholders that the derby system was untenable and had to change. Interviewee K, for instance, noted that, *"80 to 90% of the fleet knew something had to change."* Similarly, interviewee B said that, *"Everyone agreed that there was a huge problem."* Interviewee D remarked that, *"I think whenever you get to the point where the fishery is open for four days, I think everyone's sort of aware that's not a good situation."* Perhaps most tellingly, interviewee G suggested that

"So everyone kind of got behind it, because everyone recognised what the problem was. So, I think in the case of halibut and sablefish, the stars kind of aligned in a major way that everyone was going to be able to win out of this one. It was pretty much a win-win situation all over the place."

The recognition that change was needed is different to supporting IFQs specifically. Nevertheless, agreement that the *status quo* could not continue almost certainly helped the NPFMC push forward its proposals. There was essentially a mandate for change.

In this respect, the IFQ reforms had a strong political foundation on which to proceed. Interestingly, interviewee G believed that, *"If I've seen any kind of pattern across successful quota systems, it's that they tend to go much more smoothly when things are broken and it's really clear that something needs to change."* Thus, broad consensus that reform was essential was a factor that facilitated the subsequent success of the IFQ management regime.

That consensus provided the foundations that made radical changes to the fishery possible. It is also plausible that this consensus provided at least one pre-condition for IFQ management to be legitimate.

Consensus was not limited to fishery stakeholders alone. The political motivation for reforms came from organisations not directly involved in the fishery. For example, interviewee K pointed out that the U.S. Coastguard Service had come out in favour of IFQs specifically. "*Politicians could not run from that*," interviewee K remarked. Furthermore, the Governor of Alaska (Walter J. Hickel, who was affiliated to the Alaskan Independence Party during his governorship) at the time that IFQs were being discussed had expressed support for IFQs (even though his position vacillated somewhat – see Zharoff, 1992, pgs. 228-230).

Nonetheless, there was vociferous opposition to reforming the fishery's management with IFQs in particular (rather than some of the other management tools proposed). In the letter to Governor Hickel cited above, Senator Zharoff of the Alaska State Legislature mentions the 'tremendous public outcry in opposition to the IFQ plan', and notes that 'serious concerns have been presented by a wide range of individuals, organisations and various public entities regarding the socio-economic impacts of a shift to an IFQ management regime on Alaska's fishing industry and coastal communities' (Zharoff, 1992). Similarly, interviewee J described the 'huge battle' that took place over the introduction of IFQs, most of it driven by a core philosophical belief that fish are a public resource. These are hardly ideal circumstances in which to develop a resource management plan. Nonetheless, I suggest that they influenced the plan's design in a profound way because they necessitated a process that was open and participative. A lack of transparency or a perception of secrecy would arguably have been fatal to the NPFMC's efforts, because any proposal made under such circumstances would probably have lacked legitimacy and support given people's passion and concern for the fishery. Thus, the anxiety and strength of opinion that surrounded the IFQs reforms demanded an open process.

Various interviewees commented on the bottom-up approach that the design process followed. Interviewee K said that, *"As controversial as it was, it was very bottom-up in its design. Government didn't want to touch it. They encouraged it, but they were not necessarily in the design element."* Interviewee D remarked that *"Basically all stakeholders, including the management bodies that oversee it, were all involved in the creation* [of IFQs].

And it had to have played a role, in it being well-designed for the system." Interviewee G noted that the NPFMC *"facilitated the process that was essentially requested by the industry."*

Interviewee L, who was heavily involved in the IFQ design process, described the bottom-up process in some detail:

"And working with a few others, small boat organisations, we came to the table saying, "Ok, if you expect us to go along with this quota share programme" – [inaudible] what had happened in New Zealand, for example, where they went from a fleet of small, independent fishermen to a few corporate owned boats that controlled the entire fishery and ran everybody else out of business. "We want it to look very different, we want it to be owner on-board." Some people, you know…real low and meaningful limits on quota consolidation, so how much any one person can own or how much can be fished from any one boat. We pushed for vessel size classes, so that quota that was caught on boats less than 35 feet was issued as quota that could only be caught on boats less than 35 feet. And then, finally, for a block proposal that also further limited the amount of consolidation that could occur. And, um, the Council…there were some people on the Council who shared our concern, certainly, about, um, communities and small boats. There were processors who were concerned that if a few fishermen owned the whole resource, they would then dictate price. So the processors wanted to see, sort of, a relatively large and diverse group of fishermen still in the business. And then there were those who just wanted IFQs at any cost, but they realized that they needed the small-boat Alaska voice on their side to get this through. And, you know, went along with it."

Arguably, then, the bottom-up process that the IFQ reforms followed was a key factor in the subsequent success of the management system. As interviewee D pointed out, a bottom-up approach ensured that the IFQ reforms were appropriate to the fishery and therefore more likely to operate smoothly and to produce outcomes that were satisfactory from both an ecological and socio-economic perspective. For instance, one of the principal objectives (or conditions) of the reforms was that they should not change the structure of the fleet to any significant extent. The rationale behind the objective was to protect rural communities, which in many cases are largely dependent on the fishery. The socio-economic impact of the IFQ reforms was evidently a matter of importance to a number of fishermen (amongst them interviewee L, quoted above). A bottom-up approach ensured possible socio-economic

impacts were addressed. Although it is likely that a top-down approach would also have taken into account the welfare of rural communities, it would not have guaranteed action on rural social welfare, unlike a bottom-up approach. Thus, a bottom-up approach meant that the reforms were more responsive to the concerns of the fishery's stakeholders. The importance of the involvement of fishermen in the reform process was best summarized by interviewee L, who suggested that the 'voice of fishermen' was key and that the reforms would have been 'devastating' from a socio-economic point of view if fishermen had not been actively involved in the reform process.

Furthermore, a bottom-up approach may have contributed to the system's legitimacy. In particular, designing the IFQ regime from the bottom-up would have ensured that stakeholders were, at best, able to participate in influencing decision-making (as interviewee L did) and, at worst, to communicate their concerns to the NPFMC. Thus, a bottom-up approach guaranteed that the IFQ design process satisfied criteria for communication and participation. Furthermore, there is a sense – evident in interviewee D's comment - that the IFQ management regime better reflected the needs of stakeholders than would have been the case if it was designed from the top-down. Arguably, this made for a design process that was procedurally fairer than a top-down approach, because stakeholders were able to shape the rules that would subsequently affect them. The legitimacy of the fishery may have emerged through the satisfaction of procedural fairness that was demonstrated by the bottom-up approach to its design.

Although the bottom-up approach taken during the development of the IFQ regime clearly contributed to the fishery's subsequent success, it is a factor that is difficult to map to Ostrom's framework. However, it is reasonable to suggest that it is an attribute of the deliberation processes in which stakeholders engage. In the PIECAS case study, limited and restricted participation in meetings and in decision-making was also seen as an attribute of deliberation processes. In the fishery, a bottom-up approach is an attribute of the process stakeholders went through as they discussed and shaped the fishery's reform. Clearly, there is a danger of defining deliberation processes too widely and therefore finding that a variety of factors might be classified into that second-level variable. This is, perhaps, a demonstration of the framework's limitations. The two factors identified in the case studies are of themselves important in explaining PIECAS's problems. Mapping them to existing second-level variables is useful but not essential to understanding them or their impact.

3.3.6 The IPHC and the NPFMC

There was broad agreement amongst interviewees that the IPHC and NPFMC were unusually knowledgeable and skilful fisheries management organisations. There were, unsurprisingly, some negative comments about each, but overall it appeared that both organisations contributed in a meaningful way to the fishery's success. Of course, one of the problems with this line of argument is that the IPHC and NPFMC were the lead organisations at the time of the unsuccessful derby fishery. The change in fishery outcomes cannot therefore be attributable solely to these organisations, unless there have been significant changes at the IPHC and NPFMC themselves – which apparently there have not. Nonetheless, the shift from a derby system to an IFQ system seems to have made the processes in which both organisations engage more effective. In short, both organisations are competent and well run, but the derby system may have imposed constraints on them that negated these qualities. For instance, the IPHC is required to monitor halibut catches. During the severely shortened seasons characteristic of the derby fishery, the IPHC's ability to monitor catches was compromised simply because it was difficult to count such a large number of fish in such a short period of time (Hartley and Fina, 2001a). Clearly, this is no longer a problem with the longer seasons that take place under IFQ management. The key point is that, irrespective of the circumstances, the IPHC attempted to continue delivering high quality catch monitoring and assessment. It was the circumstances, then, rather than any incompetence at the IPHC that curtailed its ability to do so.

Perhaps one aspect of the IPHC that underpins the fishery's success is the excellence of its scientific staff. Interviewee D, for example, said that, *"they routinely attract top-notch modellers. The roster of people that have been in their, sort of, stock assessment rolls is just an all-star list."* Similarly, interviewee C noted that, *"the IPHC has traditionally hired the brightest of the bright stock assessment scientists… And they've had a succession of people like Steve Hare and Alan Palmer and Rick Direso*[13] *…all of whom are very well known stock assessment scientists in that field."* Furthermore, the IPHC *"pay very well, because they're an international organisation,"* and issue diplomatic visas if they wish to hire internationally (interviewee C). Thus, the IPHC appears to have talented staff, and it is able to attract and to

[13] Dr Steve Hare is now at the Secretariat of the Pacific Community. He served for 17 years at the IPHC, during which time he became Chief Scientist. Dr Rick Direso is now Chief Scientist at the Inter-American Tropical Tuna Commission, having also served as Chief Scientist at the Tuna-Billfish Programme and as an Associate Adjunct Professor at the Scripps Institute of Oceanography. I could find no information on Alan Palmer, so perhaps the name is incorrect.

retain that talent. Both of these things are clearly beneficial to the organisation's effectiveness, and by extension the fishery's management.

Nevertheless, it is worth noting that the IPHC has recently admitted that it has had problems with its stock assessment model. These problems relate to retrospective bias in the model. It is a concern that, in spite of the excellence of its scientific staff, the model should still suffer from these sorts of problems. It could suggest that the IPHC is not as competent as needed or expected. Nevertheless, there are two mitigating arguments that should give us confidence that the talent of IPHC staff is indeed an important factor in the organisation's and fishery's success. Firstly, the complexity inherent in any stock assessment is likely to prove difficult to address. That the IPHC has made mistakes is not sufficient reason to question the capability of its staff, in light of this complexity. Secondly, the IPHC has responded swiftly to rectify the retrospective bias and therefore evidently has the means and understanding to correct its mistakes. Furthermore, the reaction to problems in the model is evidence of a desire at the IPHC to maintain trust and to behave with transparency. It would have been easier for the IPHC to dismiss concerns about its model. Instead, its response arguably says a great deal about the organisation. (I mention problems with the stock assessment model again in chapter 5.)

In addition to the talent of its staff, the IPHC is effective because of a culture that encourages high standards, openness and a willingness to engage. Even in the brief time I spent at the IPHC's offices, I was impressed by the knowledge and the trouble senior staff took to speak to me. Less anecdotally, the IPHC recently underwent an independent review of its activities (see McCreary and Brooks, 2012). The report made twelve recommendations to help the IPHC address the challenges it faced in managing the fishery in the 21st Century. The IPHC's reaction to the report is indicative of the strong culture I mention above. Only two of the report's twelve recommendations (♯6 and ♯10, to expand the number of Commissioners, and to 'elevate the importance of Tribes and First Nations in the Commission process', respectively) were not adopted (IPHC, 2014b). The IPHC was satisfied with the existing number of Commissioners. It also believed that the existing processes both Canada and the United States had in place for addressing their relationship with and responsibility to First Nation tribes should be respected.

But with the remaining ten recommendations, the IPHC either acted immediately in implementing them or initiated preparatory work (IPHC, 2014b). For example, it changed the way in which it presented stock assessment advice in time for the 2012-2013 annual meeting. The recommendations have also become 'part of standard practice and continuing work' (IPHC, 2014b). In addition, the IPHC has of its own accord aimed to make performance reviews 'a regular feature of its operations', in part because performance reviews 'stand out in the literature' as a 'fundamental best practice' (IPHC, 2014b).

Arguably, each of these responses demonstrates the IPHC's willingness to accept and act upon criticism. In addition, it suggests a concern for operating at the highest standards. The focus on best practice is a good example of that concern. The reaction to the performance review is even more impressive when one considers that the IPHC was well regarded even before the review (McCreary and Brooks note that the IPHC has been 'widely praised for its skill in managing a sustainable fishery' and that, over the long-term, 'one can see many successes'). Moreover, the organisation is over 90 years old. One might assume, then, that many of its processes were embedded and that it would struggle to change, but this is not apparently the case.

The final aspect of the IPHC's effectiveness is the manner in which it communicates its decisions, and the efforts it makes to ensure participation in its research and decision-making. I describe these in significant detail in chapter 5. In short, however, the measures the IPHC takes in respect of communication and participation improve transparency and therefore accountability. For instance, the IPHC organises collaborative research trips in which scientific data on the fishery are collected by fishermen hired by the IPHC. Interviewee L suggested that this and other communication and participation measures contributed to the confidence and trust many stakeholders felt in the IPHC (even though the problems with the stock assessment model mentioned previously had shaken that confidence).

Thus, there are at least three factors that make the IPHC an effective organisation, which in turn almost certainly contributes to the success of IFQ management. The first is the excellence of the IPHC's staff, especially its stock assessment scientists. The second is strong culture, which has made the Commission responsive to criticism and determined to maintain the highest standards. The strength of its culture is arguably attributable to an emphasis on maintaining trust and on communicating effectively. In this respect, the third

factor that makes the IPHC an outstanding organisation is the transparency that accompanies its communication, and the inclusivity of participation in IPHC decision-making and other processes.

Similar factors characterise the NPFMC. Unsurprisingly, then, interviewees also praised the NPFMC. Interviewee I believed that it did a *"credible to incredible job"* with fisheries management, further noting a culture of conservative management where 'fish come first'. Similarly, interviewee K said that the NPFMC was 'fantastic'. *"There's nothing else like it, I wouldn't trade it,"* interviewee K claimed. Interviewee L believed that the NPFMC, with the IPHC, did an excellent job managing the fishery.

One aspect of the NPFMC that has contributed to the IFQ reforms' success is the conservative approach to management mentioned by interviewee I above. Conservatism manifests itself in various features of the NPFMC's decision-making. Interviewee C gave one example:

"So the general view is that the North Pacific Fisheries Management Council is very conservative about fishing levels. Typically you would have catches less than MSY[14] *levels, try to keep biomass levels high, they've closed big areas to fishing, they've done all sorts of conservation type measures. And the biggest one of those is the 2 million tonne cap. So there's a cap on…how much they can catch. …and there's no doubt that you could catch more out of the ecosystem."*

Similarly, interviewee B explained that

"the North Pacific Council has only twice not taken the recommendation of the Scientific and Statistical Committee on quota settings, or total allowable catch settings. Now we call it 'ACL', allowable catch limits. And in those two instances, the Council chose to go below, because we were uncertain about the implementation of a new model. And the industry was saying, "Look, we don't want to take those fish now" – it was Pacific cod [*Gadus macrocephalus*] *– "we don't want to take those fish now and find out next year that the model was wrong, and so we have less out there, we'd rather do this. Furthermore, it's our estimate*

[14] MSY, or maximum sustainable yield, is the largest fishing yield that a fish stock can sustain indefinitely. Fishing at the MSY therefore produces the largest possible catch without affecting the viability of the fish stock.

that the market won't…will react in an unfavourable way if we put out another 100,000 tonnes out there than if we put another 50,000 tonnes out there. The price will drop precipitously with this big change."

These two examples neatly demonstrate conservative management at the NPFMC. Although these aspects are not related to managing the halibut fishery specifically, they do nonetheless affect it directly. Perhaps more importantly, conservatism at the NPFMC means that the halibut fishery and other Alaskan fisheries under the NPFMC's jurisdiction are less likely to suffer from the problems caused by incautious decision-making, notably over-fishing. The contrast with fisheries in, for instance, New England or the European Union could not be more striking. In the European Union, for example, there is a well-documented history of ignoring proposed TACs at every step of the CFP decision-making chain. In 2002, for instance, ICES recommended a complete moratorium on all fishing where Atlantic cod (*Gadhus morhua*) are caught incidentally or purposely. The European Commission watered down this recommendation and proposed an 80% cut to the cod TAC. However, by the time the Council of Ministers agreed on a TAC, the reduction was only 45% (Daw and Gray, 2005). There is a clear difference between the attitudes to conservatism and science shown by the European Council of Fishery Ministers, and the NPFMC.

Like the IPHC, the NPFMC also appears to have measures in place that ensure effective communication with, and the participation of the fishery's stakeholders. I describe these features in more detail in chapter 5. Irrespective of the particular features that foster communication and participation, however, it is apparent that the NPFMC places some importance on clear communication and broad participation, with attendant benefits to fishery stakeholders. For instance, respondent 5 noted that NPFMC meetings 'come to my home town, comments are easy to email, process is accessible to the public for personal testimony'.

As with the IPHC, this emphasis on communication and participation encourages transparency and public debate and thus a 'better attitude between science and fishermen' (interviewee J). Indeed, cooperation tended to lead to 'more agreement on where the resource is going' (interviewee J). Support for IFQ management is therefore based in part on the measures the NPFMC (and IPHC) use to communicate clearly and to encourage public participation. Finally, interviewee K went as far as to say that, *"without openness, we would start to see the sustainability of the resource undermined."* At a number of levels, then, the

openness of the Council process in both communication and participation contributes in a significant way to the halibut fishery's success. It fosters cooperation and stakeholder buy-in, and leads to the emergence of legitimacy.

However, it would be uncritical to suggest that the NPFMC is as highly regarded as the IPHC. Comments from the survey data reveal that some fishery stakeholders feel the NPFMC is less responsive to the concerns of smaller fishers than it ought to be, and in extreme cases is even mendacious. For instance, respondent 9 believed that the 'NPFMC is driven by big corporate fishing interests. Trawl and factory online groups tend to be given priority over small fishing vessel interests'. Furthermore, the focus on communication and participation that I found so notable has not apparently benefitted all stakeholders. Respondent 9 noted that the 'NPFMC has been pretty much of a brick wall and a deaf ear for small vessel longliners in the halibut fishery for the past decade' and believed that 'my concerns are considered trivial and only listened to because the law requires that they do'.

These comments are not isolated, but they are much the strongest recorded in the survey. They are also the only ones that are critical of the NPFMC's communication and participation efforts. Where respondents did make other criticisms of the NPFMC, they concentrated on the idea that NPFMC decision-making was driven by agendas and by stakeholders with significant financial resources. I discuss these criticisms again in section 3.3.9.

The factors outlined in the preceding analysis all contribute to the overall effectiveness of the IPHC and NPFMC. As table 14 shows, the IPHC and NPFMC are examples of international and government organisations, respectively, both of which constitute second-level variables in the governance subsystem component of Ostrom's framework. (International organisations are not presently included as second-level variables in the framework, although it is not difficult to imagine that they might be included. Many social-ecological systems, especially fisheries, have international organisations nested within their governance structure.) The analysis outlined in section 3.3.6 shows that factors like strong culture at the IPHC, and conservatism at the NPFMC, provide a partial explanation for the strong performance of these two organisations in the fishery. Although neither organisation is perfect, with the NPFMC in particular criticised by some stakeholders, the overall picture is favourable. The fishery's broad success is correlated with the excellence of both organisations.

3.3.7 Separating risk assessment from risk management

The analysis above should, I hope, demonstrate how competent and effective the IPHC and NPFMC are in and of themselves. It is a singular benefit to the fishery that both these organisations are involved in managing the halibut stock. In addition to their competence, the way in which they relate to each other is equally important. In particular, there is a separation between the risk assessment (that is, determining stock levels and TAC) in which the IPHC engages, and the risk management (administering TAC and quota share) that is the purview of the NPFMC. Interviewee A believed this distinction was important. 'The IPHC separates scientific determination from competitive allocation processes', which prevented scientific determinations from being politicised, interviewee A said.

It is reasonable to argue that politicization prevents scientific advice from being the basis on which decisions for catch limits or fishing seasons are made. Politicization leads to decisions that are more discretionary and *ad hoc*. Furthermore, politicization means that a resource management system reflects vested interests rather than criteria like the legitimation function criteria. Decisions are taken that are no longer consistent with legitimation function criteria like participation and procedural fairness; they are instead overtly political. The clear lines of responsibility between the IPHC and NPFMC are one way to avoid the problems associated with politicization. Only the IPHC has the authority to produce catch recommendations. Catch recommendations are therefore less likely to reflect political interests introduced by lobbying the NPFMC.

Of course, the IPHC and the Secretary of State (who, under the provisions of the Halibut Act 1982, may accept or reject the recommendations made by the IPHC) may themselves be exposed to lobbying, politicisation and regulatory capture. To date, this appears not to have been a problem. A number of interviewees suggested reasons why the IPHC in particular has managed to avoid political pressure or manipulation. Interviewees F, G and H argued that the Commission was established at a time (1923) when fisheries were not heavily politicized. It therefore developed procedures and processes independently of any government interference. Once the IPHC was well established – and once it had developed a reputation for prudent management – it is plausible that any attempt at political interference would have drawn a (negative) reaction from fishery stakeholders in Alaska and British Columbia. In this vein,

interviewee A believed that the IPHC avoided political capture precisely because it had been doing things well for some time.

Unfortunately, the interview data do not provide any information on how the Secretary of State avoids capture when accepting or rejecting the IPHC's recommendations. However, an obvious explanation is that the Secretary of State is sufficiently removed from fishery interests that the incentive to make decisions in their favour is significantly reduced. As an appointed rather than elected official, the Secretary of State does not stand to gain votes by, say, increasing catch limits. There is the added constraint of diplomatic problems if the Canadians see that IPHC recommendations are being ignored for political rather than scientific reasons.

Finally, the number of stages at which capture is possible in the scientific determination stage of the fishery's management is limited (there are two stages, one at the IPHC and the other at the Secretary of State level). Furthermore, the number of people involved and susceptible to capture is also small (the six members of the Commission, and the Secretary of State). In comparison, politicization and/or capture is possible at three stages in the CFP (ICES, the European Commission and the Council of Ministers), and with a much larger pool of people.

The separation of risk assessment from risk management also has benefits for the jurisdictional issues that might arise if the Canadians and the Americans negotiated over quota limits. Sharing the stock in this way could lead to disagreements or horse-trading over quota, which would affect each country individually but the halibut stock equally. These problems are avoided in both the Alaska and British Columbia fisheries by providing the IPHC with the sole authority for risk assessment. Doing so significantly reduces the potential for disagreements over one country's share of quota, because neither country has the authority to negotiate over, or establish quota. The IPHC's presence in the fishery therefore removes the problem of either Canada or the United States seeking an advantage on quota for their own fishery at cost to both the halibut stock and fishery stakeholders in the other country. Interviewee C made the point neatly:

"Well, it's got to help that they're [the IPHC] *in charge of the whole thing. So their authority supersedes the Council's, and the government's and the State's. So, having one person in charge obviously helps. But at least you're not fighting and saying, 'Canada wants this, US*

wants this', and so you can't reach agreement. I've heard of some other locations where countries fight over quotas."

Of course, the apparent absence of politics from the IPHC's risk assessment would have little value if the science itself was flawed or did not take a conservative, precautionary approach to managing the fishery. Indeed, the problems with retrospective bias that have affected the IPHC's model would suggest that the science has been unsound for a number of years. Nevertheless, as discussed in section 3.3.6, there is good reason to believe that the IPHC produces the best possible science, even if it is imperfect. Furthermore, the conservatism evident at the NPFMC should provide some margin for error in risk assessment.

Arguably, then, the separation of risk assessment from risk management in the halibut fishery is a key factor underpinning IFQ management's success. Its primary benefit is in reducing the likelihood of catch recommendations being politicized, thus ensuring that scientific determinations are the sole basis for the fishery's management. The problems that overly politicized decision-making can cause are clear from the European Union's CFP, where discretionary decision-making has essentially condoned over-fishing. In addition, separating risk assessment from risk management has removed the possibility of disagreements over quota between Canada and the United States because neither country has the authority to set its own quota limit. Disagreements are disadvantageous because they lead to bargaining, which in turn is more likely to produce the *ad hoc* decision-making characteristic of political rather scientific processes. Again, the European Union's CFP is a good example of the difficulties that quota bargaining causes.

As with the specific qualities of the IPHC and NPFMC, the separation of risk assessment from risk management processes is an attribute of these government and international organisations. However, it is worth distinguishing between the various attributes of the IPHC and NPFMC. Qualities like competence and conservatism describe something about the cumulative impact of people's attitudes; the separation of risk assessment from risk management processes concerns the structure of the interaction between those organisations.

3.3.8 Culture and the halibut fishery

One of the limitations of the preceding discussion is that it provides no indication of the causes of the conservatism that characterise the IPHC and NPFMC. Interestingly, a number

of interviewees believed that these factors had roots in the cultural legacy of the halibut fishery. This cultural legacy may have established a propensity for satisfying legitimation function criteria like communication and participation. The original participants in the fishery were of Scandinavian and particularly Norwegian descent, whom interviewee H pointed out were 'conservative, close-knit' people. Interviewee H suggested that, by mechanisms unclear, the ethos and philosophy of these original halibut fishermen had 'bred its way into the fishery' and informed the IPHC's approach in particular. Similarly, interviewee A compared the fortunes of New England's groundfish fisheries (which historically have been some of the most important fisheries in the world but have declined enormously since the 1980s) to the halibut fishery, and suggested that the difference was because *"Alaskans are Norwegians and New Englanders are Portuguese and Spanish."* Interviewee B said that there are

"…cultural differences between largely Scandinavian, northern European, law abiding, hard-working people, where…versus eastern European…southern European predominantly – Spain, Portugal, Italy – um…um…fishing groups where, you know, used to a whole different style of management, not interested in the science, not, you know, trusting the science, hard-working, highly competitive, but also very much thought of regulations as cat and mouse, and science has not been helpful, science is only getting in the way. So here there was a strong commitment to the science, that's been the basis for management, and a…um…willingness to abide by the rules. I'm sure you'll find people who'll say, "Well, there's a lot of rule-breaking too out here," but it wasn't the same kind of cat and mouse game that was played elsewhere. And, you know, it's in part…you have a lot more people out there, a lot more landing ports, tended to be smaller scale, short-term, short trips, whereas here even halibut or salmon fishing was all summer, you were gone. And, and…and so…I think there is a strong cultural component to why this would develop in this way."

Interviewee L reflected interviewee B's comments, noting that

"So I have gone to meetings in New England, and the scientists who were saying there's no fish left, get shouted down by fishermen. And fishermen here [Alaska] *come from a real culture of conservation. We're in it for the long term. If they tell us there aren't fish out there, we may say, "We think there's more fish than you think there are, but we're going to go along with your quotas." We might grumble, but we'll go along with it. I mean – at*

worst. At best, well, we better take care of those fish then. So, you know, I think there's a culture of conservation in Alaska. There is also, yes, a very high level of engagement relative to other areas of fishermen in fishery management here."

Certainly, an analysis of the halibut fishery's earliest days suggests that its conservative ethos was well established even then. Fishermen displayed their conservatism when they petitioned the Canadian and United States governments to manage the halibut fishery in response to apparent halibut stock declines as early as 1914 (IPHC, 2014a). When efforts to ratify a management convention in 1919 failed, the halibut fishing industry persisted in demanding international control of halibut fisheries, leading ultimately to the 1923 Halibut Convention. That fishermen reacted in the way they did (twice petitioning the two North American governments) when halibut stocks declined is evidence, perhaps, of cultural conservatism at work. Without a conservative attitude, it is likely that fishermen would have been unconcerned by stock declines and may never have petitioned the Canadian and United States governments to manage the halibut fishery in the first place. In addition, showing caution of the kind displayed by early halibut fishermen was, for the time, novel and unusual; indeed, the Halibut Convention was the first treaty ratified for the conservation of a deep-sea fishery anywhere in the world (IPHC, 2014a).

A further link may exist between the conservatism and caution shown by Scandinavian fishermen and the central role that science has played in management of the halibut fishery. The Halibut Convention included provision for the establishment of the International Fisheries Commission (now the IPHC) to research the halibut's life history and to recommend how best to regulate the fishery. Thus, science played a key role at the earliest stage of the fishery's development. The conservatism that halibut fishermen displayed in creating the Halibut Convention also led, albeit indirectly, to the development of a scientific organisation whose advice was at the core of the management system for halibut. It suggests, perhaps, that fishermen were concerned that they did not understand halibut sufficiently well to manage them effectively – a surprising result, given the profound 'traditional' knowledge of fish stocks that fishermen usually have (Mackinson and Nøttestad, 1998).

Interestingly, many of the Norwegians who emigrated to Alaska and the Pacific north-west were Lutherans, a church that emphasised piety and orthodoxy (Fevold, 1966). It is possible that the conservatism of early immigrants and halibut fishermen has roots in their church.

Indeed, the focus on orthodoxy in the Lutheran church presumably means that social conservatism was an important part of the lives of these immigrants. It is not unreasonable to imagine that this conservatism shaped attitudes to the fishery. Reckless over-fishing, for instance, would hardly be in keeping with the conservative values of Lutheranism.

Although these links are interesting, and merit further ethnographic research, it is simply too difficult to claim with any certainty that there is indeed a correlation between the fishery's cultural legacy and the conservatism and science-driven management that characterise it today. Nevertheless, the comments made by interviewees certainly suggest that cultural legacies have played a significant role in the fishery. Furthermore, cultural legacies have successfully explained patterns of behaviour in a variety of other contexts[15]. Their importance in the halibut fishery's success should not be ignored. In this respect, it is noteworthy that cultural legacy is not included as a second-level variable in Ostrom's framework. The closest second-level variable is 'History of use' (in the 'users' subsystem), but that does not capture the full picture implied by cultural legacy. Furthermore, cultural legacy is arguably more appropriately included in the 'external' social, economic and political settings that Ostrom outlines. Cultural legacy is external in the sense that it existed as a factor in the fishery's success well before the fishery was managed with IFQs and indeed any other formal management system.

3.3.9 The legitimacy of the IFQ management regime

IFQ management of the halibut fishery is widely seen as legitimate, according to most of the experts and stakeholders interviewed during my fieldwork. Interviewee I, for instance, said that IFQ management was, *"considered legitimate by almost all players"* and further that, *"To all of us, it has legitimacy."* Interviewee C noted that, *"everyone thinks of them* [IFQs] *as legitimate"*, although noting that, *"there are several other factors involved."* Interviewees F, G and H all believed that the IFQ management regime was legitimate, remarking that the results IFQs had produced had legitimated the new management regime. They also argued that the IPHC itself had legitimacy in part because of the measures it had implemented to encourage participation and effective communication. (I comment on these measures in more

[15] Although not peer-reviewed, Gladwell (2008) describes in detail the effect that cultural legacies play in explaining differences in attitudes to aggressive behaviour and power structures. He notes that there is a correlation between cultural conceptions of hierarchy and power (as measured by Hofstede's dimensions) and the frequency with which a country's airplanes crash, for instance. The airlines of countries with deep respect for authority are more likely to suffer catastrophic air disasters.

detail in chapter 5.) Interviewee L said that, *"It is a really accessible, and legitimate and transparent process."* Interviewee B was less forthright about the regime's legitimacy, however, suggesting that, *"you will find that the people who promoted it, and gradually got into it, consider it legitimate"*, but that, *"The people who consider themselves losers, will consider it an illegitimate process."* Nevertheless, it is clear from interviewee B's comment that, in interviewee B's opinion, at least some of the fishery's stakeholders believe the IFQ management regime is legitimate.

The survey data collected after my interviews also point to a widespread perception that IFQ management is legitimate. Figure 4 illustrates these data. It is worth emphasising that these data come entirely from fishermen (n = 11), with one respondent also working for a NGO. This is important not only because active fishermen are under-represented in the interview data, but also because fishermen represent a key (perhaps the key) stakeholder group in the halibut fishery. Their perceptions of legitimacy matter a great deal because they are the stakeholder group most affected by IFQ management. It is therefore noteworthy that all but one of the fishermen who responded to my survey all believed that IFQ management is legitimate or legitimate for the time being.

Individual comments made in addition to the survey answers provide further detail on the legitimacy of IFQ management. Respondent 10, who believed that IFQ management was legitimate, noted that, 'I have fished under the old system and the IFQ system. All aspects of the fishery are much better'. Similarly, respondent 8, who also said that IFQ management was legitimate, wrote that 'Yes, overall it is [legitimate], especially when you compare it to the Bering Sea crab, AFA pollock etc'. However, these comments also betrayed concerns with IFQ management. There was anxiety about the outcomes produced by IFQs and the manner in which decision-makers conducted themselves. For instance, in the comment quoted above, respondent 8 also argued that

'The *de facto* reallocation of IFQ to by-catch fisheries is an area that makes one question the legitimacy of IFQ program and how it pertains to National Standards 1 (OY of halibut), 4, 9 and 10. The costs of entry to buy IFQ is another area that undermines program goals as is the lack of willingness of decision-makers to recognise that commercial halibut fishing was one of the first domesticated fisheries in Alaska'.

In a similar vein, respondent 3 – who believed IFQ management was legitimate for the time being - was anxious that 'there could be decisions made in the future that could restrict the general public from the opportunity to purchase halibut at the general market'. Respondent 9 felt that IFQ management was legitimate but suggested that there were 'many problems with IFQ systems', especially with the way in which quota allocation was based on historical catches in the fishery. This, respondent 9 argued, does not 'take into account illegal fishing practices when they [halibut quota] are initially allocated' and therefore promotes 'cheating and legal but wasteful practices during the qualifying years'.

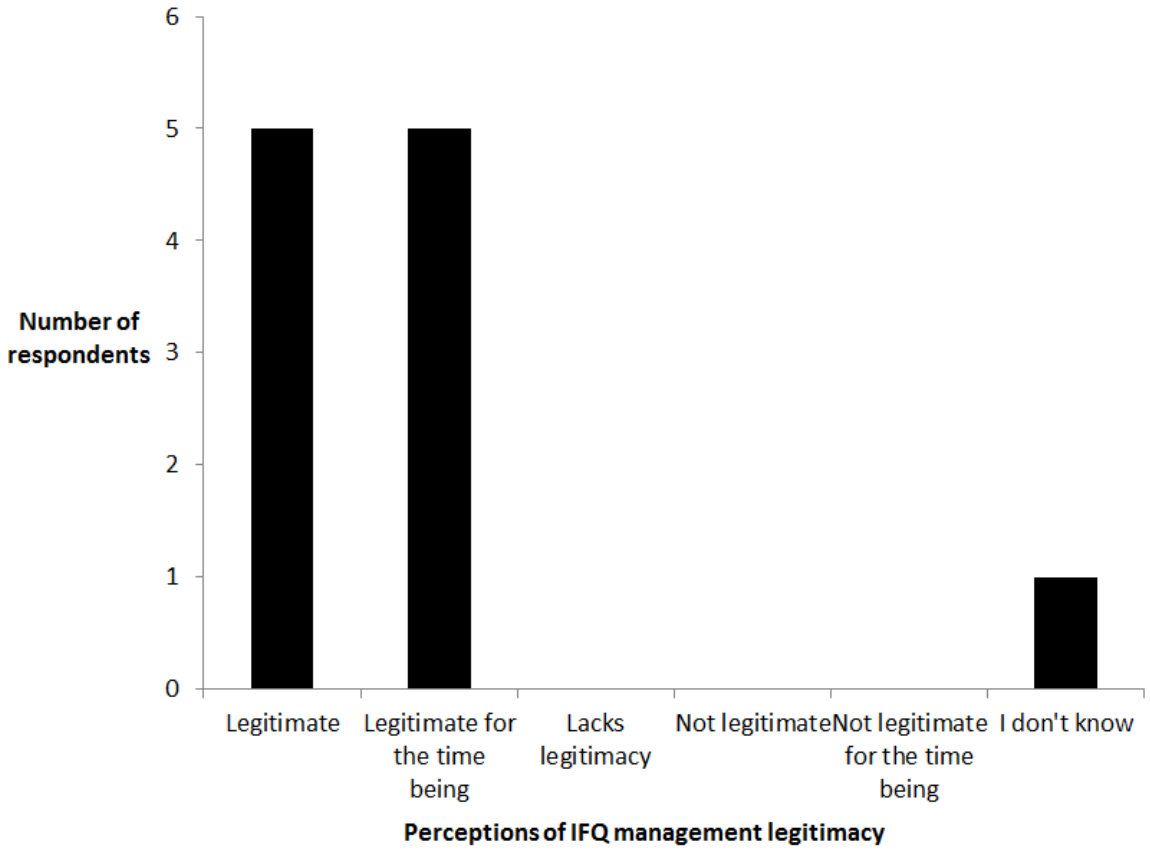


Figure 4. Perceptions of IFQ management legitimacy.

In addition to these data on the overall legitimacy of the IFQ management regime, the survey collected data on the legitimacy of the IPHC and NPFMC. Figures 5 and 6 below summarise the answers given by respondents.

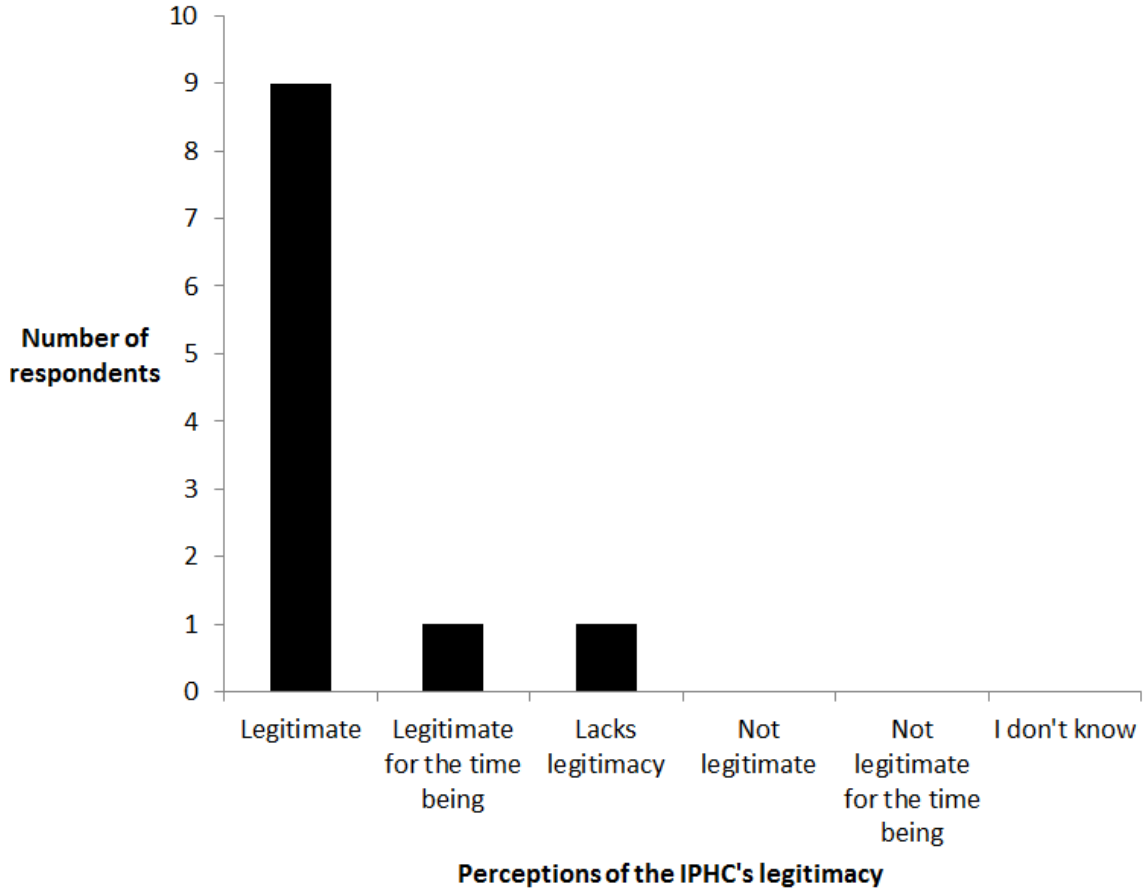


Figure 5. Perceptions of the IPHC's legitimacy.

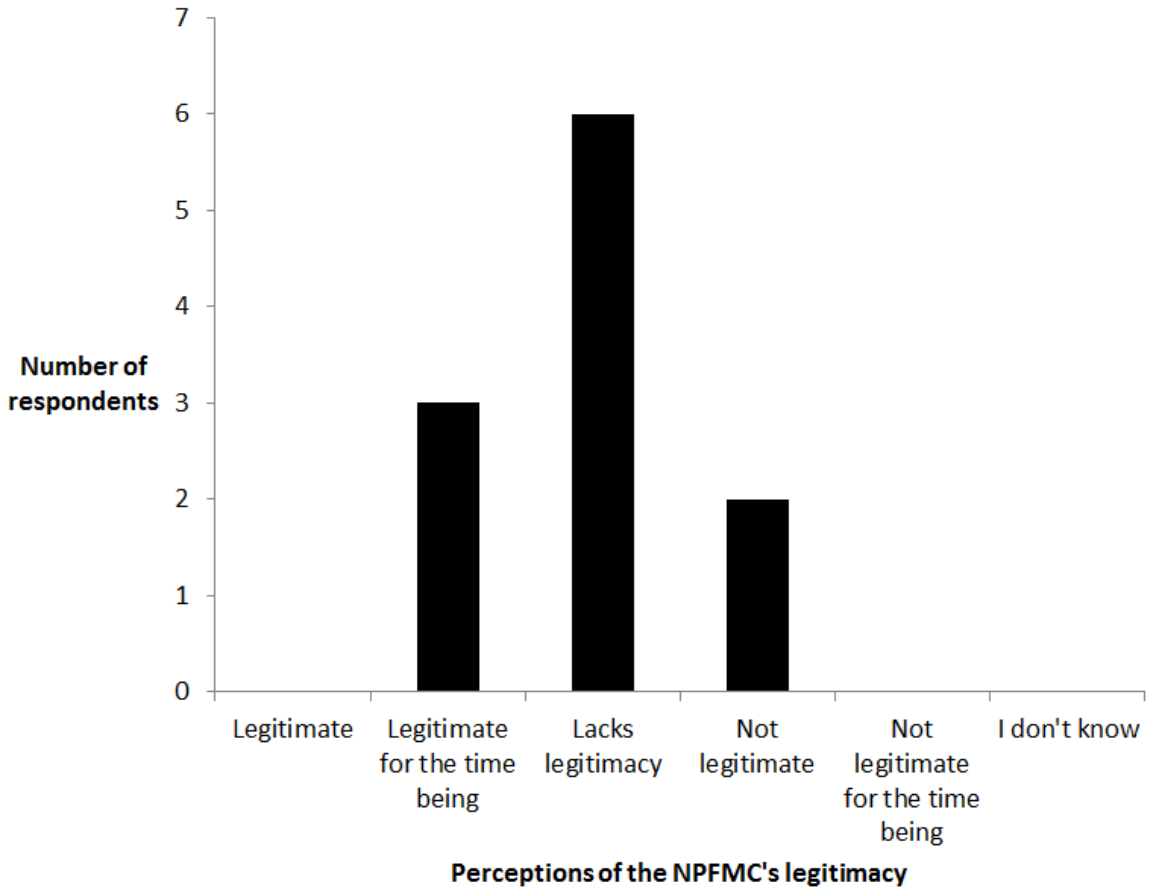


Figure 6. Perceptions of the NPFMC's legitimacy.

The difference in the legitimacy of the IPHC and NPFMC is striking. Additional comments made by respondents to the survey provide some indication of the factors that might have led to this difference. For instance, respondent 2 believed that the NPFMC lacked legitimacy and noted that 'I used to feel like I, we (ALFA[16]) had a voice with the NPFMC, but it's not like that anymore'. Respondent 3 suggested that 'terrible decisions' had been made by the NPFMC and that it was 'hard to give any credibility to a group that has had members with an agenda'. Conversely, respondent 3 had 'always felt that the decisions by the IPHC have been for the best of the resource'. Respondent 7 believed that the NPFMC was 'in the pocket of the trawl fleet', on account of its failure to address and reduce halibut and king salmon (*Oncoryhnchus tshawytscha*) by-catch. In comparison, the IPHC did a 'very good job of management, especially considering the increased pressure on the resource'. Respondent 10 felt that, although the NPFMC did 'well in some aspects', there was 'too much politics and not enough science'. In contrast, IPHC staff were 'very knowledgeable' and 'did their best to

[16] Alaska Longline Fishermen's Association.

manage the resource'. Finally, respondent 12 believed that the NPFMC put a 'little too much weight on stakeholders' and 'not enough on science'.

It is evident from these comments that respondents' perceptions of legitimacy are linked in broad terms to the conduct of the IPHC and NPFMC, their interaction with stakeholders, and to management outcomes attributable to the organisations. In particular, it is noteworthy that respondents mentioned factors like having voice with the NPFMC (respondent 2), credibility, decision-making and politics in connection with legitimacy. It suggests that factors of this kind are correlated with legitimacy in resource management contexts. Furthermore, it is interesting that respondents mentioned factors that were not just related to management outcomes. The implication is that legitimacy rests on more than outcomes alone.

It is more difficult to discern from these data (both the interview and the survey data) the impact that perceptions of legitimacy may have had on the IFQ management regime's success. However, it seems likely that they will have affected compliance with IFQ management. For instance, it is striking that all of the fishermen surveyed believed the IPHC was legitimate. It is reasonable to suggest from this that fishermen (or at least the ones surveyed) are more likely to accept and follow the IPHC's quota decisions. More generally, the high overall legitimacy of the IFQ management system provides a strong foundation for compliance. If perceptions of legitimacy varied significantly, one might expect that compliance would also vary. The fact that legitimacy is apparently so robust is perhaps an indication of high compliance. Regrettably, however, data on compliance are limited and so it is difficult to corroborate this argument. The best available data, for at-sea safety violations in 2011, suggest there was a 3.4% decrease in violations between 2010 and 2011 (from 46 violations on 26 vessels to 33 violations on 20 vessels – NPFMC, 2011). These figures are hardly useful to this discussion, however.

As is the case in PIECAS, legitimacy is best considered an attribute of a number of second-level variables in Ostrom's framework. It is an attribute of the government (and international) organisations involved in the fishery (the NPFMC and the IPHC). It is also an attribute of the management regime as a whole. If the IFQ management regime is part of the fishery's governance subsystem, then it means that the governance subsystem as whole has attributes of which legitimacy is one. Legitimacy in this sense (as a feature of the entire

management system) is harder to map to Ostrom's framework because it is not related to a single variable. Instead, it may be an attribute of the governance subsystem as a whole.

3.3.10 Summarising factors that explain the halibut fishery's success

The preceding discussion should demonstrate that there are a variety of factors underpinning the success of IFQ management in the halibut fishery. Above all, the choice to use IFQs rather than alternative management systems was instrumental in transforming the fishery. IFQs themselves are the key factor in explaining the fishery's success. They addressed the economic problems that were affecting the derby fishery, and so were the appropriate tool for the problem at hand. However, there were several additional factors that contributed to the correct selection and development of IFQs. Firstly, there was the leadership effect from British Columbia, which had introduced IFQs in 1992. It is reasonable to assume that British Columbia's experience with IFQs gave NMFS and the NPFMC confidence about what they could expect in terms of outcomes in the Alaskan fishery. Secondly, the development of IFQs was remarkably bottom-up. Fishermen in particular appear to have shaped the management system in a profound way, especially in terms of mitigating against the socio-economic consequences associated with IFQs. Arguably, the bottom-up approach adopted for the IFQ reforms was critical in making the new management system appropriate to the fishery. It ensured the IFQ management regime was as commensurate as possible with the fishery's social and economic characteristics. It also gave IFQ management a measure of legitimacy by satisfying key legitimation function criteria like participation and procedural fairness.

Once it became clear that IFQs were proving successful, it was equally evident that the bottom-up, legitimation function-oriented manner in which the fishery was designed and run was an important part of that success. Arguably, this would have promoted further legitimation-oriented behaviour and so further success. Thus, designing the fishery from the bottom up and satisfying legitimation function criteria established a virtuous, self-reinforcing cycle.

In addition to these factors, the IFQ management regime has the singular advantage of being managed by two outstanding organisations, the IPHC and NPFMC. Culture at the IPHC and NPFMC is apparently strong, with an emphasis on legitimation function criteria like

communication and participation in the management process. There is significant transparency. Moreover, at the IPHC specifically, there appears to be a real willingness to engage criticism and to ensure that standards are as high as possible and in line with best practice elsewhere in the world. The science produced by the IPHC, while imperfect, is as good as can be reasonably expected. Its scientific staff are world class. The NPFMC itself has a strong 'fish first' focus, and a conservative, precautionary attitude to managing the halibut fishery. Each of these factors contributes to making the IPHC and NPFMC model fishery management organisations.

The separation of risk assessment from risk management between the IPHC and NPFMC is another factor in the fishery's success. It has reduced the likelihood of politicization in the fishery, and therefore hindered the reflection of vested interests in decision-making. Instead, decision-making is largely legitimate because it satisfies legitimation function criteria rather than the needs of vested interests. Risk assessment processes are distinct from risk management because the authority for catch limit recommendations is the IPHC's and the Secretary of State's alone. Thus, catch limits cannot be 'watered down' as they pass from one decision-making organisation to another, as has happened in the CFP. Furthermore, the opportunity for politicization at the IPHC level is limited in part because the culture at the IPHC is strong enough to resist it and in part because it is an organisation that has been doing things well for some time (since 1995 at least, and possibly since 1923). Finally, oversight from Canadian authorities reduces further still the likelihood of politicization in the Alaskan fishery.

Finally, two intangible factors seem to have facilitated the overall success of IFQ management in the fishery: the perception that IFQ management is legitimate, and the fishery's cultural legacy. Although it is difficult to discern from the interview data, the former is likely to have improved buy-in to the IFQ reforms. It may also have increased compliance with novel IFQ regulations. The latter may explain the remarkable conservatism and prudence that seems to characterise management in the halibut fishery. Again, however, it is difficult to make any connection between the two with confidence.

Perhaps more importantly, the various factors identified in this study go some way toward satisfying the criteria needed for legitimacy. For instance, the fishery's cultural legacy may have established a tendency for legitimation function criteria to be embedded in fishery

processes. As a result – and as seen in the interview and survey data – the fishery is perceived to be legitimate by almost all its stakeholders.

Table 15 below outlines these factors and the second-level variables to which they map.

Table 15. Factors underpinning IFQ management's success.

Factor	Attribute/corresponding second-level variable
IFQs as appropriate management tool for the mainly economic problems affecting the derby fishery.	External market incentives?
Leadership effect from British Columbia IVQs	Leadership (users subsystem)
Bottom-up development	Attribute of deliberation processes?
Knowledgeable, skilful management organisations	Attributes of government and international organisations (NPFMC and IPHC, respectively).
Separation of risk assessment from risk management	Attribute of government and international organisations
Cultural legacy	'Cultural legacy' (as an external second-level variable). History of use?
Legitimacy	Attribute of government and international organisations, and the management regime as a whole.

3.4 Governance architecture, polycentricity and institutionalised governance

The preceding analysis outlines the specific factors that explain the successes and failures of, respectively, the fishery and PIECAS. There is relatively limited overlap between the factors identified in the case studies, although legitimacy appears in both. However, as mentioned in chapter 2, PIECAS and the fishery have comparable governance architectures. This architecture may be important to the outcomes observed in the management systems. In particular, the governance structure of PIECAS and the fishery may influence the participation of stakeholders in both systems -– and, as argued above, participation has played a key role in the difficulties PIECAS has experienced to date. Furthermore,

participation may also shape perceptions of legitimacy, an idea that is expanded upon in chapter 4.

The primary similarity between PIECAS and the fishery in governance terms is the presence of organisations at high governance levels. In PIECAS, the High Level Committee is a governmental organisation that leads the plan's development. In a similar way, the IPHC and the NPFMC are supranational and governmental organisations, respectively, that are responsible for the fishery's administration. There are also a number of civil society organisations like NGOs that are involved or interested in the management of each system. In the delta, for instance, FARN and Fundación M'Biguá are amongst several NGOs that are contributing to the debate on PIECAS's development. In the fishery, equivalent organisations include the Alaska Longline Fishermen's Association and the Deep Sea Fishermen's Union. These civil society groups play an important role in holding the IPHC and NPFMC to account, and in contributing to discussion about developments in the fishery. In addition, the Alaska Longline Fishermen's Association was instrumental in the process of developing the IFQ regime.

However, despite these similarities in the scales at which governance takes place, the governance architectures of the delta and the fishery differ profoundly in terms of institutional strength. The delta is a weakly institutionalised system (Berardo and Lubell, 2016). As seen, the forums in which stakeholders participate in PIECAS are less strongly institutionalised, or even ephemeral (Berardo, Olivier and Lavers, 2015) compared to the fishery; governmental or technically capable stakeholders are frequently marginalised (consider the near-absence of agricultural stakeholders in the plan); and the legal framework upon which PIECAS is based is poorly developed and/or insufficient for regulating access to and use of CPRs in the delta (consider PIECAS's lack of operational rules). Furthermore, weakly institutionalised systems suffer from higher transaction costs and weak procedural rules - indeed, the latter are mentioned on page 71 as contributing to the participation problems from which PIECAS suffer. Berardo and Lubell (*ibid*) argue that these weaknesses lead to management efforts that are 'fragmented and symbolic' – a description that fits PIECAS neatly.

In comparison, the fishery is a strongly institutionalised system. There are a large number of professional and technically competent stakeholders involved in the IFQ regime (for instance,

fisheries scientists at the IPHC), well-defined property rights (consider quota shares), and 'extensive participation by governmental and non-governmental actors in many stable and formal decision-making processes' (*ibid*).

Thus, the characteristics of the governance architectures in both management systems help to explain the management outcomes observed in both cases. Although PIECAS and the fishery share governance architectures that are structured in the same way, differences in the institutional strength of these governance systems have had a significant impact on the ability of each plan to produce sustainable outcomes. It is unsurprising that the weakly institutionalised governance system in PIECAS is associated with largely disappointing outcomes, while the strongly institutionalised governance system in the halibut fishery has created a successful management regime.

This discussion also points to an interesting extension of ideas about polycentric governance. Polycentric governance requires a 'complex combination of multiple levels and diverse types of organisations drawn from the public, private and voluntary sectors that have overlapping realms of responsibility and functional capacities (McGinnis and Ostrom, 2012). The term refers to the existence of multiple decision-making centres and units of government within a governance system and so relates to the governance architecture of a management scheme. Arguably, both PIECAS and the fishery are characterised by multiple levels and diverse organisations and might therefore constitute polycentric governance systems.

The supposed advantage of polycentric governance systems is that such systems provide stakeholders multiple opportunities to negotiate solutions to problems that are specific to the stakeholders in question (Ostrom, Tiebout and Warren, 1961; McGinnis and Ostrom, 2012). In the fishery, this advantage is realised; but in PIECAS, there is a marked absence of communication and participation, even with polycentric governance architecture. The implication of this observation is that polycentricity is not sufficient in and of itself to give stakeholders voice in decision-making. There is perhaps an additional requirement for strongly institutionalised governance if polycentricity is to confer the advantages it ostensibly does. This conclusion suggests that the architecture of a governance system generally – whether polycentric or not – can only go some way toward explaining the outcomes produced by the system. An understanding of whether or not the governance system is strongly

institutionalised is also needed. Indeed, this issue may be the most important one to consider when explaining the success or failure of a natural resource management system.

3.5 Conclusions arising from PIECAS and the halibut fishery

The analysis of the two case studies provides us with valuable lessons about the factors that underpin successful or unsuccessful resource management regimes. The factors identified in the analysis are case specific, and therefore should not be generalised to other resource management regimes. Nevertheless, at least some of the factors outlined are almost certainly relevant to other resource management regimes. Communication and participation, and the effectiveness thereof, have been shown to be important issues in a number of resource management systems (Cardenas et al., 2011). Similarly, the competence of management organisations is likely to be an important factor across a range of situations. Thus, the case studies help us to understand two specific management regimes but also provide us with an indication of the kinds of factors that might be broadly significant to resource management outcomes, and their relative importance in resource management.

More generally, the factors identified in the case studies are characteristic of weakly or strongly institutionalised governance systems. Unsurprisingly, PIECAS suffers from a weakly institutionalised governance system, while the fishery benefits from a strongly institutionalised governance system. It is notable that the factors outlined in the case studies were identified independently of any theory on the institutionalisation of governance systems. It suggests, perhaps, that thinking about management system in terms of how weakly or strongly institutionalised their governance systems are is a useful framework for thinking about each management system and the outcomes observed. This is a worthwhile avenue for further research.

The case studies also tell us something useful about Ostrom's SES framework. In particular, they suggest that the framework in its present form is incomplete. It lacks second-level variables that one might reasonably expect to be included ('international organisations', for instance). More importantly, it lacks explanatory power. The second-level variables included in the framework are purely descriptive. As outlined in tables 10 and 15, a useful extension to the framework might be to include attributes (my own term, as defined in the introduction to the thesis) for each or certain second-level variables. This is different to

decomposing second-level variables into constituent third-, fourth-, or lower-level variables. Instead, it suggests that second-level variables are made up of both lower-level variables, and particular attributes. So, using the example given in table 10, government organisations (a second-level variable) have attributes like legitimacy, or competency (how knowledgeable and skilled are officials at the organisation). The second-level variable can also be decomposed into additional lower-level variables. For instance, third-level variables for government organisations might include 'regional committees' or 'environment agencies'.

This extension is important because it provides second-level variables with a level of explanatory power that is currently absent from the framework. 'Attributes' (again, I would stress this is my own term, not Ostrom's) tell us something about the nature of particular second-level variables. For instance, in my example above, an attribute like legitimacy causes us to ask whether or not government organisations are legitimate and to consider the implications of, say, a lack of legitimacy. Conversely, identifying government organisations as present or absent in a resource management system is useful only in a descriptive or possibly classificatory sense.

Chapter 4 Legitimation function – a framework

Keywords: communication, legitimation function, participation, procedural fairness, trust.

Many of the factors identified in the two case studies in chapter 3 fit neatly with existing theory on the determinants of successful management of CPRs and SESs. However, the two studies also identified factors for which there is limited theory in the CPR management and SES literature. Most notably, legitimacy appears to have played a role in the success and/or failure of both management systems, but is relatively under-explored in the literature. Furthermore, it is striking that legitimacy features in two management systems that are otherwise largely distinct. In the Paraná delta, the perception amongst some stakeholders that PIECAS lacks legitimacy may complicate the process of designing and subsequently implementing PIECAS. In particular, PIECAS's lack of legitimacy amongst a key stakeholder group – the delta's agriculturalists – has implications for buy-in for the plan. In the halibut fishery, a widespread sense that IFQs are legitimate appears to have strengthened commitment to the plan and probably facilitated cooperation and compromise between the fishery's stakeholders.

Of course, legitimacy has been the subject of academic inquiry in a variety of disciplines. In sociology, Habermas (1973) discussed the 'legitimation crisis' he believed was afflicting political orders in 'modern capitalist societies'. Similarly, Weber was interested in the legitimacy of power, a theme that goes as far back as Machiavelli and Thucydides. In criminology and social psychology, legitimacy is an important research theme because it is seen to have an impact on compliance and cooperation with authorities and rules (see, for example, Tyler, 2006). Legitimacy therefore affects the extent to which management authorities and regulations are effective (Tyler, 1997a; Tyler, 2001a). In addition, it may influence how much stakeholders are willing to cooperate with one another, including the extent to which they cooperate with stakeholders in positions of authority.

Legitimacy is also relevant to discussions of the way in which resources or rewards are distributed. Aristotle took up this theme in his Nicomachean Ethics (Aristotle, 2004). Under what conditions will individuals accept that rewards and the way they are shared are just or right? A key aspect of this question is the possibility that some individuals find themselves

disadvantaged by the distribution of rewards, but still believe that the distribution is legitimate.

Both of these strands are relevant to CPR and SES management. Firstly, virtually all resource management systems are made up of rules, whether formal or informal, and the success of these rules depends, in part, on compliance with them[17]. (The importance of rules, and compliance with them also explains the emphasis on rule enforcement, monitoring and sanctioning made in the CPR management literature.) Legitimacy can go some way toward explaining voluntary as well as enforced compliance, insofar as rules that are perceived as legitimate are less likely to be broken by the people affected by them. Indeed, one might argue that legitimacy is sufficient to allow one to rely on voluntary compliance alone. This connection between legitimacy and compliance is well recognised in the literature. For instance, Ostrom (1998) notes that people are more likely to follow rules when those rules are 'understood and perceived to be legitimate'.

Secondly, resource management systems are often characterised by the presence of an authority (or authorities). Their prerogative is to make decisions about resource management that constrain the freedoms stakeholders might otherwise enjoy. Clearly, then, it is possible to ask questions about the legitimacy of that authority – and when an authority lacks legitimacy, the decisions it makes and the rules it crafts are themselves unlikely to be legitimate and therefore more frequently ignored. Thirdly, many resource management systems shape how resource units are distributed amongst stakeholders. In the halibut fishery, for example, ownership of quota share determines how much halibut any given fisherman is allowed to harvest in a season. Questions about the legitimacy of resource allocation decisions are therefore also pertinent in a resource management context.

Thus, at least three features of resource management systems can be better understood by considering legitimacy. These theoretical considerations, combined with the preliminary observation that legitimacy has played an important role in both the halibut fishery and PIECAS, justify exploring legitimacy in resource management contexts further. Interestingly, the subject has received some attention in disciplines closely related to CPR and SES management. In the fisheries co-management literature, for example, questions

[17] Factors like coercion, tradition, and apathy can also produce compliance. In economic analysis, compliance is more simply a calculation made based on the costs of rule-breaking versus the benefits of rule-breaking.

about legitimacy have been discussed in some detail, especially with regard to compliance (see, for instance, Jentoft, 2000; Nielsen, 2003; Pinkerton and John, 2008). Similarly, legitimacy and its impact on compliance and cooperation is an increasingly important research theme in conservation science (Stern, 2008). There is also a literature on the legitimacy of international environmental agreements (see Andresen and Hey, 2005; Breitmeier, 2008).

Of these papers, Jentoft (2000) and Pinkerton and John (2008) are particularly useful to this thesis because they outline criteria and 'key conditions' (to use Pinkerton and John's language) that a fisheries management system must satisfy if it is to be legitimate. For instance, Jentoft discusses the relationship between legitimacy and participation, although he is (perhaps wrongly) sceptical of the idea that devolving authority (that is, increasing participation in decision-making) for fisheries management to fishermen is certain to make the management system legitimate. Similarly, Pinkerton and John suggest that legitimacy emerges in a fisheries management system when, amongst others, scientists share ecological knowledge, when management authorities 'demonstrate effectiveness in implementing regulations', and when management authorities are perceived as an 'effective defender of local fishing rights'. (These papers and the conclusions they draw about the criteria underpinning legitimacy are described in more detail in section 4.2 of this chapter.)

The approach taken by Jentoft and Pinkerton and John in their studies treats legitimacy in fisheries management contexts in a functional way. My own approach in this chapter is similar, in that I develop a functional framework for legitimacy (the 'legitimation function framework'). In addition, Jentoft's discussion also raises two important points. Firstly, different authors have different conceptions of legitimacy. Some see legitimacy as derived from social norms or moral values; for others, it is instrumental and linked to outcomes. Either way, it is clear that there is no single set of criteria that are unequivocally accepted as leading to legitimacy. Secondly, legitimacy may be in the eye of the beholder – that is, the individuals affected by a resource management system – or an attribute that is specific to the system itself. This distinction has practical consequences. If the former is true, legitimacy is something that emerges depending on the way in which a resource management system is presented and received; if the latter is correct, the actual design of the system is the key element (*ibid*).

These observations provide us with a point of departure on which to base our research questions. One question that evidently requires further analysis is, "How can a resource management system gain legitimacy?" In particular, are we able to make functional statements about the criteria that a resource management system must satisfy if it is to be legitimate? The two case studies presented in the preceding chapter conveniently provide us with some indication of these criteria, because PIECAS is perceived to lack legitimacy amongst some stakeholder groups, and IFQ management is, conversely, broadly recognised as legitimate. However, the case studies do not clarify which aspect of each resource management system is deemed legitimate. For instance, the view that PIECAS lacks legitimacy may refer specifically to the legitimacy of the High Level Committee, whereas in the fishery, it may relate to the management system as a whole. Caution is therefore required in comparing the legitimacy of each system, lest we draw conclusions that are based on perceptions of the legitimacy of different things. In particular, the criteria that underpin perceptions of the legitimacy of a resource management authority may differ from those that underpin perceptions of a management system in its entirety. This chapter should be read and interpreted in light of this difficulty.

One final issue to consider in this analysis is the distinction, mentioned on page 128, between legitimacy as something that emerges based on an individual's experience, and legitimacy as something that is intrinsic to the rules or organisation in question. The practical implications of this difference for our research question are significant. The former would imply that a resource management authority could legitimate itself by behaving toward individuals in a particular way. The latter suggests that the conduct of a resource management authority is much less important than the way it is organised and related to other administrative. Clearly, both perspectives are likely to change the nature of the criteria that must be satisfied for legitimacy to emerge. Nevertheless, I do not propose to support one point of view over another, in part because any choice is bound to be difficult to justify. Furthermore, the interview data do not point conclusively to one or the other.

We therefore have one overriding research question, and two more specific research objectives:

- How can a resource management system gain legitimacy?

- Identify the criteria a resource management authority must satisfy if it is to be legitimate.

In order to achieve these research objectives, I develop a framework that outlines the criteria that imbue a resource management system – including its constituent resource management authorities - with legitimacy. The criteria included in the framework probably relate as much to the legitimacy of resource management authorities (the IPHC and NPFMC, for instance) as they do to resource management systems overall. The framework is developed largely from the literature, but also from the evidence in the interview data. In subsequent chapters, I use the framework to analyse the halibut fishery and PIECAS. In particular, I aim to show how IFQ management and PIECAS satisfy or fail to satisfy the criteria included in the framework. I have termed the framework and its constituent criteria a 'legitimation function' framework because the criteria I discuss serve a legitimation function; that is, they are involved in legitimating the resource management systems in which we are interested.

The remainder of this chapter proceeds as follows: in sections 4.1-4.4, I provide a definition of legitimacy; in section 4.5, I complement chapter 2 by providing additional detail on the method used in this chapter; and in sections 4.6, 4.7, 4.8 and 4.9 I outline four criteria – procedural fairness, trust, communication and participation - that, if satisfied, increase the likelihood that a resource management authority is legitimate.

4.1 Background - what is legitimacy?

A simple definition of legitimacy is 'right to rule' (Buchanan and Keohane, 2006) – the sense that an authority of some description is entitled to create rules which affect the lives of other people. A better definition, perhaps, is that legitimacy is 'recognition of the right to govern' (Coicaud, 2002). Legitimacy therefore 'tries to offer a solution to a fundamental political problem, which consists in justifying simultaneously political power and obedience' (*ibid*). Still another definition is 'the acceptance and justification of shared rule by a community' (Bernstein, 2005).

These definitions provide us with a working understanding of legitimacy that is useful for the remainder of the thesis. Thus, legitimacy is taken to mean 'recognition of the right to govern' in this and other chapters. However, this simple definition does not capture other important

elements of legitimacy that many scholars emphasise. These limitations should be borne in mind when reading the thesis. Notably, several definitions of legitimacy emphasise the term's normative component. For instance, something might be legitimate if it is consistent with the cultural beliefs, norms and values that are assumed to be shared amongst people (Zelditch, 2001; Johnson et al., 2006). This focus on beliefs, norms and values has its origins in Weber (1922), who argued that people's adherence to a 'social order' (rules, for instance) is shaped not only by custom or self-interest, but by 'determinable "maxims"'. For example, Weber described a civil servant who appears in the office at the same time each morning. His punctuality is not only attributable to habit or the costs of turning up late; it is also determined by his sense of duty to the civil service rules, the breaking of which would offend that sense of duty. Weber noted that an individual might act in accord with a set of rules not because he personally agreed with them, but because he presumed that the rules were consistent with widely shared beliefs, norms and values. Thus, Weber's key insight is that legitimacy can emerge even if individuals disagree with the rules in question or do not share the same beliefs or norms (Johnson et al., 2006). For Weber, then, legitimacy does not require every individual in a situation to deem something as legitimate; instead, it is sufficient that individuals believe that a majority of the other people in a group themselves perceive something as legitimate.

The influence of Weber's ideas is evident in other definitions of legitimacy. For example, Suchman (1995) suggested that legitimacy is a 'a generalised perception or assumption that the actions of an entity are desirable, proper or appropriate within some socially constructed system of norms, values, beliefs and definitions'. (Suchman writes in the organisational theory literature, and so presumably the 'entity' in question in the definition is an organisation of some description.) Again, there is an emphasis on congruence with beliefs, norms and values. Dornbusch and Scott (1975) explicitly recognised Weber in their discussion of legitimacy, noting that 'social norms legitimate action by defining it as correct, or appropriate, or permissible' (pg. 38).

Coicaud himself discusses the importance of norms to legitimacy, while also analysing the importance of consent to notions of legitimacy. Consent is integral to the right to govern. Where there is a possibility of limitations to individual freedom – as exists in any situation, including resource management, where an authority makes and implements decisions that will constrain what one can and cannot do – there is also a need for consent 'in order to

establish the right to govern' (*ibid*, pg. 12). Coicaud summarises the importance of consent to legitimacy neatly by noting that, 'to the extent that those who govern respect the rights of the members of the community, and discharge their specific duties, individuals consent to renounce some of their capacities for action and turn them over to political institutions' (*ibid*, pg. 14). By extension, the withdrawal of consent is an indication of a lack of legitimacy.

Conceiving of legitimacy in terms of consent is part of the tradition of social contract theory, to which Hobbes, Locke, Rousseau, Kant and Rawls contributed (Rosenfield, 2001). These theorists suggest, in broad terms, that the 'legitimacy of government depends on the consent of the governed' (*ibid*). However, there is less agreement on what constitutes adequate consent amongst these theorists.

These ideas about the legitimacy of government invoke issues of authority and power. Any discussion of the legitimacy of power requires the presence of people or positions 'linked by power relations' (Dornbusch and Scott, 1975; pg. 38). These power relations imply that some individuals are 'power-wielders', and others are subordinate to that power. Clearly, the actors in a government-led resource management system like PIECAS and halibut IFQs are involved in power relations of this kind; some individuals are subject (or subordinate) to management rules that are devised, implemented and monitored by resource management authorities like the NPFMC. The distinction between superiors ('A') and subordinates ('B') leads Dornbusch and Scott to distinguish between 'authorised' and 'endorsed' power. Authorised power emerges when a subordinate believes that the power wielded over him by A is legitimate because A's own superiors see it as legitimate.[18] Endorsed power occurs when B believes that his own colleagues perceive A's exercise of power as legitimate. Weber's point about the importance of an individual's perception of the beliefs of other people is evident in Dornbusch and Scott's idea of endorsed power.

Secondly, and continuing their focus on Weber and the relationship between subordinates and superiors, Dornbusch and Scott discuss the validity and propriety of the norms underlying

[18] Of course, authorised power can only go so far. In particular, there are certain positions with no immediate superiors, and therefore no source of authorised power. The legitimacy of these positions must rest on other elements.

legitimate power. Here, validity refers to 'whether subordinates acknowledge the existence of a normative order' (pg. 39). Propriety relates to the subordinate's acceptance and approval of the order in question. Both are seen as elements that shape an authority's legitimacy.

Weber himself identified the importance of validity to legitimate power. He suggested that validity was the recognition that a certain maxim is binding. Furthermore, he pointed out that compliance was not a necessary condition in determining validity. The example he gives to demonstrate this principle is insightful. Weber suggests that a thief behaves in a surreptitious way precisely because he perceives the criminal law as valid. Furthermore, the law's validity is evident in the punishment the thief receives should he be found breaking it. The thief cannot openly violate the criminal law without being punished, precisely because it is valid.

Weber contrasted binding, valid maxims to propriety maxims that subordinates are happy and willing to accept. A sense of propriety can therefore determine whether or not an authority (broadly defined) is perceived as legitimate. The key difference, then, between propriety and validity as dimensions of legitimacy is the acknowledgment in the latter that something is binding, irrespective of one's own views. Recognising validity as an important element in legitimacy reinforces Weber's original insight that legitimacy can emerge even if individuals disagree with the authority or rules in focus (the thief and the criminal law, for instance).

Although the ideas presented by Dornbusch and Scott and other scholars are useful to our understanding of legitimacy, it is less apparent how they are relevant in a resource management context. However, there is one important application for these ideas that is worth considering: namely, authorised power, endorsed power and propriety are all potentially shaped by the conduct of a resource management authority and the manner in which a resource management system is designed, implemented and enforced. For instance, endorsement of a resource management authority's legitimate power is more likely to occur if the resource management authority has behaved in a reasonable way. It may have made a significant effort to allow stakeholders to participate in the design of the management system, say. Similarly, it may have established strong relationships with stakeholders by communicating in a clear and honest fashion. In turn, these stakeholders may trust the management authority and therefore accept its adjudications more willingly. Thus, people's perceptions of endorsed power and propriety in particular depend to a certain extent on the choices and decisions made by a resource management authority. The essence of this

argument is that resource management authorities can be deliberative about ensuring that stakeholders in a SES view them and the regimes they manage as legitimate.

It is less clear whether the same is true of authorised power and validity. There is a sense that authorised power and validity depend on factors that are beyond the immediate control of a resource management organisation. For instance, authorised power is by definition shaped by the presence and decisions of higher levels of authority. This is especially relevant to government-led resource management systems like PIECAS and IFQs, where the ultimate authority of the State may legitimise the management system, irrespective of the resource management authority's conduct. Similarly, validity may depend simply on the legality of a resource management system, or on grounds of tradition. Of course, if a resource management authority begins to behave illegally, then its validity – and the validity of the decisions it make – is bound to be questioned. Equally, the higher authority that provides it with authorised power may remove its endorsement. Thus, a resource management authority can be deliberative about authorised power and validity, but to a significantly lesser extent than endorsed power or propriety.

4.2 Legitimacy and law

The discussion above makes brief reference to the link between legality and legitimacy. It raises a fundamental question – can an action be legitimate even if it is not legal? For instance, is an action legitimate if it is illegal but morally or politically legitimate (Falk, Juergensmeyer and Popovski, 2012)? In dictionary definitions at least, legitimacy is 'presented as that which conforms to the law'. Thus, at one level, 'decisions made in conformity with a legal procedure suffice to establish political legitimacy' (Coicaud, 2002; pg. 20). At another level, however, legitimacy as conformity to the law is unsatisfactory because it emphasises the procedure used to create and adopt a law at the expense of the content of the law. Instead, legal decisions might be legitimate not just because they follow accepted procedure, but because they are 'considered to be the expression of recognised and accepted norms' (*ibid*, pg. 23). Thus, legality and norms are perhaps two sides of the same coin in contributing to legitimacy.

An extension of this analysis is to consider legitimacy and the 'rule of law'. Rule of law is seen as essential to contemporary constitutional democracies. It limits the power of

government and protects individual citizens from the arbitrary application of law. It also ensures equality before the law (Rosenfield, 2001).

However, it can be challenging to see how rule of law is legitimated, for a variety of reasons. Firstly, rule of law is at some level coercive, because individuals may have to follow laws which they find oppressive or with which they disagree. The solution to this problem is *ex ante* consent to the application of the law. 'Uncoerced agreement' about the application of a law should be sufficient to legitimate the law's subsequent enforcement (Rosenfield, 2001). Nevertheless, even this explanation is problematic because laws might continue to be accepted *ex ante* by some and yet rejected by others. The key issue, perhaps, is determining the legitimacy of constraints on law-making. If constitutional or other constraints on a legislature are deemed legitimate by the majority of the citizenry of a country, then majoritarian law-making should also be legitimate (*ibid*). The rule of law is legitimated by virtue of the constraints that exist on law-makers - even though some individuals may disagree with those laws. But if unanimous consent is required, the legitimacy of the rule of law remains difficult to establish.

A narrow understanding of the legitimacy of the rule of law like the one outlined above also misses what Rosenfield describes as the 'minimum requirements of a legitimate constitutional democracy'. The argument here is that the rule of law might be consistent with legal regimes that are based on oppressive or degrading ideas like apartheid or slavery (Rosenfield, 2001). This is perhaps an extension of Coicaud's argument that content is important in establishing the legitimacy of the law.

4.3 Legitimacy and democracy

One final aspect of legitimacy worth discussing is the idea that legitimacy and democracy are inextricably linked, insofar as 'legitimacy requires democracy because it [democracy] is the central principle in contemporary politics that justifies authority' (Bernstein, 2005). Thus, something is legitimate if it satisfies or is a manifestation of democratic principles. However, it is clear that a conception of legitimacy based solely on democratic ideals is limited. For instance, Bernstein (*ibid*) notes that global environmental governance satisfies many of the criteria implicit in democratic legitimacy, but still suffers from a perceived lack of legitimacy. Legitimacy is therefore not solely a democratic issue.

4.4 What contributes to legitimacy?

The preceding discussion should provide us with some understanding of what is meant by legitimacy. However, it is equally important to consider what contributes to legitimacy; that is, on what criteria does legitimacy rest? For Weber, legitimate 'domination' (where 'domination' is defined as the probability that certain specific commands (or all commands) will be obeyed by a given group of persons) was based on three criteria (or 'grounds', to use Weber's language): rational grounds, traditional grounds, and charismatic grounds (Weber, 1922, pg. 215). Under rational grounds, legitimacy emerges when there is a belief in the 'legality of enacted rules', and a further presumption that those in authority have a right to make decisions and commands. Under traditional grounds, legitimacy rests on an 'established belief in the sanctity of immemorial traditions' and the sense that those who exercise authority as a result of these traditions are themselves legitimate. Under charismatic grounds, legitimacy is a function of 'devotion to the exceptional sanctity, heroism or exemplary character of an individual person'. In all three of these 'grounds', the importance of validity and propriety are again evident. For instance, legitimacy based on 'rational grounds' acknowledges that 'enacted rules' are in some way valid.

These ideas are clearly useful in a resource management context; they suggest that the legitimacy of a resource management authority like PIECAS's High Level Committee is based on legality, tradition, or the charisma of the Committee's members. However, there are other criteria upon which legitimacy might rest. For instance, there is extensive evidence to suggest that legitimacy and procedural fairness are strongly correlated (see, for instance, Tyler, 2001a). Perhaps it is more reasonable to say that there are a variety of criteria that contribute to legitimacy, some of which will depend on context.

Of course, Weber and Tyler write in disciplines distinct to the CPR and SES management literature. Their ideas are therefore not as immediately applicable to resource management contexts (although I would argue they are still valuable). Nevertheless, for an understanding of the criteria that contribute to legitimacy in resource management systems, it is worth turning to Weber, Tyler and other scholars. We also turn to literatures like the local governance and resource localism literature that are similar to the CPR and SES management literature. I have already mentioned two important papers in this regard – Jentoft (2000) and Pinkerton and John (2008). Pinkerton and John in particular develop a number of hypotheses

about the key conditions that create legitimate fishing regulations and legitimate management authorities. Their hypotheses are based on a study of local aboriginal management of clams in British Columbia, Canada. The hypotheses they outline include:

'Sharing of ecological knowledge by natural scientists plays a key role in legitimising regulations'.

'Regulatory legitimacy' is a key dimension of legitimacy creation, 'to the extent that a local authority can demonstrate effectiveness in implementing regulations…and keeping the system functional, orderly and acceptable…'

'Political legitimacy' is an important dimension of legitimacy creation, to the extent that a 'local authority is perceived as an effective defender of local fishing rights…'

'Moral legitimacy' is based on fishers' perceptions that regulations are 'fair, democratically-made, transparent, inclusive, and produce good outcomes'.

'Moral legitimacy' can only develop after scientific, regulatory and political legitimacy have been established. Thus, the order in which different kinds of authority are exerted is important.

Interestingly, these conditions differ significantly from the criteria I identify in this chapter. I therefore disagree to some extent with the conditions that Pinkerton and John believe underpin legitimacy. Indeed, I would argue that many of the conditions they hypothesise as playing a role in legitimacy creation lack explanatory power. For example, suggesting that political legitimacy arises from a perception that a local authority is an 'effective defender of local fishing rights' does not explain how a local authority might win that perception. Furthermore, Pinkerton and John's key conditions are arguably variations on the four criteria outlined in this chapter. For instance, one of the criteria I believe is critical in establishing the legitimacy of a resource management system is effective communication. I would argue that the sharing of ecological knowledge by fisheries scientists, say, is simply an extension of this criterion. If scientists have access to ecological information, then it is essential to a management system's legitimacy that this information is communicated in such a way that fishermen do not believe management authorities are hiding sensitive details. The key is

honesty, openness and sincerity, rather than the specific ecological data shared. This conclusion is strengthened by considering the inverse situation, where ecological information has indeed been shared but a management system still lacks legitimacy. *Ceteris paribus*, one reason why such a system may lack legitimacy is that the specific way in which ecological information was communicated failed to satisfy fishermen's standards for clarity, honesty, sincerity and other criteria. It is not enough simply to share these data; they must be shared in the right way.

Elsewhere in the literature, different contributory factors ('criteria') for legitimacy are emphasised. In a paper focusing on environmental governance, for instance, Paavola (2007) argues that 'legitimate environmental decisions…have to reflect both distributive and procedural justice concerns'. In addition, Paavola suggests that the plurality of 'ethical premises of behaviour' that the people involved in a management system are likely to espouse means that 'recognition, fair participation and legitimate distribution of power' all underpin legitimacy in environmental decision-making contexts. In another paper investigating governance (in rural local government rather than environmental situations, however), Welch (2002) emphasises the importance of 'constituent representation' for the continued legitimacy of local authorities. It is interesting that both Paavola and Welch identify explicitly and implicitly participation and issues surrounding participation (recognition and representation, for instance). Although the specific criteria they identify differ from the four outlined in this thesis, participation is clearly an area of overlap. However, I would argue that a condition like 'fair participation' (mentioned in Paavola's paper) conflates two distinct criteria: participation and procedural fairness.

In a similar paper examining global environmental governance, Bernstein (2005) discusses the elements of democratic legitimacy. They include accountability, transparency, access to participation, deliberation, and fairness (although Bernstein notes that fewer scholars focus on fairness). These elements are seen to improve the legitimacy of global governance institutions (including environmental governance institutions) that are criticised for 'usurping domestic democratic institutions'. Thus, Bernstein infers a causal link between these various

elements and the legitimacy of global environmental governance institutions in cases where deliberative and democratic mechanisms are absent from those institutions.[19]

As with Paavola (2007), there is some overlap between the legitimation function criteria and the elements of democratic legitimacy identified by Bernstein. Participation is once again a key consideration. Deliberation and transparency are arguably references to communication, and procedural fairness is reflected in Bernstein mentioning 'fairness'. Despite these similarities, however, I maintain my argument that many of these elements are simply component parts of the broader legitimation function criteria I identify. Deliberation and transparency demonstrate this point neatly. Both elements characterise effective communication. Without communication in the first place, deliberation and transparency are not relevant to considerations of legitimacy.

The literature on environmental governance therefore tells us something useful about the criteria or factors that contribute to legitimacy. There are similar insights to draw from the compliance literature. Clearly, the compliance literature does not deal with legitimacy *per se*, but it nevertheless focuses on legitimacy to some extent given its impact on compliance. For instance, Nielsen and Mathiesen (2003) suggest that perceptions of legitimacy in Danish fisheries depend on communication and persuasion and on the belief that fishery regulations are meaningful in some way. Meaningfulness in the sense used by Nielsen and Mathiesen refers to the idea that fisheries regulations are indeed conserving fish stocks. Thus, Nielsen and Mathiesen imply that the outcomes of fishery regulations are important to their legitimacy. Furthermore, they point out that evaluations of meaningfulness depend in part on the confidence that fishermen have in the regulations and the research on which those regulations are based. Although Nielsen and Mathiesen do not discuss the criteria underpinning confidence, I would argue that confidence emerges when there is effective communication and leadership on the part of management organisations. Communication, confidence and meaningfulness are therefore inter-linked.

[19] Bernstein's paper is interesting in a broader sense because it deals with a fundamental and contemporary political problem, namely the legitimacy of supranational political institutions like the European Union or World Trade Organisation (WTO). In particular, Bernstein's paper raises a key question – from where do institutions like the EU or WTO acquire their legitimacy? An answer to this question is beyond the scope of this thesis, but it is nevertheless a valuable point to consider.

In a similar paper, Viteri and Chávez (2007) used econometric methods to determine which factors could influence compliance to artisanal fishery regulations in the Galápagos Marine Reserve. Legitimacy is one such factor. Although Viteri and Chávez do not discuss the criteria that underpin legitimacy, it is worth noting that they treat legitimacy and participation as two separate factors in compliance. This approach is interesting because it suggests that, in Viteri and Chávez's conception, legitimacy does not depend on participation, despite some papers concluding otherwise. Instead, Viteri and Chávez measure legitimacy not just by assessing boat owners' views of the various regulations inside the Galápagos Marine Reserve, but also by evaluating the extent to which boat owners feel management authorities take into account the fishery sector and the extent to which leaders in the artisanal fisheries represent the interests of the sector in general.

These last two measures of legitimacy are arguably not measures *per se*, but more like underpinning criteria. Seen in this light, they might provide us with some indication of the criteria Viteri and Chávez see as playing a role in legitimacy. I suggest that communication is implicit in the two criteria because communication goes some way toward ensuring that views are taken into account and represented. The other element that can contribute to accounting for and representing views is, of course, participation. Thus, the criteria that Viteri and Chávez putatively identify actually relate to communication and, perhaps, participation, despite their separating legitimacy from participation in their analysis.

Thus, there is a small but useful literature on legitimacy in the environmental studies discipline. I should like to emphasise the ways in which this literature is different to the legitimation function framework. Firstly, and perhaps most importantly, this literature does not refer to criteria that require satisfaction if legitimacy is to emerge. Pinkerton and John (2008) identify the various stages over which legitimacy emerges, and Bernstein discusses different conceptions of legitimacy and the factors in which it is rooted. Bernstein's review comes closest, perhaps, to the idea that legitimacy depends on the satisfaction of certain criteria, but at no point in his review does he explicitly talk about satisfying criteria. Secondly, the legitimation function framework identifies four criteria – communication, participation, procedural fairness and trust – that are not all identified in other papers. Although the literature highlights the importance of one or another to legitimacy, I have not come across a paper that discusses all four as interdependent but important in their own right. Furthermore, the idea of interdependence is itself significant. The legitimation function

framework suggests that the four criteria interact and influence the extent to which each of the criteria is satisfied. By extension, all four of the legitimation function criteria require satisfaction if legitimacy is to emerge in a resource management system.

4.5 Legitimacy and Jürgen Habermas's theory of communicative action

The preceding discussion emphasises the importance of communication to legitimacy. The proposal that legitimacy is rooted in communication (amongst other criteria) is based largely on Jürgen Habermas's theory of communicative action (outlined in two volumes of the same name). Habermas's work focuses on moral, social and political philosophy, and is therefore beyond the purview of this thesis. Nevertheless, he is an interdisciplinary theorist in the truest sense of the phrase and so shares the academic ethos that underpins this thesis. His ideas on communication and communicative action also resonate in the legitimation function framework. For these reasons, I will attempt to outline Habermas's ideas on legitimacy. Doing so should help us build a more complete picture of the conditions that underpin legitimacy. However, I should caution that my discussion of Habermas is necessarily condensed. A complete treatment of his ideas would merit several PhD theses in their own right.

Amongst other topics, Habermas was interested in the question of how social order is possible (Finlayson, 2005, pg. 25). The 'order problem' centres on the observation that societies are (mostly) stable and predictable, even though social outcomes emerge as a result of the actions of large numbers of usually discrete individuals who typically do not coordinate their behaviour (*ibid*). In addition to this problem, Habermas was concerned by the Marxist belief that societies are in crisis (Frank, 2000). In *Legitimation Crisis* (1973), Habermas analysed these two themes and attempted to develop a theory of 'social pathologies' (Gray, 2012) that was further developed in *The Theory of Communicative Action* (Volume 1, 1984; Volume 2, 1987). One kind of social pathology is a loss of legitimacy, particularly in government institutions. Such pathology has ramifications for the 'order problem' in which Habermas was interested, because legitimacy is linked to social order (Frank, 2000). In *Legitimation Crisis*, Habermas traced a loss of legitimacy to the displacement of crisis tendencies in the 'economic sphere' to the 'cultural sphere'. This displacement is caused by state action, and leads to 'social integration' problems, including the possibility of government institutions losing their legitimacy (Heath, 1996).

A key element of Habermas's analysis of legitimation problems in *Legitimation Crisis* is a model of social systems. This model drew on work by the American sociologist Talcott Parsons. Parsons argued that modern societies are characterised by four distinct 'subsystems', each of which solves particular social problems[20]. In addition, each subsystem produces outputs of one kind or another. Parsons believed that legitimation was one such output. In a similar way, Habermas also suggested that the social system had constituent parts, but his model in *Legitimation Crisis* was tripartite in structure. He distinguished between three systems: the economic system; the political system; and the socio-cultural system. When Habermas speaks about the displacement of crisis tendencies from the economic sphere to the cultural sphere (see paragraph above), the economic sphere and the cultural sphere are references to two of the systems that comprise a social system.

Legitimation crises emerge in modern capitalist societies in part as a result of this social structure and the transfer of crisis tendencies from one to the other. The other element in legitimation is the way that capitalist societies are characterised by a class-based division of labour. These divisions are problematic because they hinder or prevent 'social integration' – the development of shared values that motivates people to subscribe and conform to a prevailing system of norms (Heath, 1996). These shared values cannot be imposed on individuals; instead, they must be adopted by building consensus. But for consensus to emerge, the values under discussion must represent 'generalisable interests' (*ibid*). This condition is difficult to satisfy in class societies because such societies are made up of groups with fundamentally different material interests and asymmetric economic and political power.

One consequence of these issues is that problems in the economic or political systems of a society rapidly turn into problems of social integration. This occurs because economic or political problems cannot be solved socially; that is, the economic and political asymmetries that underpin many economic and political problems cannot be justified on account of the lack of generalisable interests in class-based societies (*ibid*). In the West, the polity has reacted by attempting to manage economic crises through the welfare state. But this management transforms economic problems into political problems. Usually the political system is able to justify its actions by drawing upon outputs like legitimation from the socio-cultural system. However, the 'procurement of legitimation is self-defeating' as soon as it

[20] This is a brief summary of Parsons's work and misses a number of important details, but which are not immediately relevant to the discussion. For a more complete treatment of Parsons, see Heath (1996).

becomes obvious that the need for legitimacy is strategic (Habermas, 1973). Using legitimacy for strategic means compromises the validity of legitimacy itself. This is the source of the legitimation crisis.

My description of Habermas's ideas in *Legitimation Crisis* is brief and misses out various aspects of the argument. However, there are two key elements to bring away from the discussion: firstly, Habermas's model of the social system, which reappears in his later work; and secondly, the observation that consensus is needed to produce social order. Consensus is a part of communicative action, and communicative action is one condition that leads to the emergence of legitimacy. It is also worth drawing attention to the Marxist elements in Habermas's argument. I will return to this theme later on in my analysis.

Habermas builds on his ideas in *The Theory of Communicative Action*. He returns to the central problem of social order. His answer to the problem is that in 'modern, secular societies social order rests chiefly on the basis of communicative action' (Finlayson, 2005, pg. 47). We have already seen an allusion to communicative action in *Legitimation Crisis*, when Habermas emphasises the importance of consensus in social integration. However, it is important not to conflate consensus and communicative action. The latter is 'action coordinated by validity claims' (*ibid*, pg. 47). A 'validity claim' is a commitment made by the speaker to provide reasons that could convince the listener to accept the speaker's utterance (*ibid*, pg. 41). Usually, a validity claim is tacitly accepted by the listener. However, in cases where the listener does not accept the validity claim, the listener and the speaker enter into a discourse where the speaker must make good on the commitment to provide reasons that would cause the listener to accept the speaker's claims.

Challenging validity claims in a discourse situation requires following certain formal rules. Habermas calls these rules 'pragmatic presuppositions'. Pragmatic presuppositions are not written down in the same way that the rules of a board game are written down; instead, they are rules that one follows without necessarily knowing what the rules are or even that one is following them in the first place (*ibid*, pg. 43). Habermas suggests that pragmatic presuppositions are a necessary part of entering into a discourse; that is, a discourse situation requires an individual to commit to pragmatic presuppositions like sincerity, not excluding other participants and other arguments, and ensuring that all voices are heard and the best argument wins. Furthermore, a discourse that satisfies these criteria 'results in a consensus

on the basis of reasons acceptable to all' (*ibid*, pg. 44). An idealised discourse situation of this kind is important because it leads to the emergence of legitimacy. Thus, legitimacy requires that decisions 'rest on 'good arguments' made under conditions in which free and equal autonomous actors can challenge validity claims, seek a reasoned communicative consensus about their understanding of the situation and justifications for norms guiding their action, and are open to being persuaded' (Bernstein, 2005).

This element of Habermas's theory of communicative action is important because it describes the conditions that might restore legitimacy in situations where a lack of legitimacy has developed (Frank, 2000). I have already discussed how Habermas believes legitimacy is lost in late-capitalist societies (outlined in *Legitimation Crisis*). The ideas presented in *Legitimation Crisis* are expanded upon in *The Theory of Communicative Action*. In particular, Habermas takes his tripartite model of modern society and reduces it to two spheres of sociality: 'lifeworld' and 'system'. Lifeworld refers to that part of society that is informal and 'unmarketized' (Finlayson, 2006, pg. 51), and in which shared understandings can develop (Frank, 2000). Lifeworld includes social groups like families, households, cultures, voluntary organisations and so on. Most importantly, lifeworld is the home of communicative action. Conversely, system comprises money and power, and the economic and political institutions that wield money and power. It is also the home of instrumental (rather than communicative) action.

Habermas argues that system often and increasingly encroaches upon and destroys lifeworld. In Habermas's language, system 'colonises' lifeworld (Frank, 2000). The colonisation of lifeworld by system leads to the absorption of lifeworld functions by system. For instance, strategic decisions are increasingly left to the market or expert administrators (Finlayson, 2005, pg. 56). This process is damaging because social processes are gradually removed from public scrutiny and public discourse. A loss of legitimacy is one amongst a variety of social pathologies that emerges as a result.

4.6 Is Habermas's social theory useful for understanding legitimacy in resource management contexts?

The purpose of the preceding discussion is to summarise Habermas's ideas on legitimacy and legitimation. I am therefore adding Habermas's views on legitimacy and the conditions that underpin it to those of scholars like Jentoft, Pinkerton and John, Paavola and Welch.

However, there is a sense that Habermas's work is so significantly different to the work of Jentoft and others that it is not immediately relevant to understanding legitimacy in resource management contexts specifically. I would argue that, to a certain extent, this criticism is warranted. The legitimation function framework and the views of researchers like Pinkerton and John are qualitatively different to Habermas's treatment of legitimacy. Nevertheless, there are elements of Habermas's social theory that can inform the legitimation function framework directly and that also overlap with the work of the aforementioned scholars. In particular, Habermas makes a number of interesting points about communication that are relevant both to the framework and to the research of the scholars I mention. I will discuss the ways in which Habermas's social theory is and is not relevant to the legitimation function framework in turn, starting with reasons why it is not immediately relevant.

Most importantly, Habermas's research question asks, 'How is social order possible?' Clearly, this is a different question to the one that the legitimation function framework attempts to answer. On this basis alone, Habermas's ideas are not immediately transferable to this thesis. Nevertheless, one might argue that, irrespective of the differences in research focus, there remains significant overlap between Habermas's work and the legitimation function framework. In particular, Habermas's social theory provides an explanation for how legitimacy emerges in a society. If the legitimacy of a resource management system is contingent on wider social legitimacy, then a Habermasean perspective could be useful in explaining a particular management system's legitimacy or illegitimacy. However, I suggest that this overlap is superficial and not sufficient to make use of Habermas in the legitimation function framework.

Firstly, Habermas's theory is at an exceptionally high level of abstraction. It is therefore difficult to use his ideas to explain legitimacy at the more specific, functional level of an individual resource management system. His ideas do not map neatly to cases where greater detail is required to explain instances of legitimacy. There is an explanatory gap between his elucidation of legitimation crisis and legitimation and an understanding of legitimacy in particular resource management systems.

Furthermore, Habermas implies that legitimacy (or a lack thereof) arises as a result of the way in which society is structured and operates. A legitimation crisis emerges when system colonises lifeworld. Thus, the existence of distinct social domains (lifeworld and system) is a

necessary condition for legitimation crisis, as is the tendency for one of those domains (system) to encroach on the other (lifeworld). This view of legitimacy is fundamentally different to the one I espouse in the legitimation function framework, and indeed the one outlined by Pinkerton and John and others. I do not suggest that the structure of society is a determinant of legitimacy in resource management systems. Indeed, the legitimation function framework implies that legitimacy depends much more on the specific manner in which resource management systems are designed and operated, and the way they are perceived, than wider social structures. Wider social legitimacy is important, but I argue that it does not depend on social structure so much as existing cultural norms and traditions. (In this vein, see chapter 6 for a discussion of exogenous factors and legitimacy in resource management contexts.)

Finally, Habermas's analysis has Marxist elements that inform his ideas on social integration (particularly in *Legitimation Crisis*). The legitimation function framework does not invoke social theory, Marxist or otherwise, of any kind. I would argue that the Marxist angle adds to the ways in which Habermas's ideas on legitimation are fundamentally distinct to my own and not immediately relevant to the thesis. In particular, the Marxist or neo-Marxist overtones in Habermas's work imply that analysing legitimacy in resource management contexts using Habermas requires a similarly Marxist interpretation of, say, the way fisheries are organised. The legitimation function framework does not entail any such interpretation. Indeed, I suggest that referring to Marx adds a layer of complexity which is not actually needed to explain legitimacy.

Thus, Habermas's ideas on legitimacy and legitimation crises are not directly applicable to my treatment of legitimacy in resource management contexts. The different research problem Habermas addresses, his view that legitimacy emerges as a result of fundamental patterns in the way society is structured, and the Marxist overtones of his analysis, mean that his theory of legitimation is not directly transferable to the functional research question I address in this thesis.

However, Habermas's ideas on 'ideal discourse' are relevant to my exploration of legitimacy in resource management systems. In particular, Habermas's view that legitimacy rests on 'good arguments' made under conditions of idealised discourse (see the discussion above on pages 143/144) may tell us something useful about the nature of effective communication,

which I suggest has a key role in legitimacy. For Habermas, 'ideal discourse' is 'free from domination of any kind' and one to which 'participants have equal access' (Blaug, 1997). There should also be 'an absence of constraints on communication, and equal opportunities to object to and put forward arguments' (*ibid*). One could argue that these conditions also characterise effective communication. Certainly, a failure to satisfy the standards outlined in 'ideal discourse' will prevent communication between actors from being truly effective. For instance, communication where one group of actors is dominant over another is unlikely to be effective because some actors will be unable to have their voices heard or unable to present their point of view accurately.

Habermas's ideas on communication and 'ideal discourse' therefore provide us with some indication of the criteria that effective communication will satisfy. This aspect of Habermas's social theory is of some significance to the legitimation function framework and the thesis generally. The conditions that characterise ideal discourse are not abstract; indeed, they are functional and therefore map to the legitimation function framework. Furthermore, Habermas states that legitimacy requires 'good arguments' made under ideal discourse conditions. We can therefore have confidence that there is a possible link between legitimacy and the discourse Habermas describes.

The other element of Habermas's ideas on legitimacy and legitimation – the colonisation of lifeworld by system – also has some value to the thesis. This is perhaps surprising, given the concept's abstraction and my view that Habermas's ideas are so abstract that they leave an explanatory gap with legitimacy in resource management contexts. Nevertheless, the interaction between lifeworld and system is important in a resource management system at a number of levels. Firstly, system often 'frames' a management system. For instance, a common concern when developing a management system is that it delivers 'value for money' and 'economic efficiency'. The halibut fishery is a case in point. As mentioned (see page 96), the problems in the derby fishery identified by the Council were largely economic rather than social or environmental problems. Framing a resource management system in this way is arguably a constraint on lifeworld processes, and therefore an obstacle to the discourse and good arguments which lead to legitimacy. Thus, a key question for the individuals and organisations involved in designing a resource management system is, "How can we bring into play lifeworld functions and processes in a resource management system?" Indeed, a

Habermasean perspective would imply that the legitimacy of a resource management system depends on preserving lifeworld structurally in the management system.

Although this argument may seem overly abstract and not immediately relevant to the legitimation function framework, it may tell us something important about the manner in which the legitimation function criteria are satisfied. In particular, a resource management system that is framed by system is likely to treat the legitimation function criteria instrumentally – that is, as a means to an end. The legitimation function criteria may become part of a box-ticking exercise, for instance. But it is clear that claiming that a resource management system is legitimate because boxes have been ticked is qualitatively different to claiming legitimacy on the basis of an authentic and genuine attempt to satisfy the legitimation function criteria. I would argue that the latter is more likely to occur if lifeworld characteristics frame and are included in a resource management system. A failure to do so leads to the encroachment of system and a purely instrumental approach to legitimacy and other resource management factors.

Thus, it is evident that Habermas's ideas on the colonisation of lifeworld and system are relevant even at the level of the legitimation function framework. The distinction between lifeworld and system reveals something about the way in which the legitimation function criteria should be approached. They are not merely means to an end. In this vein, it is incumbent on the stakeholders in a resource management system to consider the lifeworld values that they bring to a management system, irrespective of their particular professions or roles. The legitimacy and success of a resource management system depends on people cooperating and compromising. Cooperation will at times mean that individuals have to put aside their own narrow self-interests or the interests of their profession in order to pursue a collective good. It requires communicative rather than instrumental action. This is the essence of lifeworld, and it rests partly on the individual consciously embracing lifeworld rather than system values.

It is possible to demonstrate the impact that a lifeworld versus system approach to resource management has on resource management outcomes. Consider an open access derby fishery versus an ITQ fishery. Both management systems have been applied to the halibut fishery. The derby fishery was characterised by competition for a limited resource (the halibut stock)

and by the operation of a largely unrestricted market (the fishery was open access)[21]. Cooperation between stakeholders only started when it was abundantly clear that the fishery was broken and required reform. (See chapter 3 for more detail on the events leading up to the introduction of ITQs.) The introduction of ITQs broke the cycle of competition and established effective restrictions on the market. Crucially, open access – and the perverse incentives it creates with CPRs – was replaced with pseudo property rights (that is, ITQs). However, ITQs have not been completely successful in limiting system from colonising lifeworld in the fishery. A number of interviewees mentioned the problems presented by quota accumulation and quota migration, and their impact on rural communities in Alaska. Accumulating quota is a way of increasing one's economic share of the halibut resource, and of acquiring power and influence in the fishery – and money and power are the two sub-systems that comprise system (Finlayson, 2005, pg. 53). Interestingly, interviewee L believed that the grassroots approach taken during the development of ITQs had prevented more damage from quota accumulation. Thus, a process of discourse and compromise had constrained the worst excesses of system.

There is one final point to make in respect of the relevance of lifeworld and system to legitimate resource management systems. The environmental and sustainability problems faced by resource management authorities are highly technical, and therefore call for technical solutions. But this position is problematic in terms of lifeworld and system, because we ascribe technology and technology-driven approaches to system rather than lifeworld. Clearly, the need for technical solutions is difficult to reconcile with a position that emphasises the importance of lifeworld. Perhaps the solution to this problem is to recognise that a successful resource management system requires a combination of lifeworld and system-framed measures. Thus, the ITQ management in the halibut fishery has proved effective because it combines a technical tool for addressing the race to fish (ITQs) with measures that preserve lifeworld (for instance, IPHC research trips that are carried out in collaboration with fishermen).

In summary, Habermas's ideas on legitimation and communicative action are valuable to the legitimation function framework and this thesis in a number of ways. Although Habermas's views on the nature of legitimation crisis are not immediately relevant, the concept of

[21] This comment should not be taken as a critique of unregulated markets or 'laissez faire' generally. I have tried to make the thesis as apolitical as possible.

discourse and the criteria that accompany ideal discourse inform my argument on effective communication in the legitimation function framework. Furthermore, Habermas's insights on the nature of lifeworld and system point to the importance of preserving lifeworld structures in a resource management system. This applies both to the design of the management system and the conduct and values of the stakeholders involved in the system. It also applies to the legitimation function criteria. If the criteria are satisfied in a purely instrumental way (that is, if the criteria are framed in system), then they cannot contribute to 'true' legitimacy, only a shadow of it. Finally, the interaction between lifeworld and system suggests that the need for technical solutions in resource management systems should be balanced by lifeworld considerations – amongst which is legitimacy.

4.7 Developing the legitimation function framework

The legitimation function framework I develop in this chapter builds on the work I have discussed above. Overall, the framework is based on a key assumption: that a resource management authority can indeed be deliberative about securing its legitimacy and the legitimacy of the management system it organises. The criteria identified in the framework are those that require satisfaction if legitimacy is to emerge; that is, if a resource management authority is deliberative about these criteria, it is more likely that stakeholders will perceive it and the management system it operates as legitimate. The legitimation function framework can therefore serve a diagnostic function. It can be applied to other resource management systems and used to evaluate both the likelihood that the system is legitimate, and, in functional terms, the reasons why legitimacy may or may not have emerged.

4.7.1 Method

The legitimation function framework developed in this chapter is based on the literature in criminology, sociology, social psychology, new institutional economics, and organisations. The framework is therefore truly inter-disciplinary. The findings outlined in these literatures are used to construct a framework made up of particular criteria that may contribute to the legitimacy of an organisation or a process. In some cases, a criterion is included in the framework because the literature establishes empirically a connection between legitimacy and the criterion in question. In other cases, the literature discusses legitimacy from a theoretical point of view or provides details on concepts like trust that intuitively are linked to legitimacy.

Some of this literature may not appear immediately relevant to research on CPR management and SESs. In particular, the criminology and social psychology literature examines people's behaviour in the courts and in relation to other criminal justice organisations like the police. It draws heavily on the work of Tyler, who has investigated legitimacy and procedural justice over a number of decades and whose scholarship is central to the field. I accept that using the ideas and evidence presented in the criminology and social psychology literature is questionable. Arguably, however, the criteria that shape legitimacy are likely to be similar across a wide range of administrative contexts. Thus, the criteria underpinning police legitimacy, say, are akin to the criteria that influence legitimacy in the halibut fishery. Furthermore, there are no data or studies to suggest that ideas on legitimacy from criminology and social psychology are not applicable to the study of management systems in SESs. Indeed, a recent paper (Jodoin, 2014) uses Tyler's ideas to explore the way rights-based approaches could enhance legitimacy in conservation initiatives. There is therefore at least some precedent for the application of Tyler's and other ideas from criminology and social psychology to contexts that are similar to CPR management. But most importantly, the criminology and social psychology literature has explored legitimacy extensively and often has strong empirical and experimental foundations. It represents an excellent platform on which to base at least part of the framework. There is also the sense that the rules we hold dearest are those that, if breached, carry the harshest sanctions. We turn to the criminal justice literature to understand these rules.

Another potential limitation of the method is that the literature is inadvertently 'cherry picked' and therefore selection bias is introduced into the way legitimation function criteria are identified. I have attempted to avoid selection bias by covering the literature as broadly as possible. Indeed, the range of distinct research areas from which evidence and ideas for the framework are drawn, suggests that selection bias is avoided as far as possible. Nonetheless, it would be invidious to claim that the framework includes an exhaustive list of the criteria that lead to legitimacy; actually, it is likely that certain criteria are not considered that might subsequently prove to have an important legitimation function. However, I am confident that the legitimation function framework as presented in this chapter is an important and useful contribution to the literature.

4.8 Criteria I - procedural fairness

Several authors emphasise the legitimation function served by the perception that a procedure is administered fairly (see Tyler, 2006, for a review). In this model of legitimacy, people judge the legitimacy of authorities or institutions based on an assessment of the fairness of decision-making processes. Tyler (2001b) summarises the 'fair process effect' by noting that 'authorities and institutions are viewed as more legitimate…when they exercise their authority through procedures that people experience as fair'. Procedural fairness is therefore a criterion that shapes legitimacy. The procedural fairness model is distinct to 'instrumental models' of legitimacy that link perceptions of legitimacy to whether or not the outcomes produced by an institution or organisation are favourable.

The fair process effect is widespread. A meta-analysis by Colquitt et al. (2001) of 183 papers in the organisational justice literature showed that procedural fairness was highly correlated with, amongst others, evaluations of authority. A study of people's trust in legal authorities based on data collected in two Californian cities (Los Angeles and Oakland) suggests that perceptions of legitimacy are shaped by trust in the motives of legal authorities. Trust, in turn, is shaped by a person's sense that a process was fair (Tyler, 2001c). Similarly, in a survey of attitudes to policing in New York City, Sunshine and Tyler (2003) found that procedural fairness was the primary driver of the perception that police authorities in New York City were legitimate[22]. This was true irrespective of the ethnicity of respondents, and was observed both pre- and post- the September 11th 2001 terrorist atrocities. A more recent study of police legitimacy by Braga et al. (2014) suggests that assessments of police action (evaluated by recording the responses of 1,361 people to three videos of police-citizen interactions in a randomised factorial experiment) are negatively impacted by *a priori* knowledge that: the police department in question is being investigated for abusive behaviour; that the police officer in question is being investigated for corruption; and that the interaction shown in the video is illegal. Furthermore, Braga et al. show that the procedural fairness experienced by respondents in prior encounters with the police influenced their evaluation of police actions in the three videos. Respondents who had experienced discourteous or disrespectful treatment were more likely to assess the videos negatively. The

[22] A weakness of Sunshine and Tyler's study is that it is based on self-reporting of law-related behaviour, rather than actual behavioural data from, say, police records.

authors conclude that 'past experiences with police officers shaped citizen attributions of the legitimacy of those actors and the institutions they represent'.

These and other studies provide the empirical foundation for a link between procedural fairness and legitimacy. They also clarify what makes a process fair or unfair. For instance, Leventhal (1980) argued that a process – whether occurring in a legal or non-legal context - is fair if it meets six particular criteria: 1) it is applied consistently across people and across time; 2) it is free from bias; 3) accurate information is collected and used in decision-making; 4) it has a mechanism that corrects flawed or mistaken decisions; 5) it conforms to personal and/or prevailing ethical and moral standards; and, 6), it accounts for the opinions of groups affected by the decision-making process. In Tyler's model of legitimacy (1997a, 1997b), four factors influence assessments of procedural fairness: inter-personal respect, neutrality, trustworthiness and level of participation. Inter-personal respect is expressed by treating an individual with courtesy, dignity and respect. Neutrality includes assessments of 'honesty, impartiality, and the use of facts, not personal opinions, in decision-making'. Trustworthiness is established when one third-party is motivated to treat another fairly, shows concern about their needs, and considers their arguments fully.

More recently, Tyler (2009) conceptualised procedural fairness as including two issues: the quality of decision-making, and the quality of inter-personal treatment. In the former, factors like the independence, neutrality and technical competence of decision-makers are important; so too is the consistency of decision-making, and the ability of people to have a say before decisions that affect them are made. Quality of inter-personal treatment is shaped by factors like the dignity with which a person is treated, and the care and concern shown by authorities (Tyler, 2009). It is clear that Tyler's earlier ideas on the factors that influence assessments of legitimacy (1997a, 1997b) have informed this more recent model.

Conceptualisations of procedural fairness are also found in other areas of scholarship. In common law jurisprudence, for instance, the concept of 'natural justice' ensures that decisions - and the process that led to those decisions - are fair. Natural justice comprises three rules: the rule against bias, or *nemo iudex in causa sua* ('no one should be a judge in his own case'); the hearing rule, or *audi alteram partem* ('hear the other side'); and the evidence rule. The rule against bias requires that a decision-maker is disinterested and unbiased in the matter to be decided. The hearing rule requires that a person whose interests will be

adversely affected by a decision have an opportunity to have their say in the decision-making process. The evidence rule requires that decisions be based upon evidence and logic, rather than speculation and suspicion. If a legal process satisfies these three rules, then it is manifestly objective and fair.

What is striking about the concept of natural justice in procedural fairness is its similarity to conceptualisations of fairness in otherwise unconnected scholarship. For instance, Levanthal's fairness criteria require that a process is free from bias and that it accounts for the opinions of groups affected by the decision-making process. Both of these criteria satisfy the rule against bias, and the hearing rule, respectively. Tyler's ideas suggest that the independence and neutrality of decision-makers are important factors in determining the quality of decision-making. Where decisions are made as a result of independent and neutral deliberations, they are also most likely to satisfy the bias rule. Similarly, Tyler's emphasis on allowing people to express their opinions before decisions that affect them are made satisfies the hearing rule.

Although Tyler's work and other studies suggest that legitimacy is based primarily on procedural fairness, there is also a view that legitimacy is determined only by the effectiveness of an authority or authorities. This approach to legitimacy – termed 'eudaemonic legitimacy' – argues that legitimacy depends on the effectiveness with which material benefits and/or prestige are produced for citizens. Tyler and other scholars account for eudaemonic legitimacy when they note that, in addition to procedural fairness, the performance of authorities plays a role in determining legitimacy. For instance, a study by Tankebe (2008) concluded that people who believed the Ghana police force conducted itself in a procedurally fair manner were also likely to have evaluated police effectiveness and police outcome fairness and favourability in a positive way.

Assessments of performance are shaped by factors like costs, delays, and the perceived or actual benefits associated with outcomes. Nonetheless, it is perhaps unhelpful to conceive of legitimacy only in terms of effectiveness, or procedural fairness. Bottoms and Tankebe (2012) suggest instead that effectiveness and legitimacy are interactive and interdependent, and that 'effectiveness is a necessary but not sufficient condition of legitimacy'. Arguably, thinking about legitimacy in this way is more realistic than a purely effectiveness-based or procedural fairness-based view.

The findings of the research outlined above therefore suggest that one criterion a resource management system must satisfy to be legitimate is procedural fairness. The research also implies that procedural fairness is expressed both during the design phase of a resource management system (that is, the rule-development phase), and in the outcomes produced by a resource management system. Thus, procedural fairness relates to rule-development in a resource management context – how fairly were the rules designed? Effectiveness is associated with management outcomes – were outcomes procedurally fair? In addition, management features that attempt to address instances of unfairness will also legitimate the system. For example, the appeals mechanism in the Alaskan halibut fishery was one way in which injustices (perceived or otherwise) could be dealt with in as objective and impartial a way as possible; its apparent effect was to provide the IFQ reforms with a measure of legitimacy (see chapter 5 for further discussion of the appeals mechanism). The framework below (figure 7) shows the criteria a decision or a process must satisfy to be perceived as fair. The framework is based on Tyler's idea that quality of decision-making and quality of inter-personal treatment inform assessments of procedural fairness. It also uses the concept of natural justice and Leventhal's six fairness criteria to identify the criteria that make a process fair.

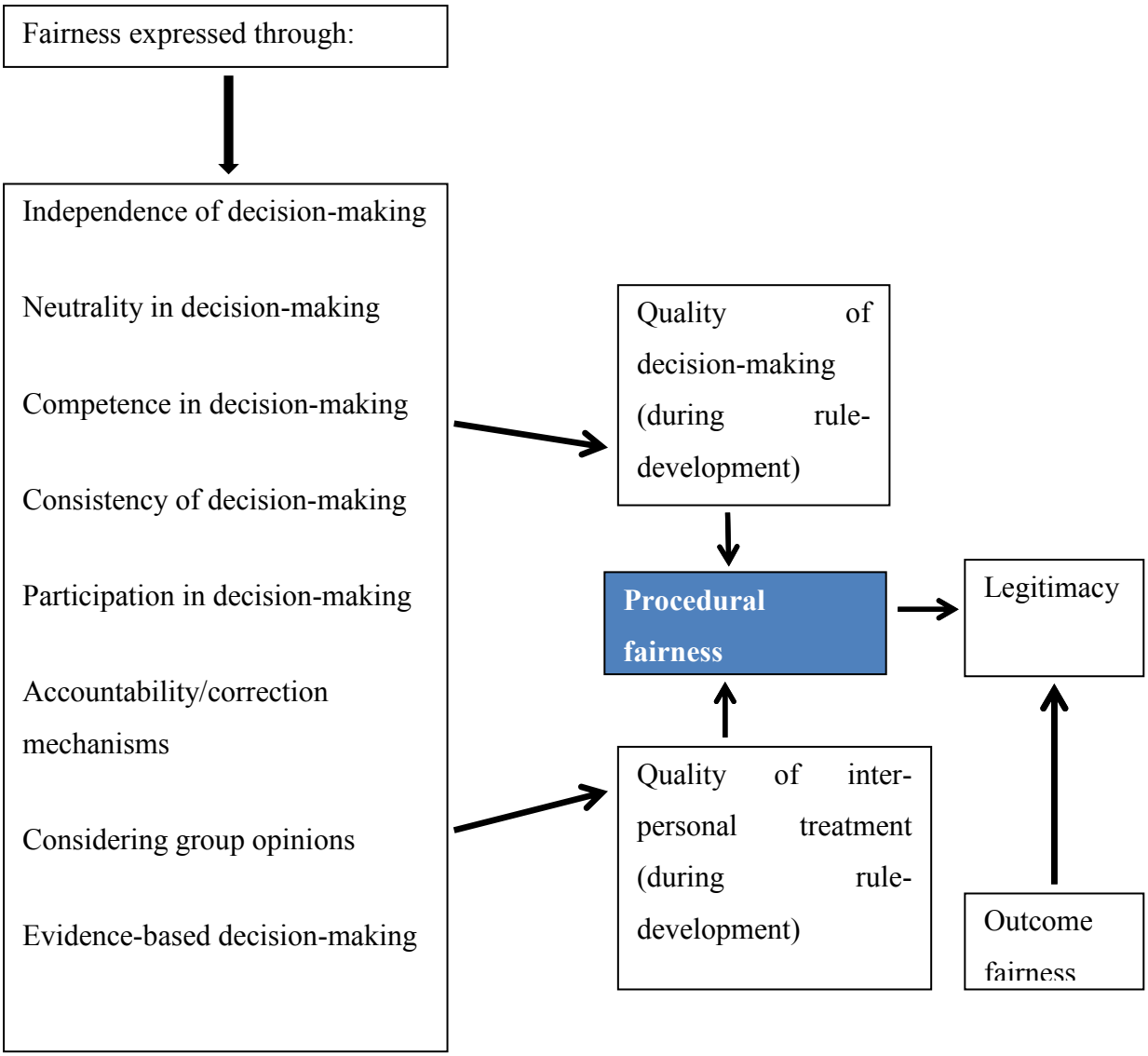


Figure 7. A framework for understanding legitimation variables based on procedural and outcome fairness.

This framework suggests that those features of a resource management system that contribute to, for instance, independent and neutral decision-making, or that mean the management system considers group opinions, will indicate that the rule-development process is being carried out in a procedurally fair way. That, in turn, will help legitimate the management rules and the management system.

4.9 Criteria II - trust

Trust is a term that lacks a precise definition. Its meaning varies across disciplines. In parts of the economics literature, for instance, it is thought of as a tendency to cooperate (see La Porta et al., 1996). In the CPR management literature, there is a sense that trust is expressed when 'an individual puts herself at risk of an outcome dependent upon the actions of others' (Henry and Dietz, 2011). Across disciplines, however, there are a number of shared concepts and ideas in definitions of trust. The first is that a willingness to be vulnerable is a key component of trust. The second is that trust often involves having positive expectations of others, whether individuals or organisations (Rousseau et al., 1998). The third is that emergence of trust depends on the existence of risk - or the perceived probability of loss - and on interdependence in the interests of individuals or groups. When all three of these conditions are taken into account, a satisfactory definition of trust emerges. In this thesis, it is understood as a 'willingness to be vulnerable under conditions of risk and interdependence' (*ibid*).

Although this definition gives us a clearer idea of the meaning of trust, it says little if anything about the conditions that must be satisfied for trust to develop. At one level, trust emerges when norms like 'reciprocate' or 'behave in a trustworthy way' are widespread amongst the individuals in a group, community or society. Norms shape both the way in which people behave, and also their beliefs and expectations about others. Thus, an actor who conforms closely to trusting norms and who lives in a society in which trust norms are frequently adhered to by other people is more likely to trust and be trusted in turn. She will believe that her trusting behaviour will be reciprocated reliably.

At another level, trust and trustworthiness are shaped by formal and informal institutions (Fehr, 2009). There is a sense here that an actor can trust the institutions themselves – she may have trust that property rights institutions guarantee her ownership of a particular good, for instance – but also that institutions can encourage or hinder the development of trust between people (inter-personal trust). The role that institutional mechanisms play in bringing about trust suggests that the 'quality' of institutions can partly determine the trust that exists in a community or country. Thus, communities or countries with weak institutions and norms of 'bad conduct' are unlikely to have high levels of trust, neither in other people, organisations or authorities, nor in the institutions themselves. In turn, the factors that shape

institutions, notably the history of a country, can themselves shape the levels of trust that characterise a society.

An implication of this argument is that the emergence of trust has a strong exogenous component. For instance, trust in the authorities that are designing and implementing a resource management plan does not just depend on the nature of the management rules and the way in which the authorities conduct themselves; it may also depend on the pre-existing levels of trust that exist in a community or country as a result of its history and the strength of its institutions. This exogenous component distinguishes trust from procedural fairness and other criteria contributing to legitimacy. The satisfaction of communication, participation and procedural fairness in a resource management plan is a result of processes directly associated with the plan itself. Conversely, the satisfaction of trust in a resource management plan may owe more to exogenous conditions that are independent of the plan.

One implication of trust's exogenous component is that people are more likely to trust a resource management plan if they have pre-existing trust in the authorities that are designing the system. Of course, authorities can earn stakeholders' trust once a resource management system has been designed or implemented, but clearly it helps a great deal if people trust resource management authorities before a resource management system is designed and implemented. Furthermore, authorities have to maintain the trust bestowed on them if their decisions and the rules they craft are to continue being trustworthy. Of course, it is easy for authorities to lose the trust that is placed in them. In this sense, trust is analogous to a good reputation: difficult to earn, but easily and quickly lost.

Like procedural fairness, trust has an important function as a criterion underpinning legitimacy. The basic intuition here is that people who trust decision-makers and other authorities are more likely to accept the decisions they make and the rules they devise. If legitimacy stems from the sense that an individual has an obligation to accept rules, then that sense of obligation to accept will be stronger when the individual trusts the authorities. As Tyler (2001) notes, 'trust in the motives of authorities is central to judgements about their legitimacy'. Furthermore, there is some evidence to suggest that trust moderates the effect of procedural fairness (see, for example, De Cremer and Tyler, 2007). The impact of procedural fairness on perceptions of legitimacy is larger when people are dealing with authorities or

organisations they trust (*ibid*). Thus, trust can serve an indirect legitimation function through its influence on assessments of procedural fairness.

4.9.1 'Micro-situational' attributes that enhance trust

There are certain attributes of a situation that increase or decrease the probability that individuals will use norms like reciprocity and trust, and that therefore lead to norm-abiding behaviour (Ostrom, 2009b). In situations characterised by repeated interactions (which approximates most closely to what is happening in the Alaskan halibut fishery, the Paraná delta, and other SESs), the use of norms like reciprocity and trust that lead to cooperation is more likely to occur when:

1. 'Information about past actions is made available';
2. The same group of participants interact repeatedly with one another;
3. Participants can communicate by sending pre-structured information;
4. Prescriptions (rules governing harvest levels, for instance) that lead to better outcomes are adopted and enforced;
5. Participants are able to communicate fully;
6. Participants are able to communicate fully with other individuals whose identities are known to them;
7. Participants can sanction or reward past behaviour;
8. 'Participants can design their own rules related to levels of cooperation and sanctions that are assigned to those who do not follow agreed-upon rules'.

(These attributes are derived or quoted from Ostrom, 2009b.)

An implication of identifying these attributes is that a resource management system in which at least some of these attributes are present is more likely to be characterised by trusting behaviour, and therefore by greater legitimacy. Consequently, those features of a resource management system that lead to the emergence of these attributes may indirectly legitimate the management system. For instance, mechanisms like public meetings which allow full and effective communication will go some way toward satisfying attributes like information being made available and participants being able to interact repeatedly with one another. Public meetings may therefore have a function in building trust between the actors in a resource management system.

4.9.2 Communication, information and trust

Interestingly, many of the attributes that Ostrom identifies above concern the availability and flow of information. For instance, there is a need to make information about past actions available. Participants must be able to communicate by 'sending pre-structured information'; and communication in general is a major feature of the micro-situational attributes.

Information and trust are arguably linked via uncertainty. In a resource management context, uncertainty can arise when stakeholders in a SES do not know how a management authority will proceed when designing management regulations, or are unsure how those regulations will impact their livelihoods and the SES itself. Moreover, the dynamics and function of ecological systems are inherently uncertain and chaotic. In general, the individuals involved in a SES will differ in their information about the system and therefore experience 'information inequality' (Arrow, 1974). (Henceforth, 'information inequality' – the term used by Arrow – is referred to as information asymmetry.) Furthermore, the benefits and costs of the information they have will also differ. For instance, it may be much more valuable to know whether or not one statement about the world (statement A) is true than it is to know whether or not statement B is true. Equally, the resources required to determine the truthfulness of statement A may be much greater than those for statement B (*ibid*). Information asymmetry is therefore the source of uncertainty, except where uncertainty is caused by a total lack of information or knowledge. The latter necessarily affects all individuals equally. Uncertainty impacts some individuals more than others, either because one individual has less information than another, or because the information he has is less valuable.

Uncertainty due to information asymmetry can lead to a lack of trust (or the presence of mistrust) between at least two individuals, or between groups, especially if the freedom of one of the actors in the situation is constrained by the decisions of another. Consider the following example. The stakeholders in a SES almost certainly know less than management authorities about the design of a resource management system, and what they do know is probably less detailed than the information held by the management authorities. If it is less detailed, it is probably less valuable as a guide to determine what the management authorities intend to do. The dilemma that confronts stakeholders, then, is how to know with the incomplete information they have whether they will be negatively impacted by the

management authority's decisions. The dilemma can only be resolved if the stakeholders receive additional information. But if it appears that management authorities are withholding information (by failing to communicate, say), and therefore maintaining the information asymmetry, there is reason to mistrust them.

This situation occurs frequently in resource management contexts. It has important implications for the legitimation of resource management systems. Where uncertainty leads to mistrust of management authorities, mistrust itself will reduce the likelihood that actors in a resource management situation perceive management rules as legitimate (for the reasons described in section 4.7). More generally, the way information is distributed in SESs is characterised by asymmetries. The uncertainty caused by information asymmetry is therefore a central feature of CPR and SES management. When particular stakeholders are in a position of responsibility or authority, information asymmetry places them in a delicate situation in terms of the way they handle and distribute information. If authorities do not use information competently, they risk engendering ill feeling and mistrust. At one level, then, legitimacy (and trust) problems are information problems. This is a simple but fundamental point. It emphasises the importance of effective communication and participation in resource management systems as a way to address information asymmetries and establish trust and legitimacy between actors in a resource management system.

4.9.3 Institutions and trust

The observation that formal and informal institutions shape trust (Fehr, 2009) suggests that pre-existing institutional arrangements can have an effect on the way in which trust, and therefore legitimacy, emerges in a resource management system. Identifying and understanding the nature of these institutions can help in understanding instances where trust is present or absent irrespective of the micro-situational attributes described above. However, it is difficult to make generalised statements about the institutions that consistently shape trust. Indeed, it is likely that the role played by institutions in trust is context-specific. For instance, people in Argentina may mistrust government institutions because of the recent history of repressive military governments in the country. Conversely, people in some parts of the United States – including, arguably, Alaska and the Pacific north-west – trust government institutions to a much greater degree than in Argentina. The impact of institutions on trust will therefore vary from place to place.

4.9.4 Summarising the relationship between trust and legitimacy

Figure 8 below summarises the various facets of the relationship between trust and legitimacy. Trust's temporal component is taken into account by distinguishing between pre-existing trust in decision-makers and authorities, and trust that is earned by authorities. The broken arrow between trust and legitimacy indicates the indirect effect that trust has on legitimacy through procedural fairness.

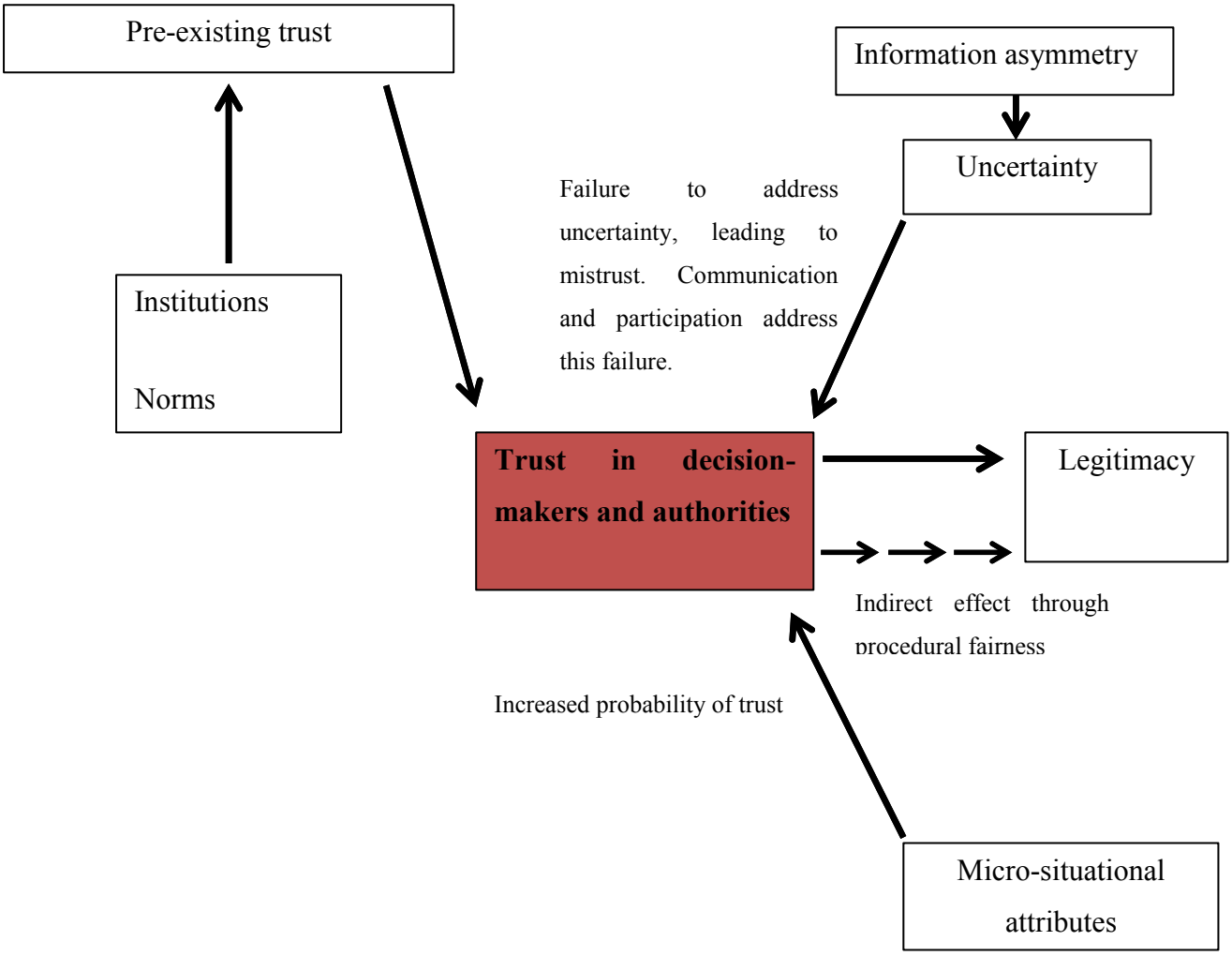


Figure 8. A framework to illustrate the relationship between trust and legitimacy.

4.10 Criteria III - communication

The importance of communication for establishing cooperation was touched upon in the introduction to this chapter. It was also evident in the studies of the halibut fishery and the

Paraná delta, and has been investigated in other empirical and laboratory settings (see, for instance, Bresig et al., 2003). Furthermore, the micro-situational attributes identified by Ostrom (2009b) include a number that relate to communication. Communication is therefore a key variable in overcoming CPR and other social dilemmas. I argue that it is also a criteria contributing to legitimacy in resource management for SESs like the halibut fishery and the Paraná delta.

4.10.1 'Effective' communication

In my discussion of Jürgen Habermas's ideas on legitimation crisis and communicative action earlier in this chapter, I emphasised the importance of his views on 'ideal discourse'. I suggested that the conditions that characterise ideal discourse should also apply to 'effective' communication. Communication that is effective and that can contribute to building legitimacy is therefore based in part on these conditions. Habermas argues that judgements about the quality of communication are made using various criteria: clarity, honesty, sincerity, and a lack of deception, distortion and manipulation (Lockwood et al., 2008). These criteria are in addition to and complementary of the principles underpinning ideal discourse: equal access to a discourse, the absence of domination, the ability to communicate without constraints and the option to put forward and object to arguments.

According to Habermas, then, 'effective' communication is communication that meets a number of standards: clarity, honesty, sincerity, and freedom from deception, distortion and manipulation. However, closer examination of these criteria suggests that at least some of them are redundant in explaining 'effective' communication. For instance, it is not immediately clear how honesty differs from sincerity. Indeed, being sincere about something is tantamount to being honest about it. Perhaps the issue that Habermas is attempting to capture when he includes sincerity is 'intent', or the motivation that underpins communication. In this sense, communication is effective when the communicator's motives are genuine, honest and concerned with the resolution of problems to mutual benefit. In short, the motivation for communicating must be 'pure'. 'Motivation' in the sense implied here is therefore a more appropriate criterion for effective communication than sincerity.

In a similar way, it is arguable that a lack of deception is also redundant in explaining effective communication. In particular, a lack of deception is just a negative framing of

honesty. Indeed, deceiving someone requires behaving in a dishonest way; deception obscures the truth. A more appropriate way to think about this standard is to consider whether or not a conversation or communication is honest both in content (is the information relayed an accurate reflection of the truth, to the best of the communicator's knowledge?) and intent (is the motivation for engaging in a conversation pure?). It is noteworthy that intent is again a key issue in understanding these standards. It suggests, perhaps, that the genuineness and purity of motivations are of general importance to effective communication and legitimacy.

Based on this analysis, effective communication as it is understood in this thesis is slightly different to the Habermasean conception of effective communication. Here, effective communication satisfies four criteria: clarity, honesty, and a lack of distortion and manipulation. Furthermore, these criteria must be reflected in the motivation that underpins communication. The focus on motivation (or intent) is absent in Habermas's discussion, and is perhaps a better way of thinking about sincerity and a lack of deception, both of which are included in Habermas's original.

These criteria are relevant at two levels: they apply not only to the content of a communication, but also to the underlying rationale behind the communication. In determining whether communication is effective, one must therefore ask two questions – is the information contained within a communication clear and honest? And, perhaps more importantly, is the motivation for sending a communication in the first place honest and free from a desire to distort and manipulate? There is a sense that the recipients of a communication are more likely to be understanding of any shortcomings in the content of a communication if it is evident that the motivation behind the communication is authentic, honest and focused on producing mutual benefits. Thus, there is reason to conclude that 'effective' communication depends ultimately on the purity of the motivations and reasons underpinning it. Content is important, but a secondary consideration in determining effectiveness.

This discussion focuses in particular on instances where one group of stakeholders are delivering information to another group of stakeholders, the recipients. Of course, communication also entails discourse between stakeholders. When Habermas writes about discourse, he is referring to argumentation and debate between individuals who are free to

participate in the discourse and who are willing to respect, listen to and be swayed by the arguments put forward by other participants. Arguably, criteria like clarity and honesty remain relevant in determining the effectiveness of a discourse. These criteria apply to the content of a particular argument. For instance, an effective argument is one in which the content and logic is clearer than in another.

However, there are a number of difficulties with a definition of effective discourse and effective argument that is based on the satisfaction of these criteria. In particular, an effective argument may not necessarily be a winning argument. For instance, discourse may arise because stakeholders in a fishery are attempting to determine quota limits for the year. These stakeholders are aiming to persuade their peers of the merits of a particular quota limit. An effective argument in this discourse is one that is clear and honest. However, a winning argument may not necessarily satisfy these criteria. A fisherman may win a discourse in which he argues that quota limits are increased because his is the most logical argument; but this same fisherman may actually believe that quota limits should be reduced and his argument is motivated by a pressing short-term need. The rationale underpinning his argument is dishonest, and the motivation for it is insincere and self-interested. As a result, I would define his argument as 'ineffective' – and yet his argument won the debate. Problems of this kind are common in resource management contexts, where discourse often leads to outcomes that can benefit or harm the interests of stakeholders in the management system. In these cases, the motivation underlying a stakeholder's point of view is the protection of his interests.

There are two solutions to this problem. The arguments in a discourse are still effective if they are clear and honest, but there is also a need for stakeholders to be honest and sincere about their motivations and in particular their interests. In the example above, communication in the quota limit discourse would have been effective if the fisherman had been straightforward about his reasons for wanting a quota limit increase. Secondly, effective discourse requires – as Habermas points out – the absence of domination and the ability to object to arguments. The former means that stakeholders are unable to protect their interests to the detriment of others without sufficient justification. Sufficient justification is achieved by communicating effectively during the discourse. Winning an argument is not necessary, in part because the challenges raised by other participants in the discourse should clarify which arguments are ineffective. Thus, the ability to object to another participant's

point of view is important because it can reveal instances in which communication has failed to satisfy the criteria that make it effective.

Habermas's ideas on communication and discourse provide us with an indication of the criteria that characterise effective communication in discourse situations and when information is delivered and received by stakeholders. However, it is worth emphasising that these criteria are difficult to meet in practice. In many instances, communication between the stakeholders in a resource management system may fail to reach the standard implied by the criteria. Habermas himself recognised this; Finlayson (2005) notes that 'in real life, where time is limited and participants prone to error, discourses will only ever approximate these ideals to a greater or lesser degree'. Nevertheless, I would argue that communication that does not satisfy the criteria is not immediately ineffective. Instead, effective communication falls along a continuum. Communication becomes more effective the closer it gets to satisfying all of the criteria. Clearly, then, the priority for a resource management authority and for the stakeholders involved in a resource management system is to encourage communication that approximates the Habermasean ideal.

In this vein, there are two other points that merit discussion. Firstly, the aspects of effective communication that concern motivations and reasons are difficult to incentivise or promote. Legislating for 'purity' in people's motives for communicating is challenging. This is problematic for a resource management authority that is trying to be deliberative about communication and in turn legitimacy. To some extent, effective communication is beyond their immediate control. Indeed, the only practical option for encouraging 'pure' motivations is, perhaps, to lead by example. The onus is therefore on resource management authorities in demonstrating that the reasons underpinning their own efforts at communication are honest and not purely self-interested. Although this may sound utopian, I would argue that people respond well and in kind to instances of authenticity. Effective communication is therefore a virtuous cycle; when it is evident that people are genuine in their efforts to communicate effectively, others will follow suit.

Secondly, it is worth re-emphasising that effective communication contributes to the development of legitimacy. The connection between effective communication and legitimacy is largely intuitive. For instance, I have already mentioned how communication can build trust between the participants in a resource management system – and trusting a

resource management authority and the rules it promulgates increases their legitimacy. Certainly, satisfying criteria like honesty is an expression of trustworthy behaviour. In addition, effective communication goes some way toward demonstrating procedural fairness. In particular, the requirement for participants in a discourse to have equal access to the discourse, an equal ability to communicate and to put forward and object to arguments, and the absence of domination, ensure satisfaction of the hearing rule. Equally, a discourse in which arguments are made and rebutted is less likely to produce biased outcomes. And finally, ideal discourse in the Habermasean sense is one in which participation (see section 4.9 below) is guaranteed. Thus, effective communicate is perhaps an expression of the satisfaction of the other three legitimation function criteria. Indeed, a failure to communicate effectively may preclude satisfaction of the other criteria. It therefore has an important legitimation function in and of itself.

4.10.2 What might effective communication look like in a resource management context?

The discussion above is useful because it gives us an understanding of effective communication and its legitimation function. But the discussion is also at a relatively high level of abstraction. It may not be clear what effective communication in a resource management system looks like in any practical sense, and therefore what deliberative steps a resource management authority should take in promoting effective communication.

Arguably, addressing this shortcoming requires a focus on the two forms of communication typical in a resource management context: communication where one stakeholder is receiving information from another (a fisheries scientist providing information to fishermen, say), and discourse between stakeholders (a management committee debating the merits of different quota limits for halibut, for instance). Ideally, a resource management system will provide opportunities for stakeholders to engage in both kinds of communication. The former could include communicating through newsletters and other media that keep stakeholders updated on developments in the management system. The latter entails meetings and fora in which stakeholders are able to provide their point of view. If the discourse that takes places in meetings and fora is to approximate to the Habermasean ideal, then it is necessary that at least one element of a meeting or forum is open to the public and therefore provides equal access.

4.10.3 Communication, information and uncertainty

The idea that legitimacy is in some respects an information problem was established in section 4.7.2. If true, it reinforces the importance of communication in legitimacy because communication is one way in which information is transferred and information asymmetries can be addressed.

Arrow's (1974) seminal work is again useful in understanding the way in which communication and information are connected. For Arrow, there is a distinction between the 'state of knowledge existing at any moment of time' and 'the possibility of acquiring information in the future'. Education is one way in which an individual might acquire information; face-to-face communication is another. Both of these entail costs in terms of capital, effort, time and even politics. Many of these costs are sunk costs. There is also a tendency toward increasing costs with increasing scale of operations or number of members in an organisation (Olson, 1965). These costs are, of course, crucial to the ease with which information is transmitted. Clearly, if the costs of investing in information transmission are higher than the benefits, organisations will choose not to invest. Equally, when communication costs are higher than communication benefits, the frequency of information transmission will decrease or fall to zero because organisations will move to minimise their costs.

This simple point suggests that the communication costs that a resource management organisation like the IPHC incurs will determine how frequently it is able to communicate. The literature suggests that there is a strong, positive relationship between frequency of communication and trust (Lubell, 2007), and so communication costs (in addition to the quality of communication) should shape the ability of organisations to engender trust, and by extension to earn legitimacy. This is not to say that costs alone are the key factor in shaping the frequency and effectiveness of communication. The quality of communication affects the latter. Intangible factors like leadership and political considerations might influence both.

Communication therefore serves an important legitimation function. Its legitimating effect is both direct and indirect. It is direct in a Habermasean sense because it allows stakeholders in SESs to reach a common understanding about their interests and goals, and in so doing to develop 'good arguments' under conditions of 'ideal' discourse. Legitimacy rests on 'good

arguments' made under these circumstances. Communication also has an indirect legitimation function through its effect on trust. The ability to communicate effectively, especially in face-to-face settings, is a 'micro-situational' attribute that enhances trust. In addition, effective communication can provide a process with some of the attributes that make it fair. Figure 9 below illustrates the connection between communication and legitimacy.

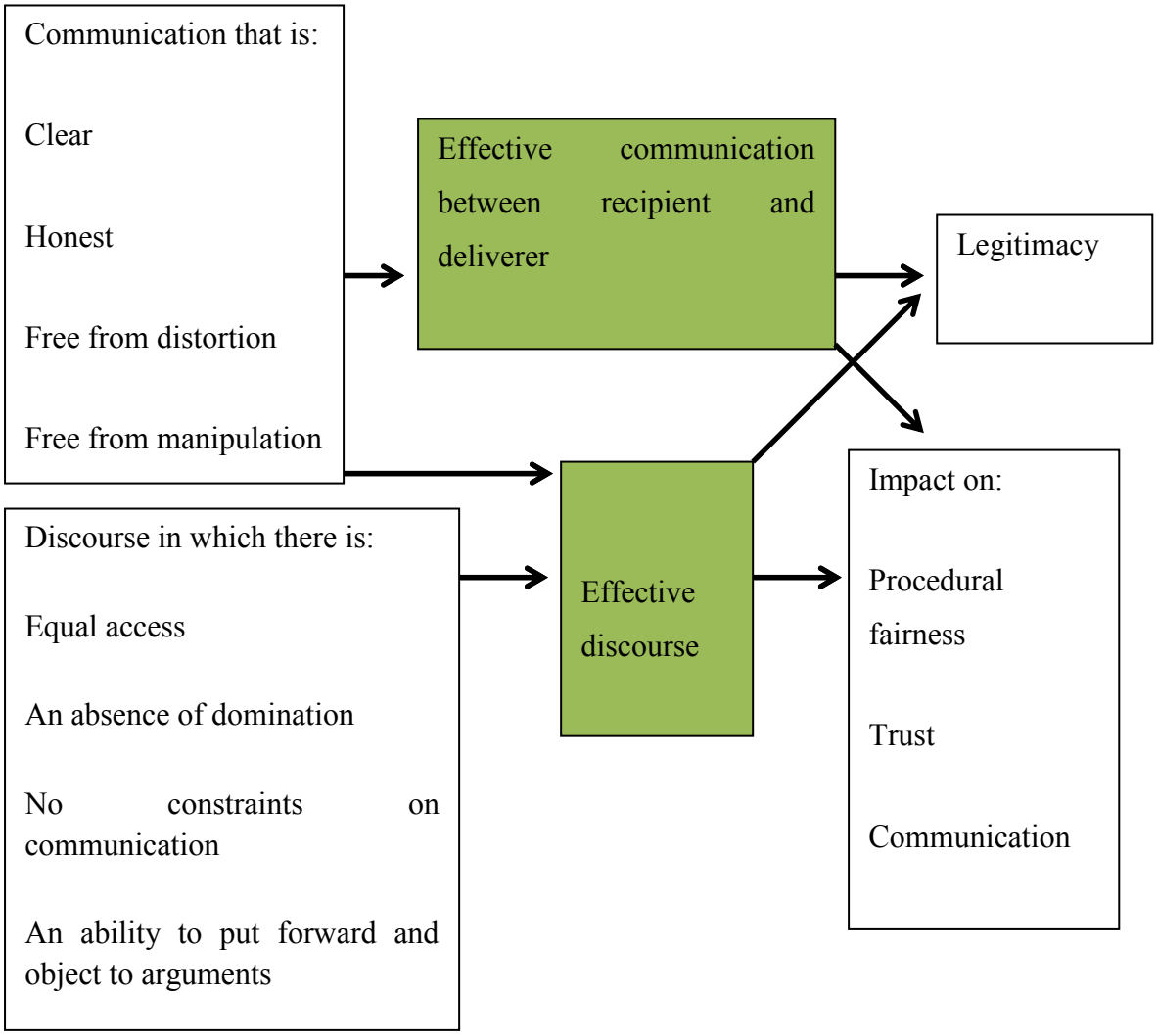


Figure 9. A framework to illustrate the connection between communication and legitimacy.

4.11 Criteria IV – participation

The final criterion contributing to legitimacy in the legitimation function framework is participation. Here, participation is understood as it is described in Pillar II and Articles 6, 7

and 8 of the Aarhus Convention. The Aarhus Convention was adopted in June 1998, and establishes a number of rights to the environment for the general public. I make use of the Convention because it is relatively new (it was implemented in October 2001), because the application of its principles is widespread (there are 46 parties to the convention, in addition to the European Union) and because it focuses on securing citizens' right to a 'healthy environment' through public participation specifically (as well as access to information and access to justice). Although the Convention does not define public participation, it suggests that, at its core, public participation provides citizens with a way to 'assert their right to live in an environment adequate to health and wellbeing, and to fulfil [their] duty to protect the environment'. Furthermore, public participation 'gives the public opportunity to express its concerns, and enables public authorities to take due account of such concerns'. The Convention suggests that public participation should be 'timely, effective, adequate and formal', and that it entails various requirements in respect of communication, information, notifications, and responses.

The Convention also covers participation in various decision-making and policy-making processes. Article 6 concerns public participation in specific decisions that may have an environmental impact; Article 7 relates to public participation in the development of 'plans, programmes and policies' that concern the environment; and Article 8 covers public participation in the preparation of environmental laws and regulations by public authorities. More generally, the Convention is at a fundamental level recognition of the concept of natural justice and procedural fairness and the rule of *audi alteram partem* specifically (see section 4.6). The premise on which the principle of public participation in the Convention is based is that public participation is an expression of *audi alteram partem* and therefore improves the quality of decision-making, both in terms of appropriateness and procedural fairness.

Reference to the Aarhus Convention is also useful because it emphasises that participation is often enshrined in law. When thinking about participation, therefore, it is worth distinguishing between participation that is not a formal requirement in a management process, and participation for which there is an underlying legislative obligation. The former is likely to be *ad hoc* and irregular; the latter, by virtue of its legislative underpinning, is probably more predictable and beneficial, in the sense that stakeholders have recourse to the law when participation does not meet a required standard. For instance, the Aarhus

Convention makes it possible to challenge decision-makers on issues concerning participation, and to change participation for the better when it does not satisfy the letter or the spirit of the Convention. When participation does not have a similar legislative basis, stakeholders are less able to hold decision-makers to account.

Based on these ideas, I define participation as a way in which the stakeholders in a process are able to have their voices heard in a predictable way. A formal legal requirement for participation is not necessary, but it is helpful. It enables stakeholders to make judgements about the honesty, reliability and sincerity of the people and processes that direct resource management systems. Thus, the primary test to determine whether or not a resource management scheme is participative is whether it satisfies the hearing rule. A secondary test is to ascertain whether the management scheme in place has mechanisms that provide stakeholders with sufficient information to evaluate the honesty, reliability and sincerity of management organisations and their members.

My definition of participation might lead to confusion because it suggests that participation and communication are tantamount to the same thing. Although communication and participation are perhaps on a continuum, there are several key distinctions between communication and participation. Firstly, participation implies something more than mere communication. Most importantly, it denotes that stakeholders are able to attend in person the functions and meetings that accompany processes like resource management. Secondly, participation can also include the involvement of stakeholders in resource management decision-making. Participation of this kind is perhaps best termed 'representative' participation, because it provides stakeholders with formal representation in the management organisations whose decisions shape a resource management system. Finally, participation can suggest that stakeholders are able to contribute to the science that underpins a resource management system. Participation in scientific processes facilitates assessments of the science used in resource management decisions. It can therefore go some way toward satisfying stakeholders that the science underpinning resource management is reliable and that it is used in an honest way.

Of course, one implication of treating participation in this way is that, by definition, it goes some way toward ensuring that a process is fair. 'Full' participation requires satisfying the hearing principle (*audi alteram partem*) and is therefore an expression of procedural fairness.

I expand on this idea in section 4.9.1. Another implication of the way I define participation is that it requires the establishment of specific processes – regular public meetings, for instance, or a requirement to notify the public of decisions or timelines. Such processes make participation a predictable or even formal part of a resource management system, and so are the surest way of guaranteeing that stakeholders are able to have their voices heard. Clearly, a resource management system might in practice be participative even participation in it is unpredictable or informal. However, predictability is important because it makes participation an integral part of the management system. It establishes an expectation of participation. Arguably, such systems are more likely to be legitimate than those where participation is *ad hoc* and can 'dry up' suddenly.

The preceding discussion should clarify the connection between participation and procedural fairness. Participation also contributes directly to effective communicative. The rationale here is simple: participation brings together diverse stakeholders and provides them with an opportunity to communicate and to engage in discourse. Without participation, it is easier to obfuscate and to communicate in a way that is less than clear or honest. This relationship is dealt with in section 4.9.2. Finally, participation and trust are linked because the former can provide the conditions under which trust emerges. I discuss each of these points in the sections that follow.

4.11.1 Participation and procedural fairness

My definition of participation (see section 4.9) suggests that participation is an expression of procedural fairness and in particular the hearing rule (the principle of *audi alteram partem*). Participation therefore increases the likelihood that a process is perceived as fair because it is one way in which individuals can ensure that their voices are heard and considered by authorities. Conversely, if individuals cannot make their voices heard in a decision-making process, the process does not satisfy the hearing rule and thus cannot be deemed fair.

This conception of participation and procedural fairness is valuable, but it is also limited insofar as it does not consider the influence of participation on other aspects of procedural fairness. For instance, participation may have an impact on the quality of decision-making and the quality of inter-personal treatment, both of which Tyler suggests are integral to conceptualisations of procedural fairness. Firstly, participation enhances the evidence base

on which decisions are made because it provides decision-makers with perspectives that they may otherwise have not been able to consider. It should therefore help improve the neutrality of decision-making, in that as many points of view are taken into account as possible[23]. It should also ensure that decisions are taken with as many of the facts available. Both of these features enhance the quality of decision-making. Secondly, participation can promote an individual's sense that he has a meaningful role to play in decision-making. That, in turn, can lead to the perception that one is being treated with dignity and respect, and can therefore cause improved assessments of the quality of inter-personal treatment.

Thus, participation and procedural fairness are connected at a number of levels. Most importantly, participation satisfies the hearing rule and hence represents one way in which procedural fairness is manifested in a resource management system. Furthermore, participation has benefits for the quality of decision-making and inter-personal treatment. Participation therefore contributes to positive assessments of procedural fairness through these two criteria.

4.11.2 Participation and communication

One key aspect of participation's legitimation function is the way it can contribute to effective communication. The relationship between participation and communication exists because participation often engenders communication (Cavalcanti et al., 2011). (I have already commented that communication and participation are closely related, with the key difference that participation entails significantly more than communication does.) Certainly, it is clear that participation in meetings and other events allows people to exchange information directly and share perspectives (Stringer et al., 2006). It brings together stakeholder groups that are otherwise distinct and may not normally have an opportunity to communicate. Participation can therefore serve to address the uncertainty that stakeholders may have about a plan's development, afford them an opportunity to contribute to decision-making, and allow them to reach compromise and/or consensus. It also means authorities can communicate their plans directly to several and/or large stakeholder groups, which is advantageous relative to situations where communication is impersonal or reaches small groups only. Furthermore, participation can allow authorities to hear stakeholders' concerns

[23] Of course, this assumes that the decision-makers themselves are unbiased.

directly and in person. Participation can therefore enhance the quality of communication. In so doing, it can lead to effective communication.

4.11.3 Participation and trust

In addition to its role in effective communication and procedural fairness, participation can also indirectly build trust. Participation is linked to trust because it affords stakeholders the opportunity to learn about the trustworthiness of other group members (Stringer et al., 2006). Although interacting in a participatory process does not necessarily mean that one stakeholder will come to trust another, it does make it easier to learn about and assess other stakeholders' trustworthiness compared to situations where stakeholders cannot communicate face-to-face or never meet in person. This is especially true in cases where there are repeated interactions over time. Repeated interactions provide stakeholders with multiple opportunities in which to build a picture of other stakeholders' character. A further implication of this argument is that a participatory process is more likely to be effective when participation occurs repeatedly over a period of time. Thus, participation in regular meetings, say, allows stakeholders to interact in person and to develop an impression over time of their fellow stakeholders' honesty, sincerity and trustworthiness. In turn, these meetings might prove to be ideal conditions for the emergence of trust between stakeholders in a resource management system.

Figure 10 below summarises the legitimation function played by participation through its effect on communication, procedural fairness and trust. As in figures 8 and 9, the broken arrows in figure 10 represent indirect relationships.

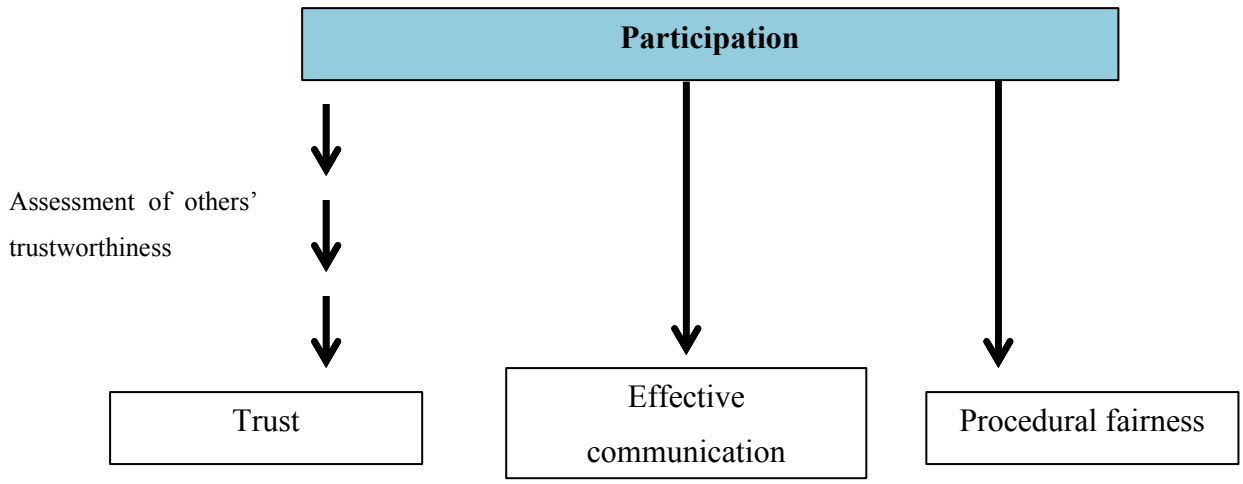


Figure 10. A framework to show the direct and indirect impact of participation on communication, procedural fairness and trust.

4.12 The importance of trust

Figures 8, 9 and 10 should demonstrate that the legitimation function criteria can interact and affect one another. For instance, trust in a resource management context may also depend on the satisfaction of communication, participation and procedural fairness. The argument here is that trust in a resource management plan or resource management authorities is broken if any of the other three legitimation function criteria are not themselves satisfied. Thus, individuals are less likely to trust resource management authorities if those authorities do not communicate clearly, or if they are perceived to carry out management processes in a way that is unfair.

However, the effect that exogenous features can have on trust means that an actor may still trust a resource management plan even if it does not satisfy any of the three other legitimacy criteria. Equally, they may mistrust the management system even if it satisfies communication, participation and procedural fairness. By extension, there is a sense that trust is the most difficult of the legitimation criteria to satisfy. It is also plausible that trust is the most important criteria of the four that serve a legitimation function. Stakeholders' assessments of communication, participation and procedural fairness are likely to be coloured by the absence of trust between stakeholders. For instance, a resource management authority will struggle to communicate effectively if stakeholders dismiss those communications as dishonest. Similarly, it is more likely that stakeholders will view management decisions as procedurally unfair if they mistrust the motives of decision-makers. Mistrust may predispose

them to believe that resource managers are making biased decisions, for example. Even if decision-makers are doing no such thing, the perception that that is the case is damaging, if not fatal to assessments of procedural fairness and therefore legitimacy. Thus, trust has a significant impact on many aspects of the other legitimation function criteria. The absence of trust, or outright mistrust, is almost certain to be negative to the legitimacy of a resource management system.

4.13 Empirical support for the legitimacy framework

The framework described in the preceding sections is based on literature from a variety of disciplines. Much of that literature has a strong empirical foundation (notably the work on procedural fairness and legitimacy, and trust). In addition, it is possible to demonstrate the validity of the legitimacy framework with evidence from the interview data (see chapters 3 and 5). The legitimacy framework is therefore based on two distinct empirical foundations. These foundations should give us confidence that the framework does indeed reflect 'real world' processes, rather than remaining purely theoretical. Of course, additional empirical scrutiny will further strengthen or weaken the framework.

4.14 Summarising the legitimation function framework

The framework outlined here argues that legitimacy has four principal underpinning criteria: procedural fairness, communication, participation and trust. The relationship between procedural fairness and legitimacy is well established empirically in the criminology and social psychology literature. Tyler (2009) conceives of procedural fairness as comprising the quality of decision-making and the quality of inter-personal treatment, and Leventhal's (1980) fairness criteria usefully inform what shapes the quality of decision-making and the quality of inter-personal treatment.

The role that trust plays in legitimacy is theoretical, but it is based on the reasonable intuition that authorities and regulations are more likely to be viewed as legitimate if people trust those authorities. Trust itself emerges when there is an expectation that trusting behaviour is likely to be reciprocated, and is therefore linked to the extent to which social norms like reciprocity are widespread in a community. Ostrom (2009b) identifies particular 'micro-situational' attributes that increase the probability that the norms that lead to trust are used. Those features of a resource management system that allow these attributes to emerge therefore

increase trust in the resource management system, and by extension the system's legitimacy. The development of trust is also linked to the impact of formal and informal institutions (Fehr, 2009). Fehr's conclusions suggest that the presence or absence of particular institutions improves the likelihood that trusting behaviour is widespread. Trust therefore has an exogenous component, because these institutions may be independent of the resource management system. Finally, trust or mistrust depends to some extent on information asymmetry and the uncertainty that it creates. Authorities and others organisations that withhold information that could otherwise address information asymmetry provide people with a reason to mistrust those organisations. Given how common information asymmetries are in SESs, and given the power management authorities have over stakeholders' lives, addressing information asymmetries is a key problem in resource management and one which has a direct impact on trust and therefore legitimacy.

Effective communication is one way to address information asymmetry. The key word in the phrase 'effective communication' is, of course, 'effective'. It implies that the manner in which communication takes place accounts for its ability to solve or reduce an information asymmetry. Habermas identified a number of criteria like clarity, honesty, sincerity and a lack of deception, distortion and manipulation that impact on the quality of communication (Lockwood et al., 2008). These criteria characterise 'ideal' discourse. Simplifying Habermas, I argue that communication is 'effective' when it satisfies four of his criteria: clarity, honesty, and a lack of distortion and manipulation. Arguably, sincerity and a lack of deception are redundant because they relate primarily to honesty. Indeed, one can argue that being insincere or deceptive during a conversation is equivalent to being dishonest.

When individuals and organisations are able to communicate effectively, it goes some way toward negating information asymmetry, and therefore builds trust and consequently a sense that an organisation or a set of rules is legitimate. Effective communication is also important to procedural fairness, insofar as effective communication – especially in discourse situations – contributes to satisfaction of the hearing rule. Finally, communication is perhaps most effective when it is face-to-face. A commitment to effective communication is therefore a commitment to participation. Thus, effective communication plays a legitimation function indirectly, through its effect on trust, procedural fairness and participation, but also directly, insofar as a failure to communicate effectively may preclude satisfaction of all the other criteria.

Participation itself serves a legitimation function by encouraging effective communication, by shaping perceptions of procedural fairness, and by affecting the likelihood that stakeholders are able to assess the trustworthiness of others. Participation in certain forms (notably events, meetings, and workshops) can lead to effective communication because it provides stakeholders with an opportunity to engage personally with one another. In this sense, participation improves the quality of communication and therefore facilitates the conversations that encourage compromise and cooperation. Equally, participation is an expression of the hearing rule, and can therefore lead to positive assessments of procedural fairness. Finally, participation allows people to assess the trustworthiness of other stakeholders. Although this does not imply that participation increases trust, it does suggest that participation can establish conditions in which trust is likely to develop.

What is perhaps more important than the individual criteria that make up the legitimation function framework is the way that these criteria interact and influence one another. Communication, participation, procedural fairness and trust are all in various ways interconnected and interdependent. As a result, it is necessary to think about the legitimation function criteria in a holistic way. Each criterion depends to some extent on the satisfaction of the others. Conversely, and as I argue in section 4.4, a narrow view of the criteria as boxes in a box-ticking exercise is insufficient for legitimacy. A box-ticking approach treats each criterion as an end and a means in itself. Furthermore, such an approach lacks the authenticity and commitment to communication, participation, procedural fairness and trust that the legitimation function requires. The criteria can never be truly satisfied if the motivation underlying the attempt to satisfy them is disingenuous.

Figure 11 below summarises the relationship between each of these four criteria and legitimacy itself, and the direct and indirect relationships between the criteria.

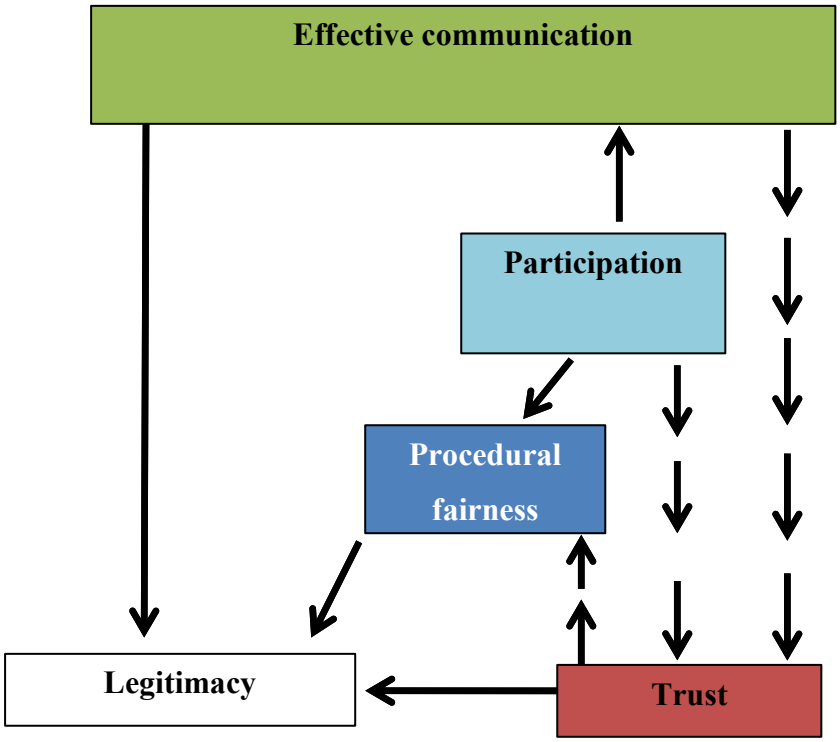


Figure 11. A framework for understanding legitimacy.

Chapter 5 An application of the legitimation function framework

In chapter 4, I introduced a framework that suggests that a legitimate resource management system satisfies four criteria: communication, participation, procedural fairness, and trust. Of these four criteria, trust is a 'higher level' criterion: it can be broken if at least one of the other three criteria is missing from a resource management process. Furthermore, but rather conversely, trust has a strong exogenous component in that an individual might perceive that a resource management plan does not satisfy any of the other three criteria but still retain his trust in it.

In this chapter, I explore the degree to which the four legitimation function criteria are being satisfied in PIECAS and in the fishery. The chapter proceeds as follows: in section 5.1, I outline the methodology employed. In sections 5.2 to 5.6, I show that the halibut fishery satisfies to a great extent the four legitimation function criteria. In sections 5.7 to 5.12, I suggest that, to a lesser extent, PIECAS is not satisfying the legitimation function criteria. Based on this analysis, I hypothesise about the elements that PIECAS should contain if it is to address its legitimation function 'deficit'. I conclude the chapter in section 5.13.

The chapter's central proposal is that there are key differences in the way that the fishery and PIECAS were designed and are managed that have of themselves satisfied (or failed to satisfy) the legitimation function criteria, and therefore contributed to differences in perceptions of each plan's legitimacy. In the fishery, for instance, the participation element of legitimacy has been satisfied by, amongst others, the incorporation of regular, public meetings into the management process. Conversely, PIECAS has failed to satisfy the participation criterion by excluding agricultural stakeholders from the design process (intentionally or otherwise).

Of course, one element of the legitimation function that this analysis does not address is the context in which each resource management scheme is placed. The institutions and social norms that shape governance and society may make the legitimation function much harder to satisfy if they themselves lack legitimacy or in some way constrain behaviour that is conducive to satisfying the legitimation function. For instance, norms of reciprocity that encourage trust – and therefore make it easier to satisfy the participation and trust components of legitimation function – may be absent in a particular community. As I discuss

in chapter 6, the legitimation function can therefore depend in part on exogenous institutional, political and socio-economic features. However, it is possible that even in well-managed countries a resource management scheme lacks legitimacy or is unsuccessful. In these circumstances, a lack of legitimacy arises because the scheme does not satisfy the legitimation function criteria.

A good example of a resource management scheme whose legitimacy is not always perceived positively but is placed within a strong institutional context is the CFP. Metrics for institutional robustness like electoral malpractice and rule of law are strong in most EU Member States, but, irrespective, the CFP's failings have proved so numerous and severe that its legitimacy has been questioned (Schwach et al., 2007; Lavers, 2011). Arguably, the CFP's putative lack of legitimacy stems not only from its failure to maintain fish stocks at sustainable levels ('eudaemonic legitimacy' – see chapter 4) but also from problems satisfying the legitimation function criteria. For instance, it is intuitive that fishermen are less likely to trust the CFP when it is apparent that the quota-setting process is deeply politicised and therefore procedurally unfair (because it is not impartial and also suffers from political bias).

The chapter has some relationship with literature that explores the design features of institutions that address environmental problems successfully (see, for instance, Andresen and Hey, 2005; Berardo and Gerlak, 2012). It may also complement the design principles literature (see chapter 3 and Ostrom, 1990). That literature suggests that the presence of certain design principles can lead to robust and sustainable resource management systems. Here, I suggest that the presence of the four legitimation function criteria contributes to similarly successful and legitimate resource management schemes. Conversely, the absence of the legitimation function criteria contributes to the illegitimacy and so possible failure of a management system.

Interestingly, some of the design principles identified by Ostrom – notably principle 3, that resource users are able to participate in making and modifying rules – enhance participation and perceptions of procedural fairness and legitimacy. In the context of this thesis, it is noteworthy that principle 3, which is seen as important for sustainability, also has a strong effect on legitimacy. It suggests, perhaps, that participation in rule making and modification contributes to sustainable outcomes precisely as a result of its implications for legitimacy and

therefore compliance and enforcement. In a similar way, the design principle that 'rule monitors' are accountable to those affected by the rules is ultimately concerned with the legitimacy of those 'rule monitors'. Introducing accountability ensures that the authorities that implement rules do so fairly. As Ostrom (2000) notes, 'the community legitimates a position'. Finally, the design principle that rule infractions are addressed with graduated sanctions depending on the severity and context of the infraction also has a strong procedural fairness and legitimacy component. It ensures that punishments are commensurate with the nature of the transgression, which is consistent with the classical definition of retributive justice and, crucially, the procedural standards and procedural fairness that retributive justice entails. It means that the sanctions imposed are fair, because they are not malicious or vengeful; instead, they are consistent, objective, and limited in their scope because they are determined by due procedure. This in turn means that they are more likely to be legitimate.

It is striking that a number of design principles that were originally identified for their importance in contributing to sustainable outcomes, and which have withstood significant empirical scrutiny (see, for instance, Cox et al., 2010), should be so heavily suffused with features that ensure the maintenance of fairness and trust and therefore legitimacy. In short, these design principles are important because they serve a legitimation function.

5.1 Methodology for chapter 5

This chapter is based on an analysis of the qualitative data I collected with semi-structured interviews during my fieldwork, the survey data made available by researchers at the University of Wisconsin-Milwaukee, and the survey I administered myself in 2014/2015. In addition, it uses documentary evidence available online.

There are limitations to the method employed in this chapter. Most importantly, the halibut fishery and the Paraná delta are so different that any comparison is difficult to justify because we are not comparing like with like. Then again, the legitimation function criteria are capable of being applied to any resource management system. In addition, the framework does not cross-apply features of one management system to another, thereby avoiding the problems that come with making generalised statements from specific case studies.

In respect of the differences between the delta and the fishery, the fishery is nested in the strong institutions that characterise the United States, and focuses on a specific, mobile

resource (Pacific halibut) that is harvested only within the jurisdictional limits of the United States EEZ. Many of the tools developed to manage the halibut stock – notably IFQs - are unique to fisheries. Conversely, the Paraná delta is situated in a country with weak institutions. The delta itself straddles three different jurisdictions, each of which adheres to a separate legislative framework (see chapter 3). Management tools have not yet been developed because the plan is still in its design stage. I attempt to avoid the problems that arise from a direct comparison by simply analysing whether or not IFQ management and PIECAS satisfy the four legitimation function criteria. Thus, there is no need to employ a comparative methodology. Nonetheless, there are instances where shared features are qualitatively different in both plans. In these cases, a brief comparison is worthwhile and reasonable because we are indeed comparing like-for-like. For example, participation in PIECAS is significantly different to participation in the halibut fishery.

To assess stakeholders' perceptions of communication and procedural fairness in PIECAS, I use data from my own and the University of Wisconsin-Milwaukee surveys. The data were analysed in Microsoft Excel. To illustrate assessments of the effectiveness of communication and procedural fairness, I plotted bar charts for the 2010, 2012 and 2014 cross-sectional survey data. For the procedural fairness data, I also used two-sample T tests to determine whether or not there was a significant difference in respondents' perceptions of PIECAS's fairness depending on the frequency of their participation in the plan.

The Wisconsin-Milwaukee data used to illustrate perceptions of communication and procedural fairness are proxies for these two legitimation function criteria. Nonetheless, they are suitable proxies because they measure, respectively, stakeholders' success in influencing discussions at PIECAS and whether PIECAS was procedurally fair in the sense that it allowed all voices to be heard equally. Both of these measures capture at least some aspects of effective communication and procedural fairness. For effective communication, the proxy data measure stakeholders' ability to communicate their concerns and have these acted upon. For procedural fairness, the proxy data reflect the idea that a process is fair if group opinions are considered (the hearing rule, discussed in chapter 4).

5.2 An analysis of the extent to which the halibut fishery satisfies the four legitimation function criteria.

There is good evidence to suggest that the way in which the halibut fishery was designed and is operated means that it satisfies the four criteria that characterise a legitimate resource management plan. In particular, I show that participation in meetings, representative participation, and participation in research occurs at various stages of the fishery's management process. Similarly, the fishery's management authorities – the IPHC and NPFMC – communicate effectively by promulgating information on the decisions they make and by generally acting in a transparent way. Procedural fairness is evident in the ability of stakeholders to participate in decision-making, and in the formality and predictability of the management process. Furthermore, procedural fairness was an implicit functional consideration at the earliest stages of the IFQ's design scheme through the inclusion of a quota allocation appeals mechanism and through consideration of the socio-economic impact of IFQs on rural Alaskan communities. Finally, there is evidence from the interview data that stakeholders trust the fishery's management authorities and (by and large) the decisions they make.

5.3 Participation in the halibut fishery

Various features of the IFQ management scheme's organisation and operation ensure that it is participative. Establishing a participative management process is some achievement in light both of the distances involved the fishery - which impose significant transaction costs on those stakeholders who do wish to participate - and the fishery's history, which has been characterised at times by fractious relationships between management authorities and fishermen. To illustrate the scale of the former problem, the fishery has management authorities based in Anchorage (NPFMC) and Seattle (IPHC). These cities are some 2300 km apart. In respect of the latter, relationships between fishermen and management authorities like the NPFMC (the main stakeholder groups in the fishery) were difficult during the derby fishery's nadir. As I argue in chapter 3, the collaborative, bottom-up approach taken during the fishery's reform was essential to repair this relationship.

One aspect of the halibut fishery's operation that has almost certainly facilitated participation is the regularity with which the NPFMC, and to a lesser extent the IPHC, meet. The former does so every two months, with meetings in Seattle and throughout Alaska. In the last 6

months of 2014, for instance, the NPFMC met in Seattle, Anchorage and Nome, Alaska[24]. Changing the location of meetings is an obvious way to engage with stakeholders who are not able to reach Anchorage or Seattle easily. Crucially, the meetings themselves are open to the general public, both in person at the meeting venue and through the Internet (presumably to facilitate the attendance of people who cannot do so in person). An agenda and schedule of events are available to download in advance of the meeting. Forthcoming meetings are clearly advertised on the home page and on the same webpage from which the agenda and schedule of events are available. Details of the location of these forthcoming meetings are prominent. Clearly, each of these features simplifies participation at NPFMC meetings.

From a theoretical point of view, the NPFMC's approach to participation is structured in such a way that the transaction costs of participating are reduced almost as far as is realistically possible. Stakeholders incur minimal costs in searching for information because it is readily available from the NPFMC's website. The information is clearly laid out and is comprehensive in its scope. The costs associated with travelling through the region to reach meetings are overcome by broadcasting online, and the regularity with which the NPFMC meets means that missing one meeting does not carry a significant opportunity cost.

Of course, the NPFMC's efforts would be cancelled out if participation in IPHC meetings were difficult. However, the clarity and regularity with which the IPHC broadcasts its meetings is similarly impressive. The IPHC follows a biannual schedule, with an interim meeting and a more complete annual meeting. The annual meeting is open to the public and online. The interim meeting was previously by invitation of the Commissioners, but as of 2014 is also public and online. Furthermore, and similar to the NPFMC, the dates of the forthcoming meetings are clearly marked on the IPHC's website. As with the NPFMC, then, participating at IPHC meetings is uncomplicated and seemingly encouraged.

One feature common to the IPHC's and NPFMC's approach to participation is the predictability of the process that surrounds the meetings. A good example of that predictability is the procedure for public input that the NPFMC follows, which reduces the uncertainty stakeholders may have about how to participate. This predictability complements the frequency with which the NPFMC meets, as well as the clarity and comprehensiveness of information available to prospective participants (see section 5.4 on effective communication

[24] See http://www.npfmc.org/2014-council-meetings/ for details.

in the halibut fishery). Furthermore, it means that stakeholders are much less reliant on social connectedness to reduce the costs of participating in a resource management plan (Coggan et al., 2010). With predictable procedures for participation in place, there is less need to use a social network to become involved in a plan. All of these measures are likely to facilitate participation in the meetings, because they reduce the costs that stakeholders incur when attempting to participate.

The survey data provide good evidence that participation in the fishery is indeed straightforward. Asked to evaluate the ease of participation on a scale between 0 and 10, where 0 indicated that it was not possible to participate, and 10 that it was very easy to participate, 11 of the 12 respondents to the survey suggested that participation was, at worst, easy and at best, very easy. The exception to this pattern was a respondent who did not know whether it was easy to participate in the fishery. Furthermore, the frequency with which these respondents participated was generally high (especially compared to PIECAS). Of the 12 respondents, 4 participated on a daily, weekly or monthly basis, and a further 3 participated trimonthly or biannually. Of the remaining 5 respondents, 4 participated annually. Only one respondent (respondent 7) did not participate at all. A neat summary of the extent to which participation is an integral part of the fishery, possibly tongue-in-cheek, came from respondent 8: 'Seems like every day we are talking about fish, fisherman [*sic*] and fisheries management'.

5.3.1 Representative participation at the NPFMC and IPHC

The IFQ management scheme also satisfies representative participation. In particular, the structure and composition of both the IPHC and NPFMC means that there are a number of fishery stakeholders who are independent of both organisations but still play an important role in their operations. At the IPHC, for instance, the 'Commission' – which is arguably the most powerful body at the organisation because it adopts regulatory proposals – is made up of one member from a federal fisheries agency, one fisherman, and one halibut buyer or processor. The Commission is therefore representative of the three key stakeholder groups involved in the fishery, and provides stakeholders outside government the opportunity to participate in the decision-making that shapes the fishery. The role has genuine influence and power, and should not be considered a 'puppet' position.

In addition to the composition of the Commission, the IPHC structure includes a number of Advisory Bodies from which it can seek advice. Indeed, the advisory role that these bodies play is aimed to 'encourage public participation in the management of the resource' (IPHC, 2014c). There are presently 5 advisory boards: the 'Conference Board', which is a panel representing American and Canadian commercial and sport fishermen; the 'Processor Advisory Group', which represents halibut processors; the 'Research Advisory Board', which is made up of fishermen and processors who suggest where the IPHC should focus its research efforts; the 'Management Strategy Advisory Board', which consists of a broad range of stakeholders, including academics, who advise the IPHC on its management strategy; and finally the 'Scientific Review Board', which provides independent scientific review of the IPHC's science. It is striking that the Advisory Boards cover so comprehensively the range of stakeholders involved in the fishery. Their presence in the IPHC management structure provides further opportunity for stakeholders to participate in a meaningful way in influencing the decisions that shape the fishery. The 'quality' of participation that the Commission and the Advisory Boards offer therefore surpasses mere attendance at meetings; it gives stakeholders the means both to advise the IPHC and to participate in decision-making.

In a similar way, the 'Council' at the NPFMC is made up of 15 broadly representative members. The current Council has members from the U.S. Coastguard; fisheries officials from Alaska, Washington and Oregon, and the NMFS; an official from the U.S. State Department and the Pacific States Marine Fisheries Commission; and fishing industry members. As with the IPHC, then, the body with the most decision-making responsibility at the NPFMC is representative of key stakeholder groups. Alongside the Council, there are a number of Committees at the NPFMC that 'assist in the collection and evaluation of information relevant to the fishery' (NPFMC, 2014b). Of these, the 'Advisory Panel' plays a key role in the Council process. It is made up of 21 members, all of whom represent segments of the fishing industry (whether commercial or sport fishing, processing, consumers or environmental interests). In addition, there are other committees like the 'Rural Outreach Committee', which aims to 'improve outreach and communication with rural communities and Alaska Native entities, and develop a method for…community participation in the development of fishery management actions' (NPFMC, 2014c).

Thus, both the IPHC and NPFMC facilitate participation in the fishery through the composition of their decision-making bodies and the presence of subsidiary bodies like the Rural Outreach Committee. These features allow stakeholders to engage with and advise the IPHC and NPFMC, and in some cases like the Commission at the IPHC, to make decisions that determine the way the halibut fishery is managed. The structure of the IPHC and NPFMC therefore contributes to the participation of a range of fishery stakeholders, rather than limiting participation to a select few.

5.3.2 Participation in research at the IPHC

In chapter 3, the collaborative research trips organised by the IPHC were highlighted as one way in which fishermen and IPHC scientists are able to develop trust for one another (see page 104). Clearly, the research trips improve participation in the fishery's risk assessment processes, in much the same way that the IPHC's Advisory Bodies and the openness of its meetings do. Arguably, participation at that stage of the management process is crucial because the scientific advice produced by the IPHC – notably their quota recommendations – has a bigger impact on fishermen's livelihoods than almost any other management decision. (Along with allocated quota share, the IPHC's recommended TAC imposes a limit on the amount of money an individual fisherman is able to make from halibut fishing in a given season.)

5.3.3 Summarising participation in the fishery

The preceding analysis should establish that several aspects of the halibut fishery's operation and structure ensure that the fishery satisfies the participation criterion of the legitimation function. In particular, the IPHC and NPFMC are organised and run in such a way that participation is built in to the management process. Any stakeholder who wishes to participate in meetings and scientific research has the opportunity to do so.

Another theme that emerges by considering participation is that many of the features that facilitate participation in the fishery's management process also contribute to effective communication between management authorities and stakeholders. In the section that follows, I highlight the effectiveness of communication in the fishery.

5.4 Effective communication in the halibut fishery

There is evidence that the halibut fishery satisfies the communication criterion of legitimation function from both the interview data and from broader analysis of the fishery's management process. In respect of the interview data, a number of interviews representing different interests in the fishery spoke positively about communication and transparency. Interviewee B, for instance, said that "*the openness of the NPFMC and the federal fisheries management process, and in Alaska the State Board of Fish Processing, those are excruciatingly transparent and open to public scrutiny*." Interviewee K believed that the Council process forces transparency and public debate. Interviewee L said of both the IPHC and NPFMC, *"both processes are…very public. They're fairly transparent. For those of us who are involved and who understand the process, I would say it's a really accessible, and transparent and legitimate process."*

The survey data also lend support to the idea that communication in the fishery is effective. For instance, 10 of the 12 respondents to the survey were unanimous in believing that communications from the IPHC were honest (the remaining two skipped the question), and a further 9 believed that the information provided by the IPHC was comprehensive in scope. Furthermore, none of the 12 respondents believed that information from the IPHC was not comprehensive. Similarly, 9 of the 12 respondents suggested that information from the IPHC was clear to very clear, of whom 7 evaluated the clarity of communication with a score of 9 or 10 (out of 10). Only two respondents indicated that communication from the IPHC lacked clarity.

The survey data were more ambiguous for the NPFMC. Assessments of clarity, comprehensiveness and honesty did not match those of the IPHC. This may partly explain why the NPFMC lacked legitimacy in the eyes of some stakeholders (see chapter 3). Nevertheless, the assessments made were still average. Some 9 respondents believed that communications from the NPFMC were honest or honest from time to time. Evaluations of the clarity and comprehensiveness of NPFMC communication were less positive. For clarity, 6 respondents believed that communication was not clear, while the remaining 6 believed that its communication ranged from quite clear to very clear. A similar pattern applied to comprehensiveness, although marginally more respondents than not (n = 7) believed that communication was comprehensive or quite comprehensive.

These data provide a good picture of communication in the fishery. Although the NPFMC does not communicate as well as the IPHC, I would argue that, for the fishery overall, communication is effective. Certainly, many of the features that facilitate participation in meetings at the NPFMC and IPHC also have the effect of transmitting information about the meetings themselves, and the output of those meetings. For instance, the inclusion of an agenda and schedule of events for each NPFMC meeting, as well as information on how one can participate and provide input at meetings, are both features that satisfy effective communication as well as facilitating participation. The former clarifies what issues will be discussed at meetings, and when; and the latter elucidates the procedure a stakeholder must follow if they wish to contribute their views before or during the meeting. Similarly, information on forthcoming meetings is (as mentioned in section 5.2.1) highly prominent on the NPFMC's website in particular.

To demonstrate how important these features are to satisfying effective communication, consider a situation where both were absent from the fishery. It is obvious that stakeholders would have much less certainty about how they could participate in those meetings, and what issues the meetings aimed to address. Indeed, the failure to make this information readily available would mean that stakeholders would have to rely more heavily on social connectedness to keep abreast of developments in the fishery.

The IPHC and the NPFMC also make the vast majority of the documents that accompany each meeting, and the minutes taken therein, readily and freely available on their websites. The level of transparency is striking. For instance, the IPHC lays out each meeting in chronological order on its website, and makes accessible the documents that were presented at each of these stages[25]. It is therefore possible to access the presentations that were made at, say, the 1-5pm session on day one of the 2014 annual meeting. Furthermore, there are reference documents available on the same webpage. For instance, the 'IPHC Annual Meeting Handout' contains detailed information on the schedule of events at the meeting.

Similarly, minutes for each NPFMC meeting are available to download, free of charge, from the NPFMC's website. Indeed, there is an entire webpage[26] dedicated to minutes from each Council meeting dating back to 2003. Given that there are 5 NPFMC meetings a year, this is

[25] See http://www.iphc.int/meetings-and-events/annual-meeting/documents.html for details.
[26] See http://www.npfmc.org/meeting-minutes/.

a significant amount of information. Furthermore, the minutes that are available are those from the meetings of each of the Council, Advisory Panel and Scientific and Statistical Committee. In total, then, the minutes from 165 meetings (as of 2014) are easily accessible to anyone interested in them.

The IPHC and NPFMC do not just communicate details of their meetings effectively, however. Each organisation also makes information about their general activities readily available. The NPFMC, for instance, produces a bimonthly newsletter - also available from its website, and to which one can subscribe – that contains news that is relevant to North Pacific fisheries. The April 2014 newsletter, for example, mentions Council discussion papers on Gulf of Alaska trawl by-catch management and Bering Sea canyons. Unsurprisingly, the newsletter also has details on upcoming Council meetings, a draft outlook for the next Council meeting, and a short section on the move to make meeting items available digitally. Indeed, fishery stakeholders are encouraged to contact Council officials if they require more information on these digital documents or if they need help downloading a software package that enables one to read the documents. (It is worth noting that this software is not the only way in which stakeholders can access the documents – it is just another option.)

The IPHC does not produce a newsletter, but it does produce an annual report that provides a year-end 'summary of the halibut fisheries, including catch limits, catch sectors, and regulation changes' (IPHC, 2014d). These annual reports are part of the Commission's library, and are complemented by scientific reports, technical reports, and reports on the IPHC's assessment and research activities. The library itself is easily accessed through the Internet.

There is, of course, an argument that all of these measures only benefit stakeholders with access to the Internet. However, it is possible to acquire hard copies of the reports produced by the IPHC by contacting the IPHC directly. Although it is unclear that it is possible to do the same thing with NPFMC documents, it is reasonable to assume that the NPFMC does make hard copy available when it is requested. Furthermore, there is a sense that, in moving to primarily digital documents and a strong online presence, the IPHC and NPFMC are simply moving with the times. Indeed, it would be possible to criticise both organisations for communicating ineffectively if they did not have a comprehensive online presence.

Beyond documents, minutes and reports, the IPHC plays a key role in communication in the fishery because it provides the NPFMC with stock assessment estimates and management recommendations. Clearly, these data and recommendations must be communicated in a clear and intelligible way if they are to be implemented properly. In this respect, it is interesting that the IPHC recently (2012) changed the format of its harvest advice. In so doing, the IPHC aimed to 'present more information and options for consideration by the Commission as it sets annual catch limits' (IPHC, 2014e). The harvest advice is now summarised in a decision table that explicitly links harvest choices to impacts on stock and fishery metrics. The table is an improvement on previous harvest advice that focused on point biomass estimates and catch limit recommendations and did not therefore adequately communicate the 'uncertainties around stock estimates and the risks of various possible outcomes at different catch levels' (IPHC, 2014f). Thus, the new decision table is more effective at conveying the limits of the IPHC's understanding and at providing the Commissioners with a range of management scenarios.

The amount of information that the IPHC and the NPFMC make available through their websites, and through minutes, presentations, newsletters and reports is striking; so too are the improvements that the IPHC has made to the way it communicates its harvest advice. The result of this transparency is that fishery stakeholders are able, if they to wish, to stay very well informed about the state of the fishery and the decisions that its management authorities are taking. It demonstrates the extent to which both management organisations communicate their activities, their decisions, and their knowledge clearly and openly.

5.4.1 Communication from stakeholders to the fishery's management authorities

Of course, communication in the fishery would hardly count as effective if it flowed only from management authorities to stakeholders. The analysis that shows that stakeholders are able to participate in meetings and advisory or decision-making bodies also suggests that stakeholders can provide significant and valuable input into the fishery's management process. Perhaps the best example of this is the role that advisory bodies play at the IPHC. The IPHC 'regularly seeks advice from its advisory bodies' (IPHC, 2014d) and therefore facilitates communication between officials and the stakeholders involved in the advisory bodies. Similarly, the collaborative research trips discussed in section 5.3.2 almost certainly encourage communication – even if informal – between fishermen and IPHC officials.

The same argument applies to the NPFMC. Most notably, the NPFMC Advisory Panel provides the Council with input on analyses and issues arising at Council meetings. Thus, there is communication between stakeholders representative of the fishing industry at large (the Advisory Panel) and the Council itself (which, for good measure perhaps, has a number of fishing industry members too). Of course, it is not necessary to be a member of the Advisory Panel or other committees to provide input into the Council process. Council meetings provide stakeholders with an opportunity to submit issues for consideration in advance of the meetings, and to make oral comments during proceedings themselves. Indeed, an entire section of the NPFMC's website is entitled 'How do I get involved?' and provides stakeholders and members of the public alike with details on how to raise issues for deliberation at Council meetings. The Council emphasises that 'public testimony – both written and oral – is taken on each and every issue prior to final deliberations' (NPFMC, 2014a). Stakeholders attending Council meetings are therefore able to do more than simply participate; they are able to testify, and to communicate their concerns and interests.

5.4.2 Problems with communication

Although the analysis above suggests that the fishery's management process satisfies the communication criterion of legitimation function to a large degree, it would be disingenuous to claim that communication in the fishery has no room for improvement. In particular, the IPHC was advised to improve its communication and transparency as recently as 2012 (in the performance review by McCreary and Brooks, 2012). Furthermore, a number of interviewees noted that the IPHC was not as open or transparent in its communication as it might be, especially with regard to its stock assessment model. Interviewee J, for instance, suggested that there was frustration with IPHC over the "*secrecy, the privacy with which they conduct their business*." Interviewee J explained that this secrecy had not been a problem in the past, but concerns had emerged in the last few years as a result of the model over-estimating exploitable biomass.[27] Interviewee J said that keeping the model secret *"seems like the worst thing in the world, to us"*, noting that there was *"lots of resistance"* (on the part of the IPHC) to "[running] *the model past some people who might be able to help"*. That

[27] The IPHC had difficulties with its stock assessment model due to retrospective bias. These difficulties were addressed in 2013, but the changes made to the model showed a 'much more pronounced decline in the estimated stock trend' and a large decrease in current population estimates and estimated average productivity levels. For further information, see Stewart et al. (2013).

resistance *"brings forth more suspicion on the political side of the process."* Interviewee J went on to comment that:

"I think it's not inherent mistrust of the IPHC, but inherent mistrust of a secret process. Um…it's inherent mistrust of…you know… six people [the IPHC commissioners] *behind closed doors, who use a formula we don't get to look at, that determines what the fishery is worth or how we fish in our waters. And…um…and it's also, it's inherent because in other processes that we've been in, where we have had a more open process and we've been able to question things, we see that process and those questions change things. Because it brings information forth. Before the decision-making process, that has, at times, been a real help."*

These comments suggest that the IPHC has failed to explain to fishery stakeholders how its stock assessment model works or how it is structured. Perhaps this is unsurprising; modelling is highly technical and the value of expending resources to teach stakeholders who, in all likelihood, have limited training in the field is questionable. However, the IPHC is strikingly clear and honest about the limitations and weaknesses inherent in their model. In a report from Stewart et al. (2013), for example, the difficulties experienced with retrospective bias – and the serious negative implications for halibut stock trends – are dealt with directly and without obfuscation. This information is also made available during annual and interim meetings, and to the press. For instance, an article in the Alaska Journal of Commerce (Dischner, 2012) cites IPHC staff discussing the problems caused by retrospective bias. But neither of these articles clarifies model function; nor is there any information on the IPHC's website. Thus, there is good evidence to suggest that the IPHC is communicating effectively about the flaws in its model without explaining in detail how it works.

Drawing firm conclusions about communication in terms of the IPHC's stock assessment from the information above is difficult. However, it is interesting that, in spite of the various other measures taken to improve communication and increase transparency, interviewee J focused on problems with the stock assessment model in particular. It indicates, perhaps, that management organisations like the IPHC have to communicate every aspect of their operations effectively. Anything that does not meet that standard is liable to be interpreted with suspicion. In some ways, then, satisfying the legitimation function encourages a virtuous circle, because it puts pressure on organisations to lift every feature of their management to the same high standard. Equally, this example demonstrates how challenging

it is for management organisations to communicate effectively across all of their practices. Every detail requires consideration.

On balance, however, the extraordinary lengths to which the IPHC and NPFMC go to communicate their activities, decisions and knowledge of the halibut fishery, and the opportunities fishery stakeholders and general members of the public have to provide input into the management process, clearly suggests that the management scheme does satisfy the communication criteria of legitimation function. Arguably, this is one of the halibut fishery's greatest strengths.

5.5 Procedural fairness in the halibut fishery

There are a number of elements in the fishery that satisfy the procedural fairness component of the legitimation function. One of these elements is closely linked to the participation described in section 5.3. In chapter 4, I argued that one characteristic of a fair procedure is participation in that procedure. Thus, one consequence of the participation that characterises the fishery is that it satisfies this element of procedural fairness. Following the ideas elaborated in chapter 4, predictable participation and communication in meetings and advisory bodies, committees and panels ensures that the fishery's management process is consistent with the hearing rule and Leventhal's closely related 'representativeness' rule ('all phases of the allocative process must reflect the basic concerns, values and outlook of important subgroups' – Leventhal, 1980, pg. 43).

However, an important distinction is needed between the procedural fairness achieved by the role of advisory bodies and testimony at Council meetings, and simple attendance at meetings and research trips. The latter arguably do not satisfy the hearing rule, or the representativeness rule, because mere participation is not sufficient to make one's voice heard. In this respect, it is interesting that there is ample evidence to suggest that stakeholders are able to communicate effectively with the IPHC and the NPFMC. It is this combination of opportunities to participate, along with regular, institutionalised opportunities to communicate one's views that satisfies the hearing and representativeness rules, and so makes the management process procedurally fair. As Leventhal (*ibid*, pg. 45) notes, 'workers probably attribute greater fairness to allocative procedures when there is genuine

participatory decision-making and frequent consultation with management'. Thus, Leventhal emphasises both communication and participation.

In addition, the fishery's management process satisfies the representativeness rule by changing the composition of the Commission (IPHC) and Council and Advisory Panel (NPFMC) on a regular basis. Leventhal (*ibid*, pg. 44) suggests that 'rotating individuals through decision-making positions reduces the likelihood that a representative clique will exercise control'. Members of the Council and NPFMC Advisory Panel each serve a three-year term. Council members serve a maximum of three terms. In addition, Council members are able to reappoint or replace Advisory Panel members at the year-end Council meeting. Similarly, IPHC commissioners from both Canada and the United States serve a maximum two-year term, although there is the possibility of reappointment by the Canadian government and the President of the United States. This rotation satisfies the representativeness rule in the way described by Leventhal, and therefore contributes to procedural fairness in the fishery.

Another element that satisfies the procedural fairness criterion of legitimation function is the structured and predictable way with which the management process is carried out. There is a chain of steps to which the IPHC, NPFMC and NMFS must adhere when making decisions in respect of the halibut fishery. Furthermore, it is clear what role each organisation and the individuals therein play in the fishery. For instance, the IPHC's role is limited to providing scientific advice and management recommendations only. Clearly, this structure prevents *ad hoc* decision-making. More importantly in terms of procedural fairness, it ensures that responsibility and therefore accountability for decision-making is well defined because it should be clear where along the chain due process has not been followed, and where the responsibility for that failure lies. The transparency demonstrated by the IPHC and NPFMC should facilitate that process.

5.5.1 The halibut fishery's quota allocation process and appeals mechanism

The quota allocation process and the appeals mechanism that accompanied it played a key role in legitimising IFQ management during its early development. Indeed, interviewee C believed that the *"whole process would have been ruled illegal or illegitimate without an allocation appeals process."* The appeals process provided fishermen who were unhappy

with the quota share they had been allocated the ability to challenge their allocation, first by addressing the NMFS and subsequently through the federal court system if the complainant remained dissatisfied.

Arguably, the quota allocation process served a legitimation function in the fishery by satisfying the legitimation function's procedural fairness component. At one level, the quota allocation process and the appeals mechanism followed a predetermined procedure. Initial allocation decisions were made by NMFS on the basis of catch records only. Challenges to allocation decisions started at the NMFS; if unresolved, they would then go to the courts for settlement. Both branches of the quota share allocation process therefore satisfied the consistency rule, because they were 'consistent across persons and over time' (Leventhal, 1980; pg. 41). There was consistency in the way allocation decisions were made and in the application of the appeals process. In turn, this consistency reduced the possibility that the allocation process (including appeals) was biased or favoured particular fishermen for reasons other than their catch record. Each fisherman could have confidence that he was being treated equally to his peers in a strictly procedural sense. Thus, both aspects of the quota allocation process were procedurally fair insofar as they satisfied the consistency rule and the rule against bias.

The use of catch records to determine quota share allocations may itself have shaped perceptions of procedural fairness in a positive way. Using catch records meant that allocation decisions were not arbitrary. Instead, they were based on the best available proxy for a fisherman's stake in the halibut fishery. (Days at sea in pursuit of halibut may have been another suitable proxy, but it provides little information on what constitutes an adequate quota share allocation.) Grounding quota share allocation in catch data satisfies Leventhal's 'accuracy rule', which argues that 'it is necessary to base the allocative process on as much good information and informed opinion as possible' (Leventhal, 1980; pg. 42). Of course, the same argument might be made for days at sea data. The key difference is that allocation based on catch records established a clear link between a fisherman's track record - and therefore his effort, skill and expertise - and the amount of quota share he was allocated. In some ways, then, the allocation process was meritocratic[28]. Thus, the use of catch records as

[28] Of course, there is an argument that the allocation process favoured fishermen who had been involved in the halibut fishery for a number of years over recent entrants to the fishery. Indeed, interviewee L pointed out that some fishermen became millionaires overnight thanks to their quota allocation. This situation arose because one quota share was allocated to each pound of halibut caught in a fisherman's best five years' fishing from the

the cornerstone of the quota share allocation process contributed to procedural fairness in the fishery because catch records represented the best available information for the purposes of that decision. It satisfied the accuracy rule, as well as introducing a basis for quota allocations that was meritocratic and therefore a reward for past commitment to, and skill in the fishery.

As an extension to this argument, it is worth drawing attention to the comments made by respondent 9 in chapter 3 in respect of quota share allocations. Respondent 9 complained that using catch records to determine quota allocation rewarded people who had engaged in illegal practices and boosted their catch record as a result of these practices. Clearly, a situation like this is detrimental to the procedural fairness of quota allocation. Nevertheless, I would argue that it is not fatal to procedural fairness for the simple reason that the NPFMC data collection procedure would have made the NPFMC alive to the problem. Hence, the NPFMC would have attempted to root out instances where illegal fishing was used to support a larger quota allocation as part of its resource allocation procedure.

At another level, the appeals mechanism ensured that allocation decisions could be modified or reversed. The allocation process therefore satisfied Leventhal's 'correctability' rule, which suggests that 'the perceived level of fairness will be increased by the presence of appeal procedures (formal and informal) that allow for review and modification of decisions' (Leventhal, 1980; pg. 43). It is certainly intuitive that giving fishermen the ability to challenge quota share decisions was essential to establishing the procedural fairness of the quota allocation process. The quota allocation process determined an individual fisherman's base level of earnings. The potential for ill-feeling and mistrust if fishermen had been unable to question allocation decisions that were clearly erroneous or with which they disagreed was therefore significant. Consider clerical mistakes that may have had serious consequences for an individual's livelihood. Furthermore, the appeals process ensured that the NMFS was accountable to fishermen – and subsequently to the courts - for the allocation decisions it made. Thus, the introduction of an appeals mechanism ensured that fishermen had means to correct mistakes and/or decisions that were themselves perceived as wrong or unfair.

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seven years between 1984 and 1990. Thus, new entrants who had five years fishing or less would almost certainly receive less quota than established participants. However, there is a sense that fishermen who had made a commitment to halibut fishing merited recognition for that commitment.

Finally, the quota allocation appeals mechanism imbued the IFQ development process with the characteristics of natural justice. The three rules that characterise natural justice (the bias rule, the evidence rule, and the hearing rule - see chapter 4) were all satisfied during the quota allocation process, in part because it was accompanied by an appeals mechanism. The quota allocation process was consistent with the bias rule because the NMFS, rather than fishermen, decided on the mechanism for allocating quota shares and therefore the ultimate distribution of quota share. For example, an allocation process run by fishermen may have had the potential for bias in favour of particular groups of fishermen who were linked professionally to the fishermen orchestrating the allocation. Equally, the quota allocation process was consistent with the hearing rule because the appeals mechanism provided fishermen with the means to have their side heard in the allocation process. Finally, the allocation process and the appeals mechanism satisfied the evidence rule because both were evidence-based. Initial quota allocation was based on catch records, and the appeals mechanism overturned initial quota allocation decisions on the basis of evidence only. The quota allocation process and the appeals mechanism were therefore fair not just from the point of view of the 'correctability rule'; they were also consistent with the principles of natural justice.

Extending the argument that the allocation process and appeals mechanism were similar to procedurally fair processes in a legal context, it is interesting that fishermen were able to take their appeals to the federal courts in instances of last recourse. Reverting to the legal system for resolution of outstanding allocation disputes was important from a procedural fairness perspective because it meant that the NMFS was no longer the ultimate arbiter of allocation decisions. This removed the possibility that the NMFS was skewing allocation outcomes in a biased way. Instead, final allocation decisions were taken by judges whose impartiality and integrity was presumably beyond dispute, who were required to treat all parties equally under the law, and who had to follow specific procedural conventions that themselves satisfied the principles of natural justice. Fishermen could therefore have confidence that, in the final instance, their appeals would be handled by an institution whose impartiality was assured. Furthermore, the introduction of the courts into the appeals process ensured that the process had several layers of accountability. Ultimately, then, the NMFS would have been accountable to fishermen both from within its organisation and externally through the legal system.

5.6 Trust in the IFQ management regime

It is evident from the interview data that many stakeholders have significant confidence in the IFQ management regime and the authorities that operate it. (See chapter 3 for a discussion of the competence of the IPHC and NPFMC.) Interviewee K, for instance, described the NPFMC as 'fantastic'; there was 'nothing else like it', according to interviewee K. Similarly, interviewee L believed that there was *"huge trust"* amongst halibut fishermen in the IPHC, and that, *"halibut fishermen do hold the IPHC in very high regard."* Interviewee L also noted that the picture was more mixed for the NPFMC, but felt that they were, *"respected as the authority that's going to make the decisions for the most part."* Interviewee E focused on the IPHC's collaborative research trips, claiming that they 'build and maintain trust'. Similarly, when asked about participation by fishermen in the IPHC's research, interviewee L noted that, *"when they* [fishermen] *are part of the research, they trust it, and when they trust it, they support the policy that stems from it."* At several levels, then, there is strong trust in the IPHC and some trust for the NPFMC. The IPHC's collaborative research in particular seems to have an important impact in fostering trust.

Elsewhere, Alverson (1997) details a letter written by Walter Hickel, Governor of Alaska 1966-1968 and 1990-1994, in which he states that in 'no way, at no time, should we go back to the old [derby] system… There should be no thought given to reversing the current [IFQ] programme'. This is a strong endorsement of the IFQ management regime, and good evidence that people trusted it would continue to deliver satisfactory outcomes.

The survey data provide more concrete results on stakeholder's trust in the IPHC and NPFMC. Encouragingly, they reflect the interview data. Trust in the IPHC is strong, but more mixed with the NPFMC. Figures 12 and 13 below outline stakeholders' trust in the IPHC and NPFMC respectively.

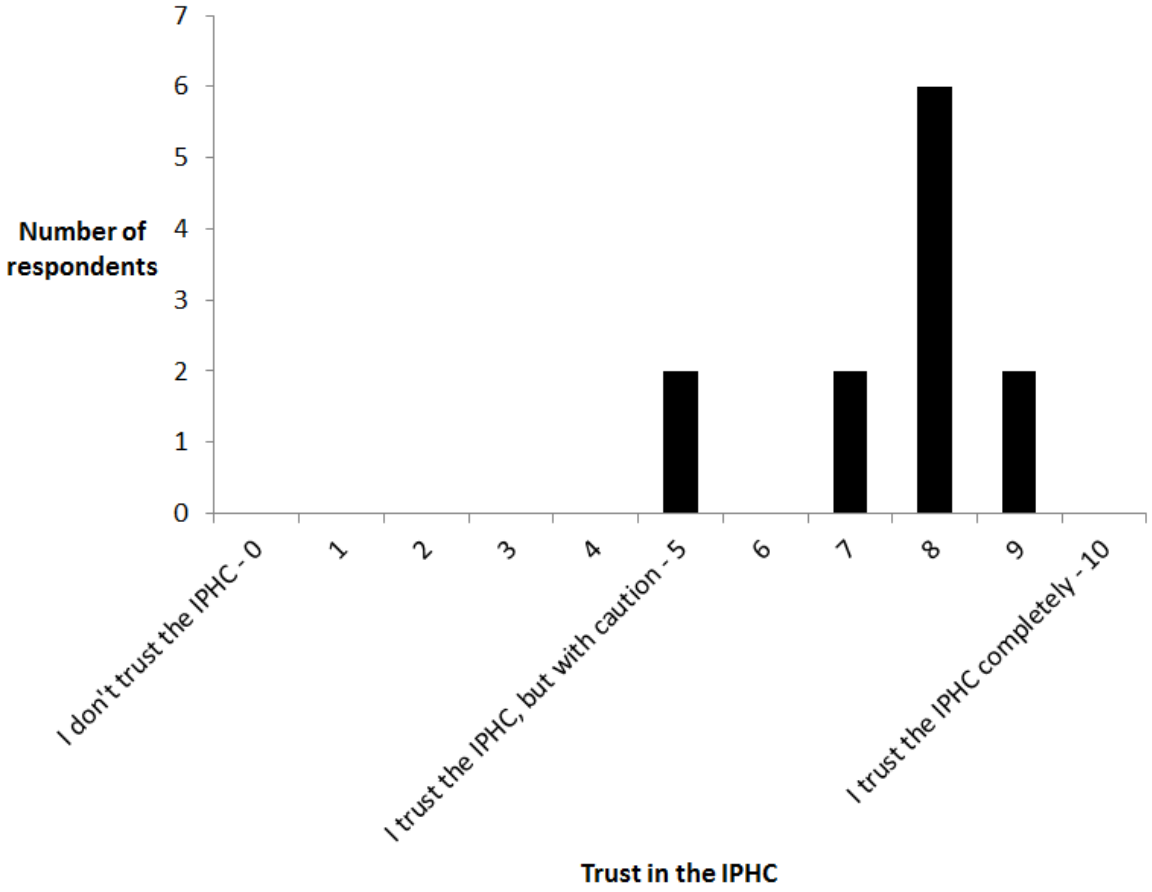


Figure 12. Trust in the IPHC.

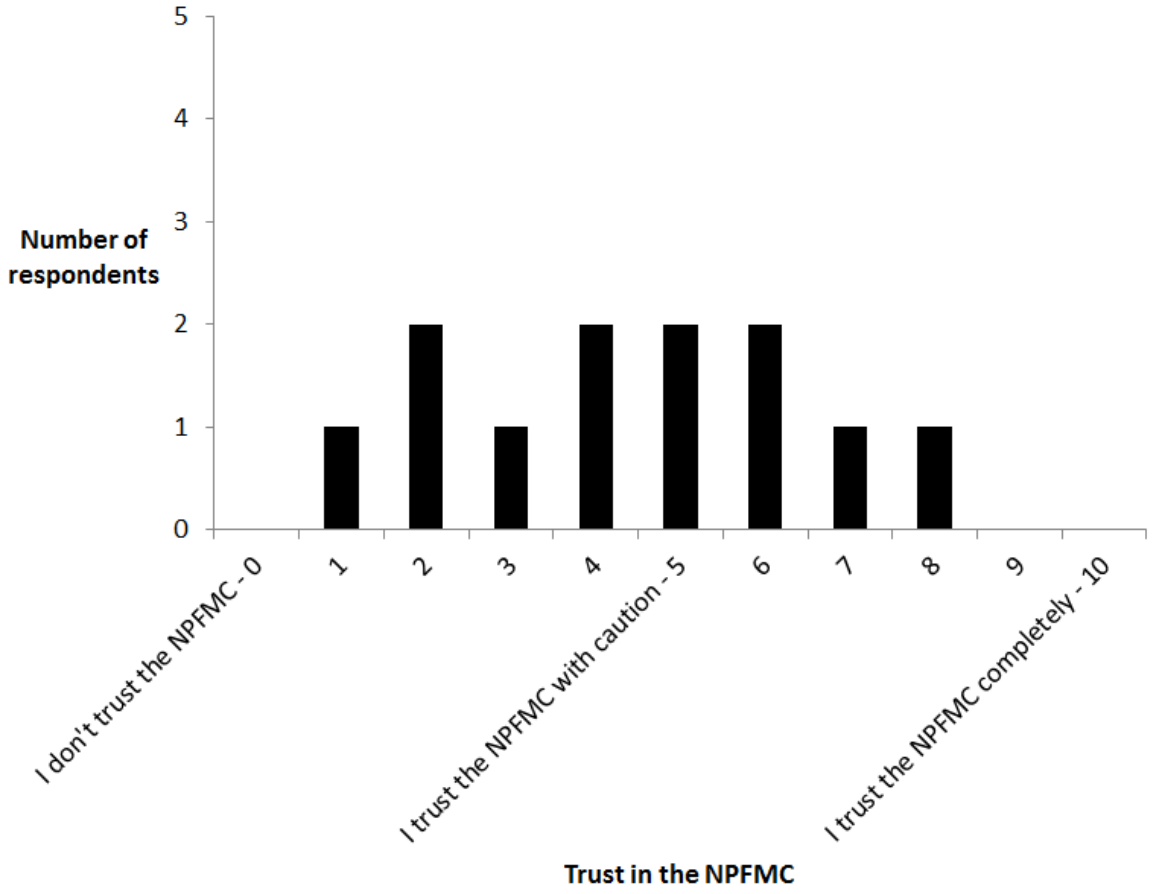


Figure 13. Trust in the NPFMC.

These results are striking, but they require cautious interpretation because the survey sample size is small. Nevertheless, they re-emphasise that trust in the IPHC is consistently strong. The picture is much more varied for the NPFMC (as far as one can tell with these limited data). Although some people do trust the NPFMC – and trust it strongly – there are also stakeholders who have almost no trust in the NPFMC at all. Of course, these data are a challenge to my argument that stakeholders trust the fishery's management organisations to a great extent. They may even be a challenge to my assertion that the fishery overall is legitimate, in that it fails to satisfy the trust criterion of the legitimation function. However, I suggest that they actually tie in neatly with existing observations. In particular, the trust data in figure 13 may explain why a number of stakeholders believe the NPFMC specifically lacks legitimacy or has no legitimacy (see figure 6, chapter 3). Levels of trust in the IFQ management system overall are high enough to satisfy the legitimation function, but at the particular level of the NPFMC, there is insufficient trust for satisfaction of the legitimation

function. This pattern indicates why the NPFMC suffers from the legitimacy deficit evident in figure 6.

5.7 An analysis of the extent to which PIECAS satisfies the four legitimation function criteria

Unlike the halibut fishery, the way in which PIECAS is being designed does not satisfy the four legitimation criteria to any great degree. To a certain extent, the veracity of this statement depends on the perspective from which one views it. For instance, agricultural stakeholders are evidently much less likely to have positive perceptions of PIECAS's satisfaction of legitimation function criteria than environmental NGO stakeholders who have been more heavily involved in designing the plan. Nonetheless, PIECAS fails to fulfil the legitimation function criteria at a variety of levels, irrespective of one's involvement in the plan. Participation in meetings is limited, and there are no mechanisms for representative participation or participation in research. Communication between the High Level Committee and stakeholders is poor. The plan's design process has at times been procedurally unfair, especially in respect of the participation of agricultural stakeholders. Finally, the plan's difficulties to date and the perception amongst some stakeholders that the Committee and other organising authorities lack competence and familiarity with the delta are detrimental to trust in PIECAS and the organisations in charge of designing and implementing it.

5.8 Participation in PIECAS

In general, government at both a federal and provincial level has dominated participation in PIECAS. This is hardly surprising; PIECAS is a government-led plan, and we would therefore expect government officials to make up the majority of the people involved in the scheme. Nevertheless – and in distinct contrast to the fishery – there is very limited participation in PIECAS by stakeholder groups of all kinds outside of government. The almost total absence of agricultural stakeholders is the most notable example of this participative failure, but even stakeholders at environmental NGOs have found themselves increasingly marginalised from the plan (Berardo et al., 2015). (See chapter 3 for survey data that illustrate the participation problems in PIECAS.)

One reason why PIECAS has experienced problems with participation is that it is difficult to participate in meetings with the High Level Committee specifically. These meetings are closed to the public and occur infrequently. For instance, the National Environment Secretariat's webpage for PIECAS (http://www.ambiente.gov.ar/?idarticulo=10287) shows that the Committee met in October 2010, March 2012[29], November 2012[30], and most recently in August 2013[31]. No further details about upcoming meetings are listed on the PIECAS webpages, and there appears to be no regular schedule that the Committee follows which would allow stakeholders wishing to participate in PIECAS to plan ahead. Furthermore, there are no contact details for the High Level Committee available through the same website, nor information on the process that stakeholders must follow if they wish to participate. The contrast with the halibut fishery is striking. It is clear that participating in PIECAS is much more complicated and *ad hoc* than it is in the fishery.

In particular, the lack of predictable opportunities to participate at meetings of the High Level Committee means that stakeholders interested in PIECAS must rely on *ad hoc* means and/or social connectedness to do so. In general, these are less effective and more serendipitous than institutionalised mechanisms. A stakeholder's ability to participate in PIECAS therefore depends on whom he knows, and the costs that he is able to bear. The former in particular is disadvantageous to stakeholders who have no particular connection to the High Level Committee. Certainly, the interview data suggest that some stakeholders have found it difficult to approach the High Level Committee. Interviewee ♯9, for instance, claimed that it had taken over a year and a half to meet with the official at the National Environment Secretariat in charge of PIECAS's design and implementation, and that the meeting itself had only been possible because of an introduction from an acquaintance in common at the research institute INTA-Delta.

5.8.1 Representative participation in PIECAS

In addition to its failure to facilitate participation in meetings, PIECAS does not satisfy representative participation. The High Level Committee is made up entirely of government officials, one each from the National Environment Secretariat and the three provinces with

[29] See http://www.ambiente.gov.ar/archivos/web/DOAT/file/ACTA%20II-1%20REUNION%20CIAN%20-PIECAS-DP.pdf.
[30] http://www.ambiente.gov.ar/archivos/web/DOAT/file/ACTA%20III%20CIAN.pdf
[31] http://www.ambiente.gov.ar/archivos/web/DOAT/file/ACTA%20IV%20REUNION%20CIAN.pdf

territories in the delta. The Committee is not therefore representative of the diversity of people with interests in the delta (agricultural stakeholders, NGOs, local and federal government, academics, and so on). Furthermore, the advisory bodies and committees that are so prominent at the IPHC and NPFMC are absent from PIECAS. Thus, stakeholders from outside government are unable to provide input into the PIECAS design process or to contribute to decision-making. As with meetings, participation is possible only by invitation or by *ad hoc* means. Certainly, the best description for the involvement of academics and environmental NGOs evident from the interview data is participation by invitation rather participation arising from a procedural opportunity to do so.

5.8.2 Participation in research

Perhaps unsurprisingly, the way in which the High Level Committee is organised does not lend itself to opportunities for participation in research. Both document analysis and the interview data suggest that the High Level Committee does not arrange collaborative research. Indeed, it is unclear how much research is presently conducted under the auspices of PIECAS. Previously, however, at the earliest stages of the design process there was participative research. Data from interviewee ♯11 suggest that the National Environment Secretariat produced a baseline environmental and ecological report on the delta and a preliminary environmental impact assessment that identified environmental "pressure points" shortly after the plan's inception. As part of this, there were several research meetings: "*the key meetings were government meetings, but there were also meetings with NGOs, with environmental organisations in the region, and with academics from the University of San Martin*" (interviewee ♯11). This information was corroborated in part by interviewee ♯1 (an academic at the University of San Martin), who described attending PIECAS's inaugural meeting. Thus, there is good evidence to indicate that participation in research was occurring at the earliest phases of PIECAS's development. Nevertheless, the crucial point is that these examples of participation in research do not appear to have continued through to the present. It is possible that further research is no longer required to make the plan a success. Whatever the reason, PIECAS no longer satisfies this component of participation.

5.8.3 The exclusion of farmers and agricultural interests from PIECAS

The exclusion of agricultural stakeholders first mentioned in chapter 3 is one of the most important aspects of participation in PIECAS and therefore PIECAS's legitimacy. Although

various stakeholders have misgivings about PIECAS, the group that appears to be most anxious about the plan are agricultural stakeholders - agronomists (interviewee #13), employees of agri-businesses (interviewee #9, respondent C) and farmers (respondent F). The frustration evident in the interview data demonstrates how powerfully these participation problems have affected their attitudes toward the plan. Interestingly, however, data from interviewee ♯9 indicate that in the last year agriculturalists have been able to engage with members of the High Level Committee. This rapprochement has, according to interviewee ♯9, improved agricultural stakeholders' assessments of the plan.

The participation problems experienced by agricultural stakeholders primarily concern participation in meetings. Certainly, the complaints made by interviewees ♯9 and ♯10 are related to their inability – and the inability of agricultural stakeholders generally – to participate in meetings. The frustration felt by interviewees ♯9 and ♯10 seems to have been exacerbated by the attendance of environmental NGOs and academics at these meetings, whom interviewee ♯10 in particular believed did not have the expertise needed to shape PIECAS in a way that was appropriate to the delta.

Of course, there is an argument that agricultural stakeholders fare just as poorly in terms of participating in PIECAS as any other stakeholder group. For instance, there are no stakeholders outside government that are involved in representative participation processes in PIECAS. This is as true of environmental NGO stakeholders as it is of agricultural interests. Nonetheless, the absence of agriculturalists from meetings like the ones linked to PIECAS's initial research programme is especially problematic because, by almost any measure, agriculturalists constitute a key stakeholder group in the delta. Agriculture shapes the delta's ecology in a number of key ways (Baigún et al., 2008), and in parts of the delta is people's main livelihood. Thus, there is little apparent justification for the exclusion of agricultural stakeholders from PIECAS. Arguably, if any stakeholder group could expect to participate in PIECAS, it would be the delta's agriculturalists. Their absence from the plan is therefore detrimental to PIECAS's satisfaction of the participation element of legitimation function.

5.8.4 Comparing participation in the fishery with participation in PIECAS

As mentioned in the methodology for this chapter, there are difficulties associated with comparing the IFQ management regime to PIECAS. Nonetheless, it is instructive to consider

the significant qualitative differences in participation that exist between the two plans. The most striking observation is that the fishery has a much more comprehensive structure in place to facilitate participation than PIECAS. Even the length of the analyses presented in this chapter indicates that the fishery is considerably more participative than PIECAS, and that it achieves participation with a diversity of means that are absent from PIECAS. In addition, it is clear that participation is treated seriously in the fishery; it is a central feature of the management process. The IPHC and the NPFMC appear to go to tremendous lengths in encouraging participation, even if it is at significant financial cost to the organisations themselves. By contrast, PIECAS emphasises the importance of participation but in practice pays it lip-service only. The features that facilitate participation in the fishery are absent from PIECAS, even though implementing them would almost certainly benefit participation. In this light, it is difficult to judge PIECAS's efforts at participation to date favourably.

5.9 Communication in PIECAS

Communication and participation in the halibut fishery were closely linked, with many of the features that facilitate participation also satisfying the effective communication component of the legitimation function. A similar pattern is evident with PIECAS. However, unlike the IPHC and NPFMC in the fishery, the High Level Committee is communicating its intentions for PIECAS's design poorly.

One example of ineffective communication in PIECAS is the failure to advertise forthcoming High Level Committee meetings. There is no information at all on the National Environment Secretariat's webpages about the Committee's next meeting, or, as mentioned in section 5.8, information on the schedule that the Committee is following. More problematically still, minutes of the Committee's meetings are not publicly available. However, a summary of the decisions taken at Committee meetings are accessible from the National Environment Secretariat's website. These documents are described as 'Acts' and so presumably stipulate the measures that the Committee would like to see taken in respect of PIECAS's development. There is therefore at least some transparency on the High Level Committee's decision-making, even if it is restricted.

In general, information on PIECAS is condensed to a single webpage on the National Environment Secretariat's website. Although this webpage provides access to documents

that establish the rationale and the legal basis on which PIECAS is founded, including the Letter of Intent that formalised PIECAS and a document describing how PIECAS will be operationalised, there is a notable lack of information on the key players involved in PIECAS. In particular, it is not clear how one can contact the High Level Committee or other individuals working toward implementing PIECAS. In addition, there are sections on the webpage that have been left blank or contain no documents for download. For instance, a section entitled 'Activities in progress' has yet to be furnished with relevant documents; another section on 'PIECAS forums' is similarly empty. Given that the National Environment Secretariat's website is the primary source of information for people interested in PIECAS, these omissions are unhelpful and representative of the limits of communication under PIECAS.

5.9.1 Communication between the High Level Committee and the delta's stakeholders

In addition to the paucity of information available on PIECAS, there is evidence to suggest that communication between the High Level Committee and the delta's stakeholders has been equally ineffective. Clearly, this is attributable in part to the limited opportunities for participation that have characterised PIECAS. Participation in meetings is an obvious way in which people can have a voice in the plan's design process.

Comments from two interviews in particular suggest that communication between the Committee and stakeholders is ineffective. Interviewee ♯9 remarked that the plan's communication was not yet adequate. Communication was neither frequent nor clear enough. In general, interviewee ♯9 believed that communication under PIECAS did not provide stakeholders with sufficient detail on PIECAS, leaving stakeholders with uncertainty about the plan's development. Poor communication also made long-term decision-making difficult. Interviewee ♯9 noted that he/she still felt distant from the plan.

Elsewhere in the interview data, interviewee ♯1 described the misinformation that characterised PIECAS's inaugural meeting:

"In that sense, problems started with the first meeting in Victoria. It started with a version that what was wanted was a national park. As a result, everyone started to fear – and by everyone I mean agricultural producers in the islands, local people – that, suddenly, everything was going to be converted into a national park, and that it wouldn't be possible to

do anything at all [in the delta]. *Which was completely false, that idea. At no time was the idea to establish a strict reserve. And I think the blame there lies with the National Environment Secretariat; they should have made local actors participate… And so when the meeting was called, there were dozens of people outside protesting. "No to PIECAS." In that respect, the meeting in Victoria was between national civil servants, provincial civil servants, others too: academic centres, who were invited to speak – like us* [the University of San Martin], *the University of Buenos Aires, and other groups…but agricultural producers weren't there, for example. And all this because of misinformation…"*

Although this a single incident and therefore insufficient to draw generalised conclusions, it does indicate that, even at PIECAS's early stages, the High Level Committee and the National Environment Secretariat were not communicating clearly. Whether or not the rumour about a national park in the delta originated with the High Level Committee or National Environment Secretariat, it is reasonable to argue that misinformation of that kind emerged only as a result of poor communication before and during the inaugural meeting. It is difficult to imagine that similar protests would have taken place if the National Environment Secretariat and/or High Level Committee had outlined succinctly PIECAS's aims and ensured that the delta's stakeholders had a firm grasp of the plan's details.[32]

The University of Wisconsin-Milwaukee survey data also provide evidence about the effectiveness of communication between stakeholders and the High Level Committee.[33] These data are a close proxy for effective communication because they demonstrate stakeholders' perceptions of their ability to express their concerns and have those concerns accounted for during discussions. Figures 14, 15 and 16 below show how successful survey respondents felt they were in influencing the discussions taking place in PIECAS.

[32] A problem here, of course, is that PIECAS's objectives are broad and poorly defined. Communicating them is therefore challenging. See chapter 3 for details.

[33] Survey respondents were asked to assess their success in influencing discussions taking place in PIECAS, on a scale of 0-10 (0 = not at all successful; 10 = very successful).

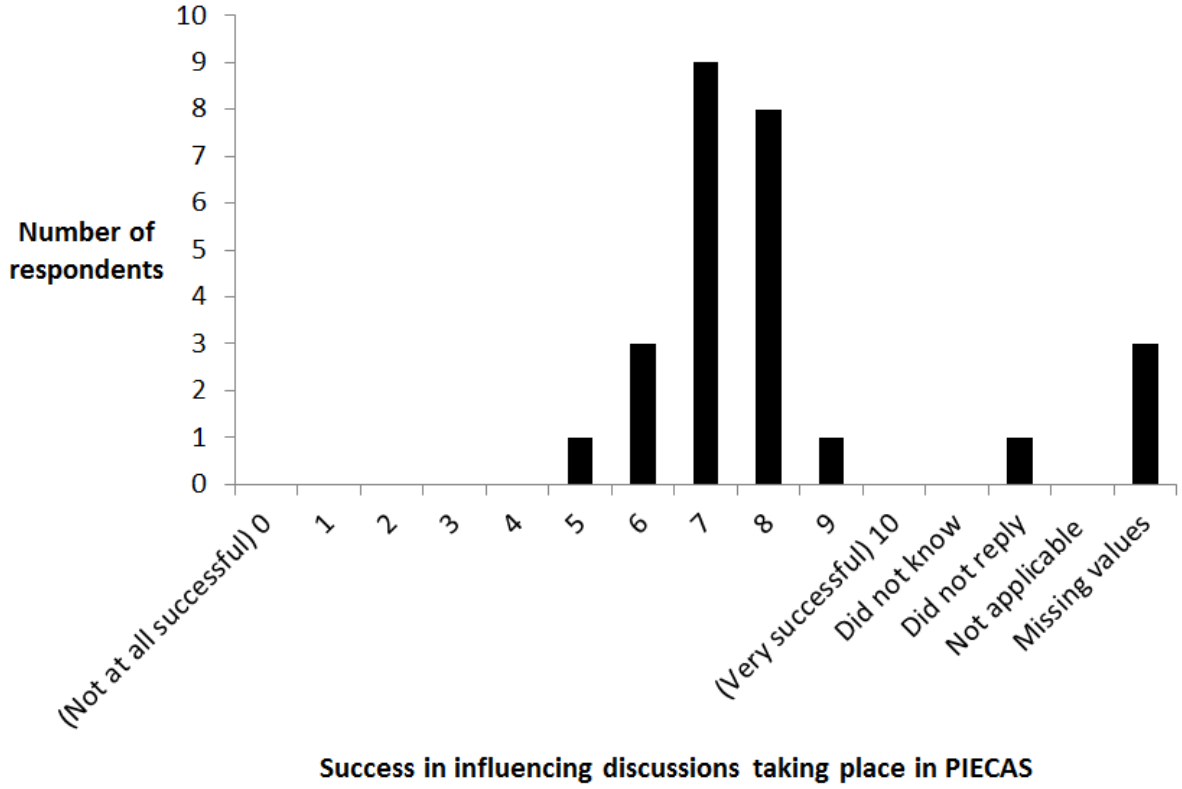


Figure 14. Assessments of success in influencing discussions in PIECAS (2010 survey).

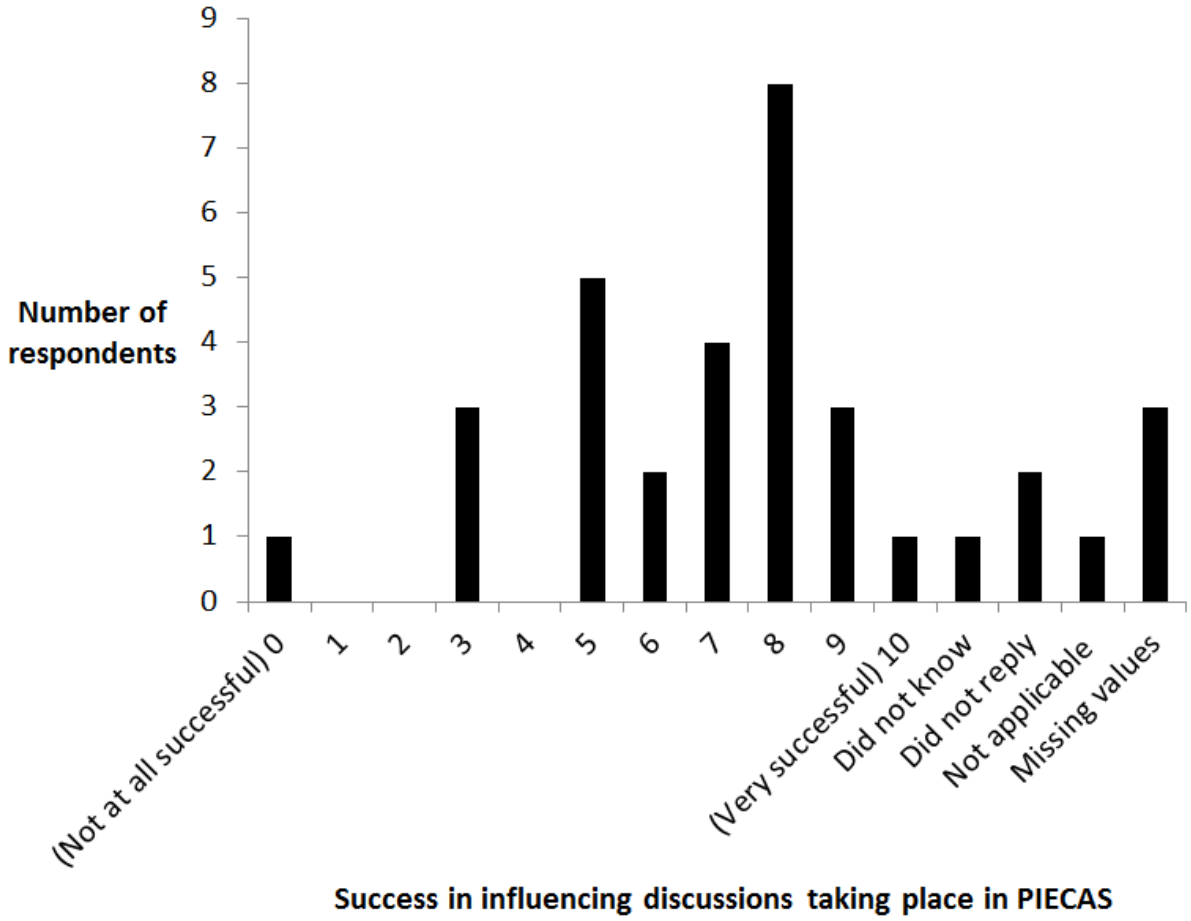


Figure 15. Assessments of success in influencing discussions taking place in PIECAS (2012 survey).

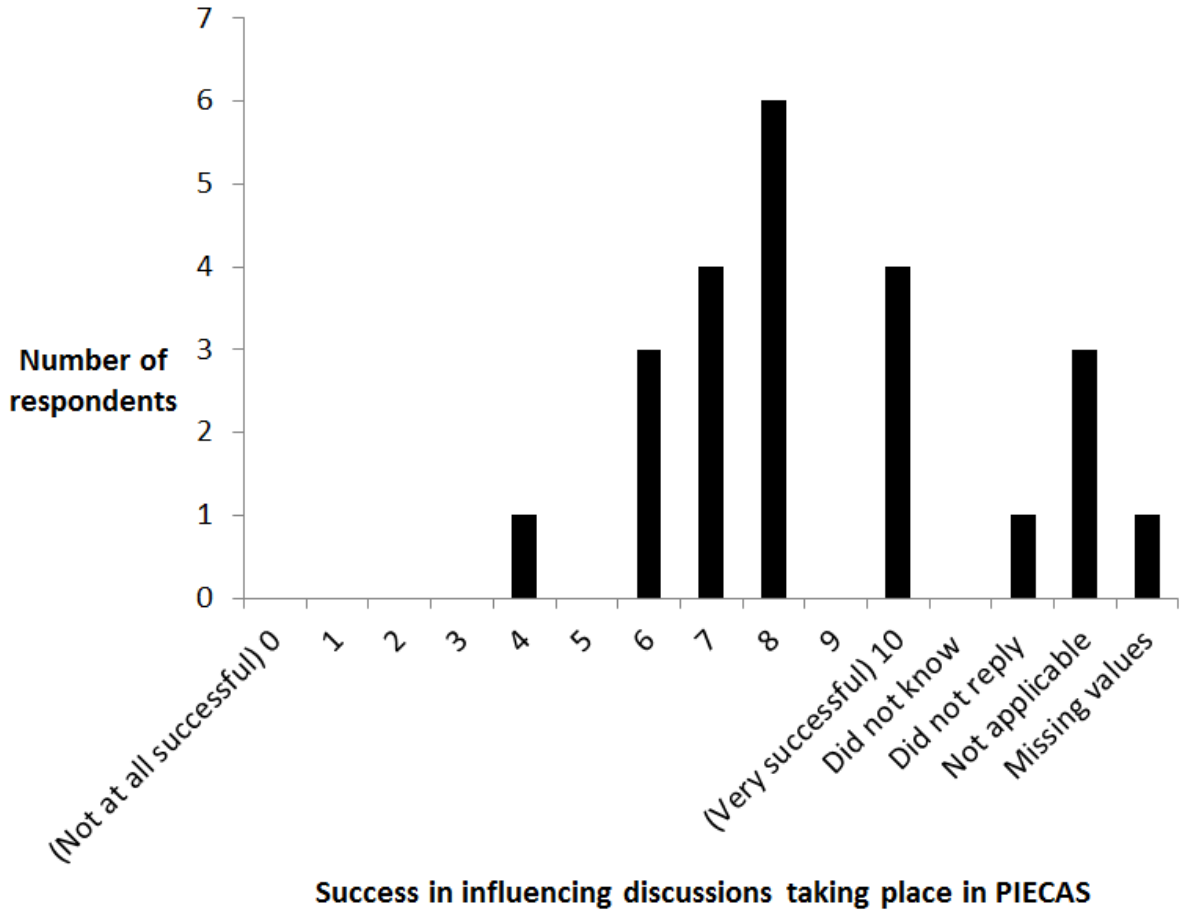


Figure 16. Assessments of succes in influencing discussions taking place in PIECAS (2014 survey).

In 2010 and 2012, few respondents believed they were 'very successful' in shaping the discussions taking place in PIECAS; indeed, only one respondent across 2010 and 2012 scored his success in influencing discussions as '10'. Instead, the majority of respondents in both surveys were generally positive about their effectiveness in communicating during discussions; most scored '7' in the 2010 survey and '8' in the 2012 survey. However, in spite of these assessments, it is notable that at least some respondents did not believe that they had been successful in influencing discussion in PIECAS. In 2010, one respondent rated his effectiveness as '4'; a further 3 respondents believed they had been neither successful nor unsuccessful ('5') in shaping discussions. These respondents would likely agree that they had a neutral impact in shaping discussions, thus suggesting no real sense of empowerment in influencing effective communication. By 2012, at least one respondent believed that he was 'not at all successful' (or a score of '0') in shaping discussions in PIECAS, and a further 8

respondents scored their effectiveness as '3' or '5'. The deterioration in assessments of success between 2010 and 2012 is notable, and suggests that communication between stakeholders and the High Level Committee worsened at that time. Thus, the 2010 and 2012 survey data provide some evidence that effective communication in PIECAS was fragile. It is possible that the lack of institutionalised communication processes contributed to this fragility.

However, the data for 2014 paint a more positive picture. Most respondents (n = 10) believed they had had at least some success influencing discussions, evaluating their effectiveness as '7' or '8' on the fairness scale. Furthermore, the number of respondents who felt they were 'very successful' (a score of 10 on the fairness scale) increased between 2012 and 2014 (n = 1 in the former, to n = 4 in the latter). In contrast, the respondents who suggested they had limited success influencing discussions fell, from 9 in total in 2012 to 1 in 2014. Moreover, none of the respondents involved in the 2014 survey believed they had had no success influencing discussions at PIECAS.

Thus, the survey data indicate that communication under PIECAS improved between 2012 and 2014. Recent communication efforts may therefore have been more effective than in the past. These latest data may give us pause to consider the conclusions drawn from the 2010 and 2012 surveys. It will be interesting to see whether survey data in 2016 imply continued improvements, or whether communication regresses back to 2010 and 2012 levels.

5.9.2 Comparing communication in the fishery to communication under PIECAS

It is worthwhile extending the argument outlined in section 5.8.4 and considering the differences in communication between the fishery and PIECAS. As with participation, it is evident that there are important qualitative differences in the degree to which communication is effective in each plan. Most striking, perhaps – and similar to participation - is the commitment to clear and frequent communication in the fishery. The same level of rigour appears to be absent from PIECAS. Furthermore – and again similar to participation – the range of features that facilitate effective communication is far greater in the fishery than in PIECAS. In light of these differences, it is unsurprising that PIECAS appears at times to have failed to satisfy the communication element of the legitimation function.

5.10 Perceptions of procedural fairness in PIECAS

The University of Wisconsin-Milwaukee survey data also provide valuable evidence about perceptions of procedural fairness in PIECAS[34]. Although these data do not directly address procedural fairness, they are a suitable proxy because they measure people's perceptions of the extent to which PIECAS provides stakeholders with voice in the process. As I have argued before, having voice in a process goes some way toward ensuring that that process satisfies the hearing rule.

Figures 17, 18 and 19 show that there is significant variation in perceptions of procedural fairness as measured by the proxy variable. Stakeholders in the 2010 survey were mostly positive about perceptions of procedural fairness in PIECAS, although a number (n = 6) were lukewarm in their assessments. They gave PIECAS a score of 5 or 6, which arguably suggests some misgivings about the plan's fairness. It is certainly not a strong endorsement. Figure 17 summarises the results from the 2010 survey.

[34] Survey respondents were asked to assess, on a score of 0-10 (0 = very unfair; 10 = very fair), whether PIECAS was fair in the sense that all voices were equally heard.

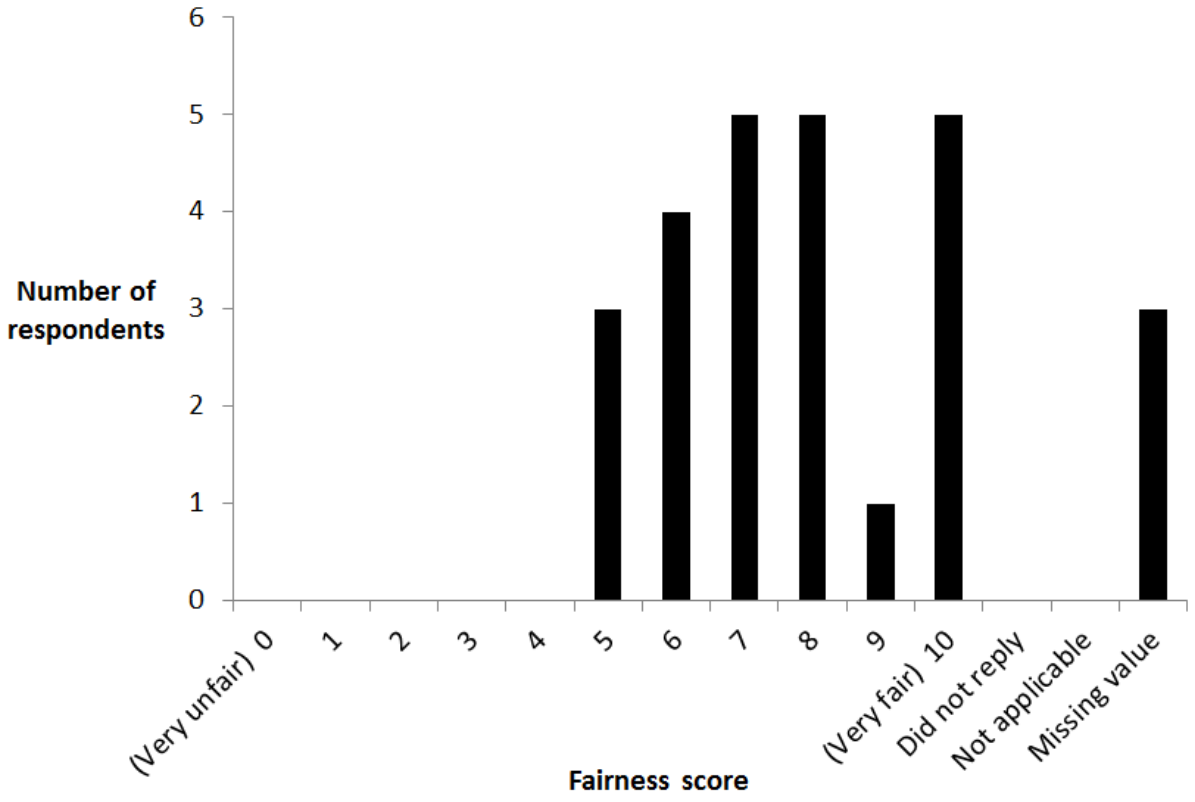


Figure 17. Assessments of procedural fairness in PIECAS (2010 survey).

Results from the 2012 survey are more striking. Four of the survey respondents believed that PIECAS was actually unfair (fairness scores of 2, 3 or 4), while a further six assessed procedural fairness as neither fair nor unfair (fairness scores of 5 or 6). In addition, only two respondents believed that PIECAS was very fair (fairness score of 10), compared to five respondents in the 2010 survey. In general, the most important difference between respondent attitudes in the 2010 survey and the 2012 survey is the notable increase in the number of people who were critical of PIECAS's procedural fairness. It suggests deterioration in overall assessments of procedural fairness between 2010 and 2012. Furthermore, the respondents who provided the fairness scores in both surveys did not include agricultural stakeholders. Given their absence from the PIECAS design process, it is likely that they would have assessed PIECAS's procedural fairness poorly in both years. Thus, there is good evidence to believe that PIECAS did not satisfy the procedural fairness component of legitimation function between 2010 and 2012. Figure 18 below outlines the results from the 2012 survey.

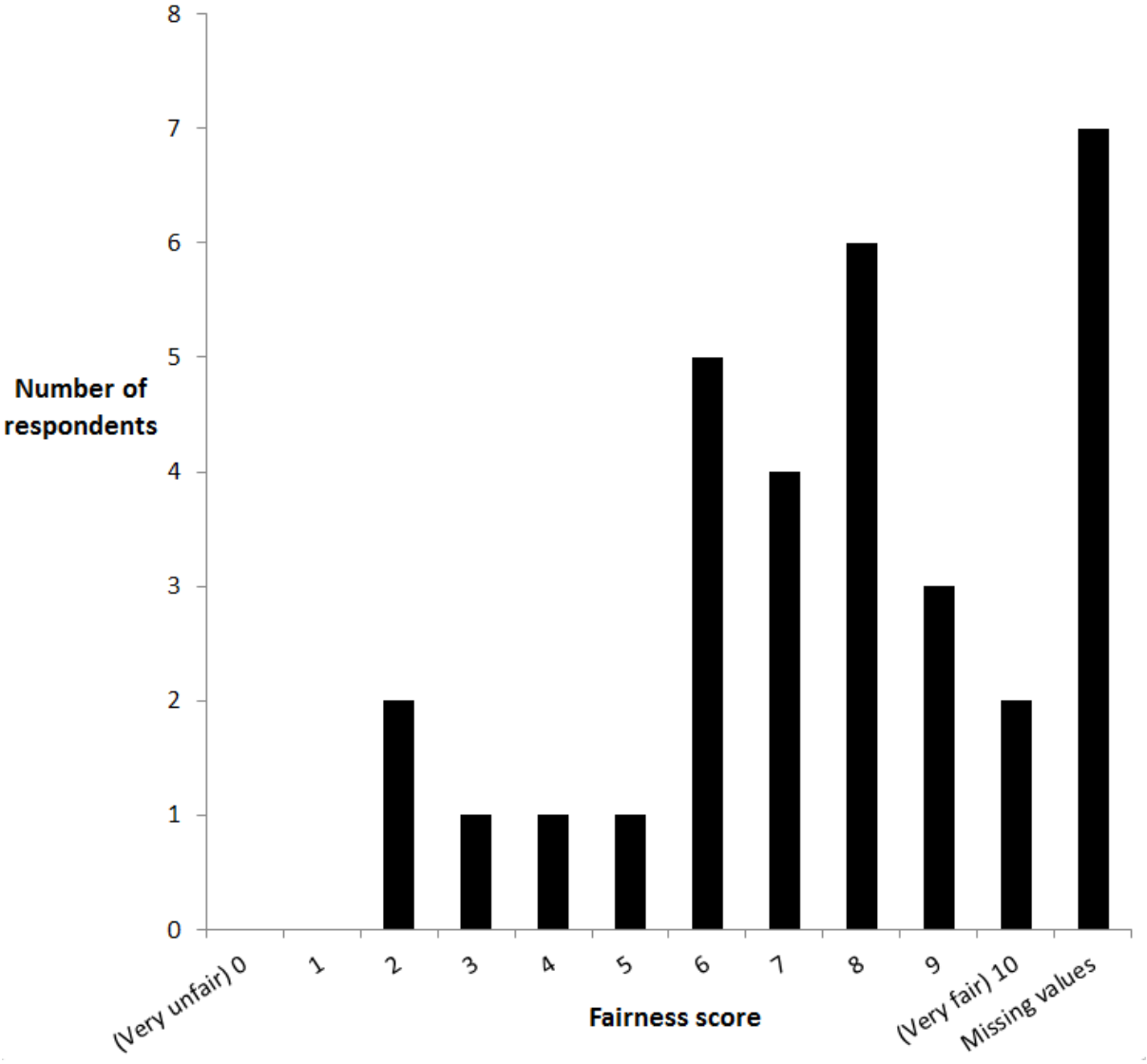


Figure 18. Assessments of procedural fairness in PIECAS (2012 survey).

However, the data from the 2014 survey suggests that there has been an improvement in assessments of procedural fairness since 2012 (consistent with the earlier observation that the effectiveness of communication also improved in 2014). The number of respondents who believed that PIECAS was procedurally unfair fell; indeed, there were no respondents who indicated that PIECAS scored less than 5 on the fairness scale. Conversely, the number of respondents who believed that PIECAS was very fair (score of 10) increased, from 2 in 2012 to 5 in 2014. The most recent assessments of PIECAS's procedural fairness therefore suggest that PIECAS is going some way to satisfy the procedural fairness element of the legitimation function. Crucially, however, the 2014 survey does not include agricultural stakeholders (like the 2010 and 2012 surveys). Given that agricultural stakeholders have reason to believe

that PIECAS is procedurally unfair, their inclusion in any survey may change the nature of the results observed. What is clear, however, is that perceptions of both procedural fairness and the effectiveness of communication have improved in the last two years. It is possible that the two are connected; improvements in communication have enhanced procedural fairness, and vice versa. Figure 19 below summarises the 2014 survey data on procedural fairness.

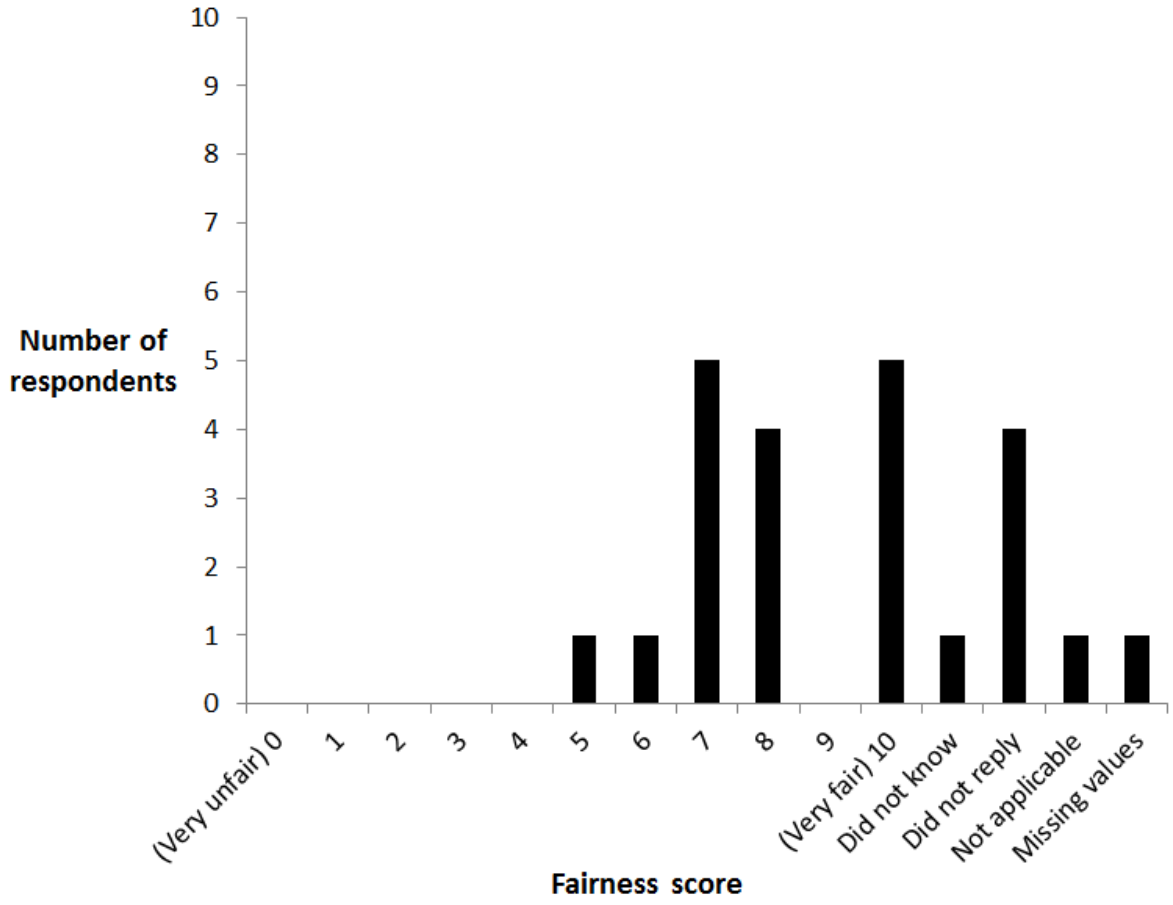


Figure 19. Assessments of procedural fairness in PIECAS (2014 survey).

The legitimation function framework also suggests that there is a relationship between participation and procedural fairness. In the halibut fishery, the ample opportunities for participation that exist have arguably contributed to satisfying the procedural fairness criterion of the legitimation function. In PIECAS, conversely, the participation problems that have characterised the plan have contributed to indifferent or negative assessments of the plan's fairness. Indeed, the survey data suggest that frequency of participation in PIECAS is positively correlated with higher assessments of PIECAS's fairness. A two-sample T test

with unequal variances[35] on the 2010 survey data shows that mean fairness scores for survey respondents who had been involved in PIECAS in the last six months were significantly higher than mean fairness scores for survey respondents who last participated in PIECAS longer than six months ago (T = 3.0571, p = 0.0062). This is good evidence that PIECAS's participation problems are strongly associated with negative perceptions of its fairness. Stakeholders who are unable to participate in the plan, or participate infrequently, are more likely to question its procedural fairness and, by extension, its legitimacy. The full output of these tests appears in appendix E.

The statistical evidence supporting the idea that participation and assessments of procedural fairness are linked is further corroborated by considering in an intuitive way the consequences of the absence of agricultural stakeholders from PIECAS. It is apparent that there is something fundamentally unfair – in general and in procedural terms – in the absence from PIECAS of the stakeholder group (agricultural interests) whose livelihoods may be most affected by PIECAS. Their absence means that rules that may affect their day to day business are being developed without their input or their consent. Under these circumstances, PIECAS fails to satisfy several aspects of the various conceptualisations of procedural fairness outlined in chapter 4. In terms of natural justice, the absence of agriculturalists means that PIECAS is inconsistent with the hearing rule. The High Level Committee and the National Environment Secretariat cannot hear the views of agricultural stakeholders if they are not present at meetings and are generally unable to participate and have a voice in PIECAS. Similarly, the absence of agriculturalists means that PIECAS is inconsistent with Leventhal's representativeness rule. Indeed, it is clear that agricultural stakeholders are not involved in the 'genuine participatory decision-making' and 'frequent consultation' that Leventhal attributes to improved assessments of fairness.

Finally, the absence of agriculturalists means that PIECAS does not satisfy Ostrom's design principle that stakeholders are able to participate in making and/or modifying the rules that affect them. Although this design principle does not explicitly address procedural fairness, it is evident that it plays a legitimation function precisely because it makes a process fairer. The design principle is consistent with both the hearing rule and the representativeness rule, and therefore goes some way to providing a process with the elements that make it fair.

[35] A Shapiro-Wilk W test provided some evidence that the data were approximately normally distributed (z = -3.460, p = 0.999).

5.10.1 Leventhal's representativeness rule and the organisation of the High Level Committee

In section 5.3.1, I argued that the composition of the Commission (IPHC) and Council (NPFMC) and the use of limits on the terms that Commissioners and Council members could serve were consistent with Leventhal's representativeness rule. By extension, it is clear that the composition of the High Level Committee does not satisfy the representativeness rule. I describe in section 5.8.1 how the Committee is made up solely of government officials at a federal and provincial level. Thus, the people who actually make decisions about PIECAS's development are not representative of stakeholders outside government. The 'genuine participatory decision-making' described by Leventhal is not possible with a High Level Committee organised along these lines. The contrast with the Commission and Council in the fishery – where decisions are taken by individuals from a number of different organisations and sectors in the fishery – is striking. Furthermore, the officials on the High Level Committee can, in theory, serve indefinitely because there is no stipulation on fixed terms. As a result, there is no requirement to rotate individuals in and out of the High Level Committee. This too is in contrast to the fishery and in contravention of Leventhal's representativeness rule. It is additional evidence that PIECAS is unlikely to satisfy procedural fairness elements of the legitimation function.

5.11 Trust in PIECAS

It is difficult to draw firm conclusions about stakeholders' trust in PIECAS and their trust in the High Level Committee from the interview data. However, it is intuitive that amongst agricultural stakeholders in particular, trust in the High Level Committee is likely to be low because their absence from the PIECAS design process gives them reason to mistrust the High Level Committee. Any given agricultural stakeholder might reasonably ask why he or she is unable to participate in PIECAS and to communicate his (or her) views and concerns about the plan, especially when the plan may have a significant impact on their lives. This sentiment is likely to be exacerbated by the involvement of academics and environmental NGOs, whose expertise is questioned by agricultural stakeholders like interviewee ♯10 (see section 5.8.3) and who have much less to lose from PIECAS but are nevertheless active participants in the plan. Without clear information from the High Level Committee, it is probable that agricultural stakeholders will feel suspicious of the Committee and other participants in PIECAS. Interviewee ♯10's comments about a lack of expertise could

certainly be interpreted as evidence for suspicion, although this is a tentative argument at best.

The survey data do provide interesting information on trust in the High Level Committee, however. Two observations merit discussion. The first is that some of the stakeholders surveyed did not know about the High Level Committee. The second is that marginally more stakeholders did not trust the High Level Committee than trusted it (n = 4 and n = 3, respectively). Interestingly, and in support of my argument above, the people who mistrusted the High Level Committee were almost exclusively agricultural stakeholders. Conversely, those respondents who trusted the High Level Committee belonged to NGOs or provincial government. The sole exception to this pattern was interviewee ♯8, who, despite working for a NGO, lacked trust in the High Level Committee. However, these data should be interpreted with caution given the small size of the samples involved.

Trust in the High Level Committee and PIECAS generally will also have an exogenous component that is independent of the design and operation of PIECAS (see chapter 4 and the introduction to this chapter). This exogenous component might be determined by attitudes to the incumbent government, say. Again, however, it is difficult to reach particular conclusions about trust in the government from the interview or survey data. Perhaps the only indication that some stakeholders might mistrust the government comes from remarks made by interviewee ♯9, who believed that there was a political element in the recent change of attitude to agricultural stakeholders' involvement in PIECAS:

"They really are looking at us in a different light. There are also people who were 'fundamentalists' in respect of agricultural production in the delta. These people are politicians. They're more cautious. They're no longer categorical. They don't tell us, "You have to do this because it's happening to me." Going to a meeting with a municipal Environment Secretary where they tell me, "You're not going to be taken into account because there's not space for you in my municipality," with a strong, defined, intransigent position, I've suffered that. These same people are now giving us dialogue in the municipality, and they respect us and they listen. And I'm sure, Anthony, that it's a political question, that someone said, "Look, you're making a mistake." They almost ordered them to change their position."

Of course, interviewee ♯9's remarks do not address trust explicitly. However, they do indicate that interviewee ♯9 believed political machinations might explain the trajectory PIECAS is following. If other stakeholders share interviewee ♯9's views, their opinion of PIECAS might be coloured by their attitude toward the incumbent government in Buenos Aires. If interviewee ♯9 is mistrustful of that government, it suggests that interviewee ♯9 may also mistrust the government officials that make up the High Level Committee and that are responsible for shaping PIECAS. The same argument applies to stakeholders with beliefs similar to interviewee ♯9. Again, however, it is worth cautioning that this argument is inconclusive at best and speculative at worst.

5.12 Legitimation function criteria and top-down management approaches

Both the halibut fishery and PIECAS are top-down insofar as the lead management organisations in both schemes are offshoots of government at a federal and/or state or provincial level (or both, in the case of the High Level Committee). The IPHC is unusual in that it is an international organisation, but it too operates in a top-down fashion; it produces scientific advice and management recommendations that the NPFMC has limited discretion to change or to ignore.

The problems associated with top-down or centralised resource management plans are widely recognised (see, for example, Acheson, 2006). There is frequently outright antagonism between local communities and government bureaucracies. Non-cooperative or non-compliant behaviour can arise because there are 'misunderstandings about new resource policies and distrust of government's sincerity or ability to hold on to its promises' (Baland and Platteau, 1996, pg. 254). In some cases, governments lack detailed knowledge of SESs. As a result, they introduce measures that are culturally or ecologically inappropriate, or impose perverse incentives and significant costs on stakeholders. In other cases, agency problems lead to corruption or the protection of particular stakeholder groups at the expense of others.

Arguably, many of the problems that accompany top-down approaches are a product of the significant institutional and geographical distance that often exists between management authorities and the stakeholders affected by management rules. For instance, an increase in institutional and geographical (and even ideological) distance increases the transaction costs

of establishing trust-based relationships (Lubell, 2007). As a result, it is harder to develop trust in management authorities – and without that trust, there is a higher likelihood of ill-feeling and hostility. Similarly, an increase in institutional and geographical distance in particular can have a negative impact on stakeholder participation in a management plan. It is clear, for example, that stakeholders who are based hundreds or even thousands of kilometres from the headquarters of management authorities will find it harder to participate in resource management processes than stakeholders who are closer. Difficulties with participating in a plan can also lead to ill-feeling, especially if there is a sense that management authorities are not doing enough to facilitate participation, or if one's exclusion from a resource management plan is unfair.

Lubell (2007, referenced above) suggests that transaction costs play a role in mediating the effects of significant institutional and geographic distances. Similarly, Adger et al. (2006) and Coggan et al. (2010) highlight the transaction costs associated with the vertical interplay between 'public parties' (regulators like the NPFMC, say) and 'private parties' (resource users like fishermen, for instance). Transaction costs are broadly defined (see, for example, Demsetz, 1968; Williamson, 1981), but are usually thought of as the resources used to establish, maintain or transfer property rights, or the costs of 'planning, adapting, and monitoring task completion under alternative governance structures' (Williamson, 1981). In a resource management context, there are transaction costs associated both with establishing trust (as Lubell (2007) suggests), and with stakeholder outreach, participation and consensus building (McCann et al., 2005). In a resource management context, these transaction costs might be more appropriately considered management costs (Nielsen, 2003). Irrespective of the nature of the cost, however, it is clear that the higher the transaction costs in an interaction, the harder it is for regulators and stakeholders alike to overcome the difficulties associated with significant institutional or geographical distances.

One implication of this argument is that measures that reduce the transaction costs associated with a resource management plan will go some way toward enhancing trust, participation in, and communication of the plan. Hence, minimising transaction costs helps to close the institutional and geographical distance (metaphorically, at least) that might otherwise accompany a top-down management approach. As a result, minimising transaction costs should also enhance perceptions of legitimacy. Management authorities that design or operate resource management plans in such a way that the transaction costs of

communicating, participating and developing trust are reduced can improve perceptions of a plan's legitimacy.

Interestingly, the analysis in this chapter suggests that the fishery and PIECAS fare differently in the extent to which they reduce transaction costs and therefore the degree to which they mitigate the impacts of top-down management. In the halibut fishery, it is evident that both the IPHC and the NPFMC have introduced a number of measures that facilitate stakeholder participation in the IFQ management process and that encourage stakeholders to voice their concerns and ideas. Although these measures are presumably costly to both organisations (consider interviewee B's comments about the 'excruciating' transparency of the Council process), they significantly reduce the transaction costs that fishery stakeholders incur when participating and communicating. For instance, the costs associated with the search for information are lowered by the accessibility and clarity of the information presented in documents, newsletters and on the IPHC's and NPFMC's websites. The ready availability of information reduces the uncertainty – and therefore the transaction costs – of how one can participate, or how one can provide the IPHC and NPFMC with one's opinion. Consider the benefit to stakeholders of the NPFMC's 'How do I get involved?' webpage, for example. Arguably, many of these transaction cost-reducing measures are essential to effective communication and participation in the fishery given the vast size of the region covered by IFQ management (see section 5.3 for additional detail on the region's geography).

Conversely, the manner in which PIECAS is being designed does little to reduce the transaction costs of communicating about, and participating in the plan. Indeed, the measures that have successfully facilitated effective communication and participation in the fishery are all but absent from PIECAS. There is no procedure that a stakeholder can follow if he wishes to participate at PIECAS meetings, for instance. Equally, there is no specific or obvious way for a stakeholder to communicate with the High Level Committee. As a result, many of the problems associated with top-down management approaches are evident in PIECAS. The antagonism that exists between agricultural stakeholders and the High Level Committee is a good example.

The implication of this argument is that, without particular features that facilitate effective communication, participation and trust-building, satisfying the legitimation function is considerably more challenging in top-down than bottom-up or grassroots management

approaches. The latter are less likely to suffer from problems of institutional and geographical distance, which in turn reduces the cost of satisfying the legitimation function criteria. This is not to say that top-down approaches are always inimical to satisfying the legitimation function; it is simply more difficult. By extension, the organisations charged with designing a top-down resource management scheme should recognise the costs that top-down management schemes impose, and the consequences for legitimacy implied by these costs. Arguably, a basic principle in top-down resource management should be to reduce the transaction costs of satisfying legitimation function criteria. This principle further emphasises the importance of the design of resource management systems.

5.13 Conclusions arising from the application of the legitimation function framework

The preceding analysis suggests that the four legitimation function criteria are broadly satisfied in the halibut fishery but remain largely unsatisfied in PIECAS. Indeed, the University of Wisconsin-Milwaukee survey data suggest that perceptions of some legitimation function criteria like effective communication and procedural fairness have worsened at times in PIECAS. The chapter's overall conclusion about the legitimation function in both management schemes is therefore consistent with the interview data and survey data, where it was suggested that PIECAS lacks legitimacy (especially amongst agricultural stakeholders) but the halibut fishery is imbued with it. An argument based on the legitimation function criteria is one possible explanation for this pattern. Of course, it is difficult to show an indisputable causal relationship between the legitimation function criteria and the emergence of legitimacy, but the analysis does at least suggest that there is some correlation between the four criteria and perceptions of legitimacy. Further research should establish whether this correlation holds in other resource management systems, and with sufficient evidence may even point to causation.

One striking aspect of the analysis is the starkness of the differences in the satisfaction of the legitimation function between the fishery and PIECAS. The former has a wealth of features that encourage effective communication and participation, and that demonstrate trustworthiness and procedural fairness. The NPFMC and IPHC both reduce the transaction costs associated with participating in the fishery's management by organising regular meetings that are open to the public, both in person and online. They deal with the challenges presented by Alaska's geographical size by hosting meetings in different cities.

The meetings themselves, and the decisions made at them are apparently communicated clearly and honestly. Advisory Bodies, Committees and collaborative research trips further encourage participation and consideration of stakeholder opinions. Finally, there is a predictability and level of rigour accompanying participation at both the IPHC and NPFMC that ensures stakeholders have certainty about how, when and where they can participate. Collectively, these features satisfy each of the four legitimation function criteria. It is clear that they facilitate participation. They contribute to effective communication. They provide the management process with many of the elements that make for procedural fairness. And in turn, in part by satisfying the preceding three criteria, they increase the likelihood that trust between stakeholders and management authorities emerges (although this conclusion is challenged by a lack of trust in the NPFMC). The cumulative effect of these measures is to provide the fishery with legitimacy.

Conversely, similar measures are absent in PIECAS. Indeed, the way the plan is being designed is preventing the satisfaction of the four legitimation function criteria. The High Level Committee meets infrequently and on an apparently *ad hoc* basis. These meetings are not open to the public, and the Committee itself is comprised only of government officials at a federal and provincial level. There is no information on forthcoming meetings or matters for discussion, nor input from advisory bodies. There is no formal mechanism by which stakeholders can raise their concerns with the High Level Committee; participation is therefore heavily dependent on social connectedness. Furthermore, the diversity of tools in the fishery that encourage participation and effective communication in the fishery are missing from PIECAS. Finally, the absence of agricultural stakeholders from the plan's design has had a serious impact on their perception of the plan's fairness and legitimacy.

The principal effect of these features has been to limit participation in PIECAS, but they have also shaped the clarity of communication, perceptions of fairness, and the trust stakeholders – but particularly agricultural stakeholders – have in the plan and the High Level Committee. In turn, it is unsurprising that a number of the stakeholders interviewed for this research questioned PIECAS's legitimacy.

One implication of these conclusions is that it is possible and desirable to design a resource management plan in such a way that it is more likely to satisfy the four legitimation function criteria. If, as suggested here, legitimacy can emerge when certain criteria are met, then it

should be feasible to design a resource management plan that satisfies these criteria from its inception. In this regard, it is reasonable to assume that where the legitimation function criteria are not designed into a plan, the effort required to establish legitimacy after a resource management system and its outcomes are first seen as illegitimate is significant.

The two case studies point to at least some design features for legitimation function criteria that could be appropriate. The experience of the halibut fishery suggests that a conscious undertaking to make management meetings open and predictable serves a valuable legitimation function. Similarly, facilitating participation by including non-government stakeholders in decision-making councils or committees can also encourage legitimation. So too can establishing advisory bodies or committees that are comprised entirely of stakeholders independent of the management authority. None of these features are unreasonably difficult to implement, but their impact on legitimacy is significant.

Of course, it is also possible that, even if a resource management scheme satisfies each of the four legitimation function criteria, a scheme will still be perceived as lacking legitimacy. This observation points to the impact that the institutional and socio-economic setting in which a resource management scheme is placed can have on perceptions of legitimacy; that is, the wider context in which a resource management scheme is embedded establishes pre-conditions for legitimacy or illegitimacy. For instance, it is conceivable that a resource management scheme is deemed illegitimate because the authorities implementing it have come to power through non-democratic institutions that themselves lack legitimacy.

Furthermore, I have not proven that satisfaction of the legitimation function criteria is a guarantee of the success of a resource management scheme. Indeed, legitimacy is not necessarily highly correlated with decision implementation (Berardo, personal communication, 2014). A scheme may satisfy each of the criteria but still lead to unsustainable outcomes. There are a number of possible instances in which such a scenario might arise. For instance, a resource management system may prove to be unsuccessful even with satisfaction of the legitimation function when sound scientific advice is beyond the management system's reach. This might occur when scientific advice is too complex or multifaceted to account for in management processes. For example, many EU fisheries are multi-stock fisheries where several fish species will be found in the same area. Each of these stocks requires a quota limit, and a process for allocating a share of multiple quotas across

countries. Although establishing a scientifically justifiable quota limit is relatively straightforward, even in a multi-stock fishery, the allocation process is much more complicated – for instance, it is difficult to ensure that individual countries receive a share of quota that is ecologically sound. The United Kingdom might receive a larger share of cod quota than its domestic fisheries can withstand, say, even if the overall EU cod quota is sustainable. The politicisation of the CFP may have occurred precisely because a politically-driven allocation process is easier to negotiate than a scientific one.

This example should demonstrate ways in which sound scientific advice can be beyond the reach of a management process. In such cases, satisfaction of the legitimation function is unlikely to lead to successful management outcomes. Another way in which a management system can fail, even with satisfaction of the legitimation function, is when technical solutions to a given management problem are not known. Prior to the invention of ITQs, for example, it is not clear that measures for successfully addressing over-capacity in fisheries were well-established.

Finally, there are two other instances in which satisfaction of the legitimation function may not be sufficient for successful management outcomes. Interestingly, these two situations relate in some way to communication and participation in a management process, and are therefore not entirely distinct from the legitimation function. Firstly, it is possible that the participants in a management process collectively conclude that one management approach is superior to another, even though the opposite may be true. In such cases, an attempt to implement the appropriate approach – against the collective's wishes – is likely to be unpopular, even if it will ultimately lead to sustainable outcomes. Indeed, the appropriate approach may lack legitimacy because its implementation is perceived to be unsound and raises issues of trust. This is perhaps a weakness inherent in any resource management system where stakeholder participation is a key element. It is not possible to guarantee that stakeholders will agree with or agree to suitable management measures, thus jeopardising the management system's success. Perhaps the only solution to this problem is to communicate the merits of an approach effectively – which raises the legitimation function once again.

Secondly, it is possible that a suitable management measure, executed in a way that satisfies the legitimation function, is still rejected by stakeholders if it is perceived as culturally unacceptable. Cultural mores of this kind may mean certain management approaches are not

available to management authorities, even if those approaches are likely to be more suitable and lead to successful outcomes. Culture can therefore be a constraint on the decisions management authorities are able to make. Furthermore, culture can be so ingrained in a community that it is difficult to overcome any constraints with effective communication and participation alone. This argument points to the importance of exogenous factors like culture to management outcomes.

Interestingly, the legitimacy of a resource management plan may also depend in part on exogenous factors over which management authorities may not have control. This is not to say that legitimacy is purely exogenous. Satisfying or failing to satisfy the legitimation function criteria will contribute to the emergence of legitimacy, but their effect may be mediated by exogenous factors. The legitimation function remains a crucial issue to consider when designing a resource management plan because a failure to satisfy the legitimation function may well be fatal to a plan's legitimacy, irrespective of its institutional setting. I turn to the interplay between the legitimation function criteria and exogenous factors in chapter 6.

Chapter 6 The influence of 'exogenous' factors on legitimacy.

Keywords: culture, marginalisation, tradition, unionism.

The legitimation function framework introduced in chapter 4 goes some way toward explaining why stakeholders may perceive a resource management system as legitimate. The analysis in chapter 5 then shows the explanatory power of the framework, through its application to the two case studies presented in chapter 3. Chapters 4 and 5 should demonstrate that the legitimation function framework provides resource management authorities with some indication of the features a legitimate resource management system might contain. The framework is therefore a guide to designing management systems with legitimacy in mind.

However, the framework has less explanatory power in the absence of a thorough understanding of exogenous influences and their interrelationship with the framework. These exogenous factors are those that are beyond the immediate control of the resource management organisations charged with designing, implementing and operating the management system. Consider a case where a management authority has assiduously satisfied the four legitimation function criteria – communication, participation, procedural fairness and trust - but finds that its management system still lacks legitimacy in the eyes of many stakeholders. It is possible that the lack of legitimacy observed is related in some way to pre-existing beliefs about the nature of the management authority, or the presence of norms or cultural traits that predisposes some stakeholders to view management efforts as illegitimate. These beliefs, norms and cultural traits may carry greater weight in determining perceptions of legitimacy than the legitimation function criteria. Indeed, their influence may be so significant that satisfaction of the legitimation function criteria cannot by itself ensure legitimacy.

Perhaps the most obvious demonstration of this principle is a situation where stakeholders reject the legitimacy of the State itself. The State may have become tyrannical, for instance, with its authority resting on fear and coercion rather than legitimacy. In these cases, government-led management systems like PIECAS or IFQs are likely to suffer from a lack of legitimacy simply because they are an extension of the State's illegitimate power. Furthermore, even if the management authorities involved generate goodwill by satisfying the

legitimation function criteria, they are unlikely to have legitimacy themselves because they are agents of an illegitimate State. It is evident then that the legitimation function criteria are not the entire picture when it comes to understanding legitimacy in resource management contexts. In essence, we are recognising that resource management systems are 'not isolated from wider political structures of region and state' and that the 'specificity of local socio-cultural forms and their historical particularity' is important to the system's function (Mosse, 1997).

Assuming that there is merit in this argument, it is interesting to consider whether there are certain beliefs, socio-cultural forms and political structures that might predispose stakeholders in the fishery and in the delta to view halibut IFQs and PIECAS as illegitimate. We require an understanding (even if it is incomplete) of the recent history of Argentina and the United States, and more importantly, some sense of how this may have influenced stakeholder perceptions of government and government policy.

At one level, both the Argentine and the United States government may be perceived as legitimate because they are democratically elected. Their authority does not rest on coercion and force (although in Argentina's case, the military junta's rule between 1976 and 1983, and other factors, has led to deep-rooted suspicion of government.)[36] In this respect, it is reasonable to assume that PIECAS and halibut IFQs are not illegitimate extensions of an illegitimate State. Any legitimacy (or lack thereof) the two resource management systems may have is therefore not attributable to a broader perception that government, government organisations and government initiatives lack legitimate authority. However, the performance of government in Argentina and the United States diverges significantly, and therein there may be a reason for believing that government and by extension government initiatives like PIECAS or halibut IFQs are illegitimate. The argument here is that while the Argentine government and the United States government are seen as legitimate because they are democratically elected and not tyrannical in their use of power, differences in their conduct and effectiveness may have influenced stakeholder perceptions in such a way that PIECAS lacks legitimacy but halibut IFQs do not, independent of the four legitimation function criteria.

[36] The death of Argentine prosecutor Alberto Nisman early in 2015 – and accusations that he was murdered on the order of the Argentine government to ensure that he did not reveal potentially damaging information on the links between the government and Iranian terrorists suspected of blowing up a Jewish centre in Buenos Aires in 1994 – is a case in point.

In particular, Argentina suffers from corruption, weak institutions and weak rule of law to a much greater extent that the United States. Transparency International's corruption perception index ranks Argentina 107th out of 175 countries surveyed, well below the United States (ranked 17th). Spiller and Tommasi (2003) suggest that Argentina's public policy is 'incoherent', and that economic policy in particular is highly volatile. In general, they argue that Argentina 'presents low-quality and incoherent public policies, with instability in some dimensions and excess rigidity in others'. Although policy in the United States may also be criticised for incoherence, the general picture is more favourable than it is in Argentina. For instance, management of the American economy has, over the long-term, been highly successful. In contrast, Argentina has endured a century of economic decline. Prior to the First World War, it was one of the 10 richest countries in the world. Economic growth averaged 6% per annum. Income per head was 92% of what it was in the 16 wealthiest countries in the world; today, it is just 43% (The Economist, 2014). In addition to these problems, the repressive military junta that ruled Argentina in the 1970s and 1980s had and continues to have a profound effect on Argentine society and politics.

All told, Argentina's policy problems and its turbulent recent history may have an important effect on perceptions of legitimacy not just in resource management contexts but in a range of situations. In particular, it is possible that a belief that the State is corrupt has the effect of delegitimising government organisations and government initiatives. Thus, it is plausible (although difficult to attribute conclusively) that PIECAS's lack of legitimacy is linked to a wider societal perception that the Argentine State is corrupt, and that organs of the State like the National Environment Secretariat are also corrupt. Corrupt behaviour may be delegitimising because it exploits the trust that the electorate places in government.

In contrast to Argentina, the United States has much stronger institutions and rule of law. Halibut IFQs are situated in a context where the rigour with which institutional processes are carried out is assumed, if not assured. Exogenous factors like corruption or an inability to rely on the law are therefore unlikely to be as significant in shaping legitimacy as they possibly are in the Paraná delta. Nevertheless, there are other exogenous factors that may play a role in shaping the fishery's legitimacy. For instance, the IPHC is based in Seattle, which is some 2000km from Alaskan fishing communities (see chapter 5). It is possible that halibut fishers in Alaska question the IPHC's legitimacy precisely because it is so far removed from them, although there is no evidence of this in the interview or survey data.

Similarly, there are aboriginal communities in Alaska and the Pacific Northwest that may feel a cultural or traditional right to halibut that is at odds with government-led management in the form of halibut IFQs. These communities may believe that IFQs are illegitimate in the sense that they have superseded historical, culturally important forms of managing the fishery.

The comparison between Argentina and the United States suggests that it is indeed possible that 'exogenous factors' can shape perceptions of legitimacy in addition to or independently of the legitimation function criteria. However, it is interesting that the argument in the paragraphs above makes a connection between perceptions of corruption and a factor like trust (which is, of course, included in the legitimation function framework). It implies, perhaps, that the effect that some – if not all - exogenous factors have on legitimacy is mediated via the legitimation function criteria. For instance, one might argue that corrupt practices are an example of a breakdown in procedural fairness. Indeed, most definitions of corruption include the idea that the conduct of an individual or organisation has failed to follow due process and not met some agreed-upon standard.

Neither the interview nor the survey data contain any information that provides us with clues about the exogenous factors that have influenced perceptions of legitimacy in the fishery or in the delta. As a result, the approach taken in this chapter uses meta-analysis to see whether there are cultural, historical or socio-economic factors beyond the immediate control of resource management authorities that have influenced the legitimacy of fisheries management systems.

The chapter proceeds as follows: in section 6.1, I provide details on the methodology employed; in section 6.2, I outline the results of the meta-analysis; section 6.3 discusses these results, before section 6.4 concludes the chapter. Section 6.1 is comprehensive but should be read as complementary to the methodology chapter (chapter 2).

6.1 Meta-analysis methodology

Meta-analysis – or a 'study of studies' – is a method that is routinely employed in disciplines as diverse as economics and medicine, and is increasingly used by scholars trying to understand the management of CPRs and SESs. For instance, Cox (2014) describes a meta-analytic approach (the SESMAD project) that assesses whether the variables that explain

management outcomes in small-scale CPR systems are relevant to environmental governance outcomes at larger scales. As part of the SESMAD project, Epstein et al. (2014) investigated international governance of Atlantic Bluefin tuna (*Thunnus thynnus*). Elsewhere, Pagdee et al. (2006) used meta-analysis to identify factors that influence the success of community forest management. Similarly, Rudel (2008) employed meta-analysis to understand changes in local forest cover in Mexico.

In this chapter, I have applied Pagdee et al.'s method to the following research question: what are the exogenous factors that characterise legitimate and illegitimate resource management systems? Clearly, this is such a broad research question that it opens a variety of avenues for further investigation. In this instance, I have chosen to make fishers the unit of analysis. Thus, I aim to identify the attributes that describe the fishers (and by extension, fishing communities) included in the case studies that make up the meta-analysis sample. In particular, I ask the following: are there factors – a colonial legacy, for instance, or a history of unionism – that might have skewed fishers' perceptions of government in such a way that government-led resource management initiatives are deemed illegitimate? Does a history of unionism, say, correlate with a belief that a resource management system is illegitimate?

At this stage, I should clarify how I am defining 'exogenous' factors. In this chapter, I treat factors and attributes as exogenous if they are not directly contingent on the resource management system for their existence. Of course, this is a broad definition and necessarily subjective. However, it does allow us to make a distinction between factors that emerge from management decisions, and factors that have their origins outside the management system or SES in question. For instance, participation in rule-development is clearly an 'endogenous' factor, according to my definition, in that its presence depends on decisions made within the framework of any given resource management system. Conversely, fishermen in a particular SES having a long history of unionism (militant or otherwise) is not contingent on the decisions and rules that comprise a management system. Unions may have existed before a particular management system came into existence, for example. A history of unionism is therefore an exogenous factor. My definition is similar to one used by Agrawal (2001, 2003), who suggests that 'context' (or the exogenous factors that surround a resource management system) is best seen as the 'encompassing variables that remain constant for a given study but not across studies'.

6.1.1 Sampling

Following Pagdee et al. (2006), the first step in the meta-analysis was the identification of sample papers. I started by concentrating on the CPR management literature, but chose to limit the study to papers discussing fisheries management only. The rationale for focusing on fisheries alone, rather than fisheries and wetlands (the environment most similar to the Paraná delta), was twofold. Firstly, there are significantly more papers studying fisheries than there are wetlands. Secondly, wetlands contain a variety of resources. They are likely to have a variety of management systems to deal with these different resources. Unless papers distinguish clearly between management systems, it may be difficult to link certain exogenous factors with the legitimacy (or otherwise) of particular management systems. Fisheries suffer from this problem to a lesser extent, because management systems tend to focus on one resource or even one stock. The halibut IFQ system is a case in point.

I used the Digital Library of the Commons (DLC) database (http://dlc.dlib.indiana.edu/dlc/) as the source database for sample papers. The DLC is maintained by the University of Indiana at Bloomington, and contains any article published that is relevant to CPR and SES management. The DLC has the advantage of containing a significant number of papers, some of which go back to the 1980s and earlier. It is also simple to use. In particular, specific search terms produce the same list of papers on every search. The only difference between searches is that additional papers may have been added to the database in the intervening period.

Searching for papers classified under 'fisheries' produced a list of 593 papers. Once this sample was collated, I proceeded to read through the abstract (and where necessary, the introduction) of each of these papers, in order to determine whether the study in question analysed a case or cases where there was an interaction between a government resource management authority and a local community or aboriginal group. The reason for focusing on papers examining cases of this kind specifically was that papers where there is an interaction between a management authority and a local community may provide a useful proxy measurement of legitimacy. For instance, a paper may chronicle protests by a local aboriginal community against a management initiative being pushed forward by a government resource management authority. Although not a perfect proxy, it is reasonable to argue that, in a case like this, the protests against the management plan are a symptom of a

lack of legitimacy. Furthermore, by focusing on such papers, the benefits arising from larger sample sizes in meta-analysis are not lost due to the paucity of papers that measure legitimacy directly.

In determining whether or not a paper included an example of a community-government interaction, the paper had to pass a relatively low threshold. Thus, I excluded articles that focused on aquaculture, marine protected areas (MPAs), or whaling; articles that assessed the viability of proposed management interventions, rather than existing community-government interactions and management systems; and articles that investigated conflicts between fishermen (on the basis that the interactions of interest in the meta-analysis were fishermen-government interactions rather than fishermen-fishermen interactions). I included articles examining co-management systems (where government devolves some responsibility to fishermen for managing fisheries resources); articles that discussed court decisions (the rationale being that these had a direct impact on the fisher-government interactions of interest); and articles looking at the creation or rebuilding of institutions, because here too it was likely that fisher-government interactions would be affected.

I made no distinction between conference papers, journal articles, reports, discussion documents and book chapters. As a result, some of the studies included in the sample are not peer-reviewed. This is a potential weakness of the approach adopted in this chapter, but including peer-reviewed papers only would significantly reduce the number of case studies available for sampling in the DLC.

Using the selection criteria outlined above, I was left with 73 papers from the original sample of 593. Once I had collated this smaller sample, the next step in the process was to determine whether or not the management systems included in the papers were examples of legitimate or illegitimate systems, or whether the articles did not contain sufficient information to draw such a conclusion. Again, I used a variety of criteria to determine whether or not the management system in a particular case study was legitimate or illegitimate. A legitimate management system was one where the fishers affected by a fisheries management system supported the system, as manifested by a lack of complaints, protests, and ill-feeling. Particular language usually accompanied these cases: words like ‘accepted’, ‘justifiable’, ‘well-supported’, and ‘satisfied’ were used as guidance. An illegitimate management system was one where the local population expressed anger or dissatisfaction with the management

system, or complained about or protested against management decisions and rules. In studies where court decisions were discussed, the contents of any court rulings were seen as evidence that a management system was or was not legitimate. For instance, a court decision in favour of a community protest indicated that the management system that was the source of the community's ire was indeed illegitimate.

Sampling papers using these criteria was unavoidably subjective. Without direct measurements of legitimacy, deciding whether or not a case study contained an example of a legitimate or illegitimate resource management system often required a subjective judgement. I attempted to overcome this problem in two ways. Firstly, I read through each article in its entirety. In virtually all cases, it was clear by the end of the article whether or not the fisheries management system in question was legitimate or illegitimate. Secondly, I used a relatively high threshold when drawing my conclusions. Articles where I was unsure about the legitimacy of the management system were not included in the final sample.

Following this process, I finished with a sample of 26 papers (from the initial 73). Thirteen of these papers investigated resource management systems that appeared to be legitimate, although two examined systems that had started as illegitimate but subsequently gained legitimacy. The other thirteen papers included case studies where the management systems under analysis were illegitimate (excluding the two papers mentioned above). A further 28 papers (from the sample of 73 papers) had insufficient information to draw a firm conclusion; and 17 papers were incorrectly sampled (that is, the papers did not actually contain examples of fishermen-government interactions).

It is worth noting the distinction I make between papers (or articles – I use the terms interchangeably) and case studies. Case studies comprise the individual analyses included within any given paper. Thus, one paper can contain one or more case studies. In several instances in the final sample, I determined that one case study investigated in a paper included an example of a legitimate or illegitimate management system, while other case studies in the same paper did not. Of course, there were also a number of papers (indeed, the majority) with only one case study.

The qualitative nature of the results in all of these papers, as well as small sample sizes, made statistical analysis difficult. Furthermore, each paper did not necessarily represent a non-

independent datum. There were cases where two or more papers examined the same resource management scheme. Nevertheless, I used Fisher's exact test to evaluate the significance of the correlation between legitimacy and certain exogenous factors with relatively high counts in the final sample. Using Fisher's exact test was one way to overcome in part the challenges presented by small sample sizes. In addition, Fisher's exact test uses count data and does not therefore require the difficult conversion of qualitative data into quantitative data. Although an imperfect approach, choosing Fisher's exact test was the best way to incorporate some statistical methods into the analysis.

6.1.2 Coding of selected case studies

Given the difficulties associated with using statistical techniques with the data I collected, I developed a coding form to interpret the qualitative results included in the sample. In this respect, I was using a standard protocol in meta-analysis (see, for instance, Schlager, 1990; Pagdee et al., 2006). Coding protocols allow for the extraction of data from each paper in a uniform way, even if the results contained across papers vary significantly. As the papers in the sample I had collected did indeed contain a variety of results collected with a range of methods, coding was a sensible way to overcome problems associated with methodological diversity.

Although there are several existing coding protocols (for instance, the SESMAD project protocol used by Epstein et al. (2014)), none of them were suitable for the purposes of my research question. I therefore developed my own protocol, following the method employed by Pagdee et al. (2006). Pagdee et al.'s research focused on the factors that determine the success or failure of community forest management schemes. They devised a conceptual framework of reasonable measures of success, before categorising the data in their sample papers according to this framework. If a particular paper included a measure not previously considered, it was added to the framework. In a similar way, I developed a framework of factors that might reasonably influence fisher-government relations. Where my subsequent reading of the sample papers suggested there were factors I had missed, these were added to the framework, and the papers re-read with the new factor(s) in mind.

Though this is an incomplete list of exogenous factors that might impact upon stakeholder attitudes to the legitimacy of a management system, the final coding framework included the following factors:

1. Colonial legacy
2. Aboriginal and/or land treaties
3. Marginalisation
4. Experience and/or perception of government corruption
5. History of political activism
6. History of unionism
7. History of government abuses
8. History of protest
9. Suspicion of government
10. Discontent with government
11. Questioning government use of science
12. Class and/or labour identity
13. Culture and/or traditions
14. Socio-economic status
15. Government action

Each of these exogenous factors required careful definition. These definitions are included in table 16 below.

Table 16. Definitions of the coding variables.

Exogenous factor	Definition
Colonial legacy	Author(s) discussed impact of colonial government on fishing communities.
Aboriginal and/or land treaties	Author(s) discussed impact of aboriginal or land treaties, historic or otherwise.
Marginalisation	Evidence that fishers do not wield much political or socio-economic power.
Experience and/or perception of government corruption	Evidence of corruption (i.e. bribes, kickbacks, nepotism) in the day-to-day business of government.

Exogenous factor	Definition
History of political activism	Evidence that individuals or communities have long experience lobbying and/or protesting against government.
History of unionism	Evidence of union activity, including labour unions, cooperatives, and associations.
History of government abuses	Evidence of serious abuses of power and injustices by government – a more serious category than simple corruption.
History of protest	Evidence of a tendency to express dissatisfaction or interests through protest, whether street protests, demonstrations, rallies, picketing, and similar.
Suspicion of government	Predisposition to see government as a threat to liberty and prosperity; an ideological disagreement with the concept of the State.
Discontent with government	Disagreement with government decisions, interventions, and regulations.
Questioning government use of science	Evidence that fishers and fishing communities question the use and application of science by government agencies.
Class and/or labour identity	Evidence that fishers identify themselves according to facets of their background or profession.
Culture and/or traditions	Evidence of traditional modes of behaviour, customs, and ways of thinking.
Socio-economic status	Information on the socio-economic status of fishers and fishing communities.
Government action	Government interventions that affect and are relevant to the livelihoods and well-being of fishers and fishing communities.

For each paper, I determined whether or not these factors were absent or present. One of the problems with this approach is that concluding that a factor is present or absent leads to a loss of heterogeneity that may be important to the case in question (Epstein et al., 2014). There is a trade-off between heterogeneity within a case and homogeneity across cases (*ibid*). I attempted to address this issue by recording the detail associated with each factor when it appeared in a case. Indeed, these details provided the bulk of the data in the analysis that follows.

6.2 Results

I now turn to presenting the results of the meta-analysis. I begin by providing a simple description of the articles that form the basis of the meta-analysis. I then summarise the results of the coding exercise.

6.2.1 Describing the sample papers

The initial meta-analysis sample (n = 73) was comprised largely of conference papers (n = 45), followed by articles in the peer-reviewed journal literature (n = 24). One case study formed a book chapter; a further three case studies came from working papers. As mentioned, it is potentially problematic in terms of the quality of the case studies that not all of the papers included in the sample are peer-reviewed. The secondary sample (n = 26), which included the final case studies chosen for analysis, also contained more conference papers (n = 14) than any other document type. There were 10 journal articles in the sample, one working paper and one book chapter.

The 26 articles in the final sample were published between 1991 and 2014. The majority of articles in the sample were published in the 2000s (n = 20), with the remaining 6 published in the 1990s.

Within the 26 papers, 34 case studies were discussed. These case studies were global in their reach. Twelve case studies were North America-focused (including American Samoa and Hawaii); six were situated in Europe; four in Latin America (including the Caribbean); seven in Asia (including India); four in Africa; and one in Oceania.

The full list of papers included in the final meta-analysis sample is found in the appendix E.

6.2.2 Coding results

The data produced in the meta-analysis are both qualitative and quantitative (the latter in the form of count data). Figure 20 below illustrates the quantitative data. The bar chart shows the number of times in which a particular exogenous factor is mentioned in the meta-analysis sample, split by the factor's appearance in a legitimate or illegitimate case study. One factor - a history of unionism – appeared nine times (three times in legitimate case studies, six times in illegitimate case studies). Discontent with government and culture and traditions appeared

eight times each. Class or labour identities were mentioned six times. Marginalisation was present in six case studies, and questioning government competence or use of science in five case studies. At the other end of the spectrum, there was only one instance of experience or perception of government corruption, and government action. Colonial legacy impacts were not discussed in a single case study, surprising perhaps given that a number of case studies were situated in countries with colonial histories (India and New Zealand, for instance).

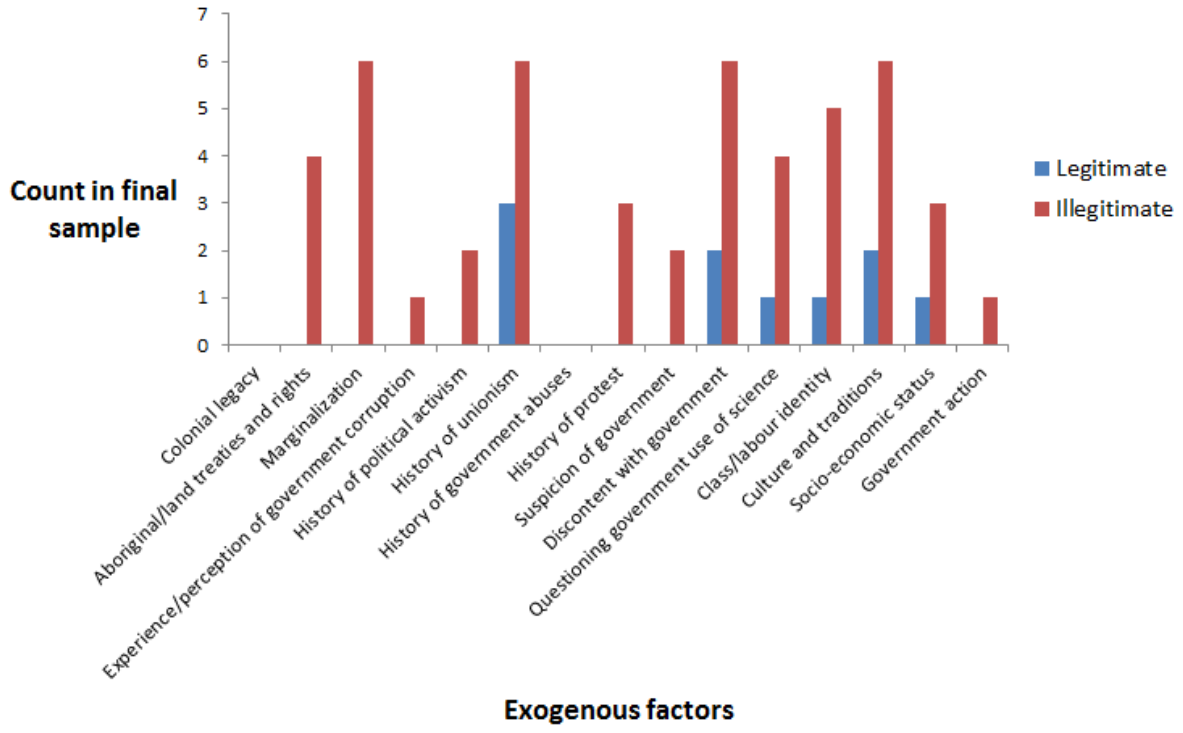


Figure 20. Count data for external factors by legitimacy or illegitimacy of case study.

6.2.3 Qualitative results

Qualitative data collected for each exogenous factor provided additional detail on the attributes and impacts of each factor. For example, the case studies revealed that one way in which labour unions had shaped fishing communities was by increasing the ease with which fishing communities could express their opinions in a political or management arena. Holm and Rånes (1996), for instance, suggested that a fishermen's union established in the 1920s had helped northern Norwegian fishermen access the polity more easily. Similarly, Barrett (1991) showed that the Bermuda Industrial Union had provided Bermudan fishermen with its

full support when disputes between fishermen and the Bermudan government on over-fishing reached a head in the 1980s. In British Columbia, the Native Brotherhood – a labour union for aboriginal peoples – played a key role in providing fishermen with representation during discussions on salmon management in the Nass and Skeena Rivers (Wright, 2008).

The case studies also provided interesting details on culture and traditions and discontent with government. For instance, a number of the fishing communities discussed in the case studies had a cultural conception of nature and CPRs[37] that were at odds with government views of and objectives for those resources. King (2011), for example, described how the Mi'kmaq First Nation in New Brunswick, Canada, viewed conservation in more holistic terms than government. For the former, conservation is linked not only to the health of fish stocks but the wider 'economic, political and spiritual well-being' of the community; for the latter, the purpose of fisheries conservation was simply to 'improve the material lives of people'. Furthermore, King notes that the Mi'kmaq believe the creator 'Kisulk' provided them with a 'divine obligation' to enjoy nature's bounty, but also to protect and preserve it. Similarly, in a case study of the São Francisco River in Brazil, de Andrade (2006) describes how fishing communities along the river conceive of it as a 'life-force' or 'Father', in contrast to government designations of the river as a commodity and source of income. In addition, some case studies emphasise how individual species or stocks have cultural significance. In New Zealand, for example, rock lobster (*Jasus edwardsii* and *Jasus verreauxi*) are culturally important to the Maori (Yandle, 2004).

In terms of discontent with government, King (2011) again provides some interesting detail. King found that the Mi'kmaq believed that policy-making at the Department of Fisheries and Oceans (the Canadian government's fisheries management arm) was 'biased and racist', 'adversarial', and 'paternalistic and condescending' between the years 1993 to 2000. Evidently, the culture at the Department of Fisheries and Oceans was in some way inimical to the Mi'kmaq's way of being and thinking. Elsewhere in the meta-analysis, Delaney (2006) describes how party political considerations meant local governments were unresponsive to the complaints of fishermen in Cambodia. This is a good example of how factors independent of a fishery (that is, party politics) can have a significant impact on a fishery's performance and on the beliefs and behaviour of fishermen.

[37] Of course, these communities would not call resources like fish stocks CPRs. The term 'CPR' is largely, if not entirely academic.

Three other factors that appeared in a number of case studies merit further elaboration: class or labour identity, questioning government use of science, and marginalisation. Class or labour identity as an exogenous factor appeared in 6 case studies, and questioning government use of science was present in 5 case studies. In three of the case studies that mention class or labour identity, the theme underpinning the factor is one of adversity and resistance against power (that is, 'David and Goliath' attitudes). Thus, Holm and Rånes (1996) describe how coastal fishermen felt some antipathy toward offshore trawl fishermen in northern Norway; King (2011) discusses the distinction 'native' Mi'kmaq fishermen made between themselves and 'non-native' fishermen; and also in northern Norway, Olson (1996) highlights how coastal fishermen considered themselves 'little guys' at odds with the State, trawlers and local fish-buyers.

In most of the case studies in which questioning government use of science was identified as an exogenous factor, the recurring theme was of fishermen challenging the competence or experience of government fisheries management organisations. For instance, Rova (2004) noted that bleak-roe fishermen in the Gulf of Bothnia (Sweden) believed officials at the National Board of Fisheries in Gothenburg were 'novices' when it came to managing the bleak-roe fishery. Similarly, Hara (2008) suggested that Malawian fishermen around Lake Mangochi believed that newly instituted 'Beach Village Committees' (local-level organisations that aimed to ensure local participation in fisheries management) were making decisions on issues in which they had little knowledge, and that those decisions were often capricious. Finally, Wright's paper (2008) on salmon management on the Nass and Skeena Rivers in British Columbia describes how the Canadian government used science to justify and legitimise the salmon management decisions it made. Significantly, however, aboriginal groups were quick to exploit inconsistencies and weaknesses in the science – particularly in respect of their application to fisheries regulations - to support their own arguments.

Two interesting observations were made in two case studies that discussed marginalisation of fishermen and fishing communities. Delaney (2006) noted that artisanal fishermen in Cambodia believed that curbing illegal fishing would be possible only with the assistance of institutions with money and power. By extension, the fishermen did not have the means – either financial or political – to address illegal fishing themselves. Thus, Cambodian fishermen are to some extent powerless to shape their own fishery precisely because they are marginalised. In the other case study (de Andrade, 2006, examining fisheries on the lower

São Francisco River in Brazil) marginalisation was linked to a lack of democratic representation. During the military dictatorship of the 1960s and 1970s, for instance, fishermen had to fight for 'citizenship rights' that had otherwise been denied. (It is unclear from the paper what 'citizenship rights' refers to, but presumably it does not mean the right to vote given that the Brazilian state was a dictatorship.) It was only in 1988, with the introduction of the Federal Constitution, that fishermen's colonies and federations – fishing associations at a municipal and state level, respectively, that were headed up by individuals who were unelected, had strong ties to local political elites, and were not fishermen – became democratic bodies.

6.2.4 Statistical results

Although the data produced in the meta-analysis are derived from qualitative findings, and although the final sample size was relatively small, it was possible to use statistical techniques in this chapter's analysis. In particular, statistical techniques allow us to determine with some confidence whether or not a particular exogenous factor predicts the legitimacy or illegitimacy of a resource management system.

The count data for a number of the exogenous factors are so low that they preclude the use of statistical methods. However, the factors with higher counts – namely a history of unionism, culture and traditions, discontent with government, marginalisation, and class or labour identities – lend themselves to analysis using the Chi-squared (χ^2) test and Fisher's exact test. The null hypothesis for each factor is as follows:

H_0 = There is no significant difference in the legitimacy of resource management systems with and without a history of unionism.

H_0 = There is no significant difference in the legitimacy of resource management systems with and without exogenous culture and traditions.

H_0 = There is no significant difference in the legitimacy of resource management systems where discontent with government is present or absent.

H_0 = There is no significant difference in the legitimacy of resource management systems with and without marginalisation.

H_0 = There is no significant difference in the legitimacy of resource management systems with and without class or labour identities.

For a history of unionism, we accept the null hypothesis[38] ($\chi^2 = 0.153$, d.f. = 1, $p > 0.05$). For culture and traditions[39], we accept the null hypothesis ($p > 0.05$). For discontent with government – which had the same count data as culture and traditions – we also accept the null hypothesis ($p > 0.05$). For class or labour identities, we accept the null hypothesis ($p > 0.05$). For marginalisation, we accept the null hypothesis ($p > 0.05$), but the result is almost statistically significant.

6.3 Discussion

The statistical findings outlined above have great value in answering this chapter's primary research question. They provide us with at least some evidence that a number of the exogenous factors hypothesised to contribute to legitimacy or illegitimacy in resource management systems do not actually do so. Thus, according to the statistics, a history of unionism, culture and traditions, discontent with government, marginalisation, and class or labour identities are not significantly correlated with legitimacy in resource management contexts.

If, as the results suggest, these exogenous factors have no impact in shaping people's perceptions of the legitimacy of a resource management system, then by extension 'other' factors may have a more important influence on legitimacy. We cannot conclude with complete confidence that these 'other' factors are endogenous because we lack statistics for the remaining exogenous factors (and, moreover, the list of exogenous factors is almost certainly incomplete). Thus, 'other' exogenous factors may still potentially have a role in influencing legitimacy. However, the identity of these exogenous factors is not clear, and my analysis of the relevant literature did not reveal any candidate factors. It will be possible to rule out the other exogenous factors included in this chapter by running statistical analyses on them too, but to do so requires increasing the sample size for each factor significantly.

[38] The χ^2 statistic and p value were calculated online at http://www.graphpad.com/quickcalcs/contingency1/. The p value was corroborated with a separate calculation in Excel.
[39] The p values for culture and traditions, discontent with government, class or labour identities, and marginalisation were all calculated using Fisher's exact test, online at http://www.graphpad.com/quickcalcs/contingency1/.

In terms of a history of unionism, culture and traditions, discontent with government, class or labour identities, and marginalisation, the statistical results are perhaps surprising. Each of these factors could ostensibly have a significant impact on perceptions of legitimacy in resource management contexts. Indeed, other literature emphasises the importance of history, culture and institutions (amongst others) to the success of, for instance, NGO-led natural resource management projects in the developing world (Black and Watson, 2006). This apparent discrepancy between the quantitative results produced in the meta-analysis, and the qualitative conclusions drawn in other papers is worth examining further.

Unions, for instance, can shape opinions of management authorities in a number of ways. At one level, unions often provide a balance to the power of business and political elites (Acemoglu and Robinson, 2013). Support from unions can therefore enable fishermen and other stakeholders in a resource management system to interact with authorities and other interest groups on a similar political footing. Unions form a 'public sphere' in which stakeholders can have a voice (Ishihara and Pascual, 2009). This is especially significant in some fishery management systems because fishermen are often marginalised in both a political and socio-economic sense (Béné and Fried, 2011). They may wield limited political power, and are therefore more easily ignored by government. Clearly, the fairness – in both an absolute and procedural sense – of this situation is dubious. Unions go some way toward addressing these issues by changing political equilibria in favour of fishermen.

This argument also suggests that a history of unionism and union representation can enhance communication and shape participation in resource management systems. In particular, unions allow members to engage in political processes that might otherwise be closed to them. Holm and Rånes's (1996) make this point when they note that fishing unions facilitate 'access to the polity' (see page 241). In addition to changing political equilibria and the power wielded by their members, then, unions can provide opportunities for participation and dialogue in a management process that individual fishermen may otherwise lack. On both counts – political power, and communication and participation – one might expect that a history of unionism is positively correlated with perceptions of legitimacy in a resource management system. In this light, the statistical results from the meta-analysis are counter-intuitive.

The results produced by Fisher's exact test for culture and traditions, class or labour identities and discontent with government also suggest that these exogenous factors do not significantly affect perceptions of legitimacy in resource management contexts. As with a history of unionism, this is unexpected. Culture and traditions in particular can have powerful effects on people's behaviour and their attitude toward management authorities (Mosse, 1997). In his study of fisheries in Malawi, for instance, Hara (2008) indicated that customary tribal authority had diminished the standing of government-backed Beach Village Committees (BVCs) amongst local fishermen. BVCs were government-instituted organisations that aimed to increase local-level participation in the fishery. However, traditional community leaders, who were not necessarily included in the BVCs and who still wielded significant authority as a result of tribal customs, disputed and diminished the standing of the BVCs. Hara's case study goes to the heart of questions about legitimacy. The conflict he describes arises because the legitimacy of the BVC's authority had not been established as strongly as it was for tribal leaders.

This example suggests strongly that the conclusions drawn from the statistical analysis about culture and traditions should be treated cautiously. Cultural or traditional notions of legitimate authority can conflict with a government's authority. Hara's research demonstrates this principle neatly. It is clear, then, that there are instances in which culture or traditions can have a significant impact on perceptions of legitimacy in resources management systems. This nuance is missed in the statistical analysis, and is of significant interest. It also raises an important question: to what extent can an exogenous predisposition to feelings of illegitimacy be put aside when the internal features of the management system itself give no reason for a charge of illegitimacy to arise? For instance, the problems surrounding BVCs in Malawi could be resolved by equitable decision-making that provides a role for traditional community leaders in the BVC (thus satisfying procedural fairness). Indeed, if difficult decisions about trade-offs in a resource management system satisfy pre-agreed criteria, then exogenous factors should for the most part be eliminated from the management system itself. Arguably, exogenous factors should only resonate in a management system which provides evidence that exogenously-derived perceptions of illegitimacy are replicated in the management system itself. This is an important observation as it resides alongside the point that experiential learning - leading to trust drawn from communication, participation and being treated in a procedurally fair manner - may well lead

a participant in a management system to overcome an exogenous pre-disposition towards the illegitimacy of decision-making institutions.

In the case of Malawian BVCs, the government's management system was not appropriately designed to consider or to respect the traditional leadership provided by tribal community chiefs. Thus, the perception that the new management system lacked legitimacy arose not because of the pre-existence of traditional tribal authority, but because such authority was not sufficiently reflected in the system.

A critical analysis of other case studies included in the meta-analysis sample further supports the ideas suggested by Hara's case study. For instance, in a paper examining the response of Mi'kmaq aboriginal people in New Brunswick, Canada, to fisheries management efforts by the Canadian government, King (2011) noted that the Mi'kmaq believe they have unique sovereignty over natural resources as a result of rights and responsibilities given them by Kisulk, the Creator (see again section 6.2.3). Thus, Mi'kmaq 'cultural sovereignty' is derived from a higher authority than that invoked by government, say. Claims for the legitimacy of government-led resource management systems that rest on the legality and natural authority of government interventions are therefore weakened because government is perceived to have less authority relative to the community itself; the community's authority and sovereignty over fisheries and other natural resources flows from Kisulk itself. Furthermore, the Mi'kmaq have different conceptions of conservation and the aims of resource management compared to government resource managers. For the latter, resource management is couched in scientific terms and concerns the enhancement of fish stocks and the improvement of economic and social structures in (aboriginal) communities. For the Mi'kmaq, conversely, resource management is a holistic process that is linked not only to the health of fish stocks but to the 'economic, political and spiritual well-being of the wider community' (King, 2011).

Interestingly, these cultural beliefs have not shaped perceptions of judicial and government interventions in the New Brunswick fishery in a consistent way. In 1999, for instance, the Canadian Supreme Court ruled in its Marshall decision that Mi'kmaq people had a treaty right to fish and to earn a 'moderate livelihood' from the fishery. In addition, any imposition by the Canadian DFO of close seasons and licences represented an 'unreasonable interference' on these treaty rights. In a subsequent clarification – Marshall II – the Supreme

Court ruled that these treaty rights could only be limited when there was justification to do so on conservation grounds. Crucially, the Court's decision in Marshall was greeted 'with joy' by the Mi'kmaq. Arguably, the reason why Marshall provoked such a warm response was that it reflected the Mi'kmaq's exogenous cultural beliefs about their sovereignty. Indeed, King notes that the Mi'kmaq believed Marshall was an 'affirmation of their treaty rights to earn a livelihood from the fishery' – and, for the Mi'kmaq, the legitimacy of these treaty rights ultimately rested on the Mi'kmaq's cultural and traditional ties to the fishery.

Conversely, Mi'kmaq perceptions of interventions by the DFO were negative. In section 6.2.3, I mentioned that the Mi'kmaq believed that the DFO was 'biased and racist', 'adversarial', 'paternalistic', and 'condescending' in its attitudes and relationship to the Mi'kmaq. In addition, the Mi'kmaq believed the DFO had 'mismanaged' the fishery. Conversely, the DFO was anxious about the Mi'kmaq system of fisheries management, and also expressed concern that the integrity of fish stocks was at stake. More importantly, however, the Mi'kmaq perspective was that the DFO's interventions were 'intended to separate them [the Mi'kmaq] from their lands and resources'. Indeed, King suggests that some Mi'kmaq people feel that the DFO's focus on conservation is a 'convenient excuse for maintaining control over the community and its resources'. Arguably – and unlike Marshall – the DFO's actions in this instance were illegitimate because they did not sufficiently address the Mi'kmaq's cultural beliefs on sovereignty over the fishery. On the other hand, if these beliefs had been reflected in the DFO's management decisions, then it is likely that the decisions would have been perceived as legitimate.

The key issue, then, was that the DFO did not conduct itself and did not design its management plan in a culturally appropriate way, from the point of view of the Mi'kmaq. In general, a management system that is designed such that it contradicts or fails to account for traditional and long-held beliefs about natural resource management is unlikely to be legitimate. The issue here is normative. Cultural and traditional ideas can lead to disagreements about how natural resources ought to be managed. Mosse (1997) makes a similar point when noting that the 'cultural and symbolic construction of common property has a bearing on the way that these resources are (or have been) managed or mis-managed'.

This conclusion is particularly interesting in light of the legitimation function criteria. It is clear from King's case study that the DFO failed to satisfy at least one of the legitimation

function criteria (communication) during its dispute with the Mi'kmaq. There are several problems evident in the DFO's conduct (although it is probable that both parties are partly to blame). Firstly, the DFO and the Mi'kmaq were concerned by different issues. For the DFO, the crux of the matter was fisheries access and resource management; for the Mi'kmaq, it was governance, rights and sovereignty (the very issues which had a cultural component for the Mi'kmaq). Problematically, however, the government appeared interested only in the issues which it deemed important; indeed, it 'disallowed other topics from the conversation' (King, 2011). This position is hardly conducive to clear, honest dialogue. It actually suggests that the government was unwilling to listen to the Mi'kmaq. Moreover, the Mi'kmaq did not believe the DFO's sincerity when it claimed that the only issue at stake was conservation. Instead, they believed that the DFO was motivated by a desire to reassert control over the fishery. Arguably, this situation arose precisely because the DFO was failing to communicate its intentions clearly and sincerely. Finally, the government's attempts at mediation fell flat. A government-appointed mediator was accused by the Mi'kmaq of being 'disinterested' in their concerns; in turn, the Mi'kmaq were blamed for making 'unreasonable' demands.

It is clear, then, that dialogue between government management authorities and the Mi'kmaq was limited and often fraught. The honest and ready exchange of information and views supposed by the legitimation function was apparently absent. Indeed, the breakdown in the relationship between the two parties is arguably attributable in part to poor communication. Interestingly, the dispute between the DFO and the Mi'kmaq finally ended when the Mi'kmaq's Band Council elected a leader who was 'more willing to work with government than the sovereigntist activists at the forefront of the dispute' (King, 2011). The implication is that clear, honest dialogue was re-established following this election, and with that, a solution to the differences between the two groups emerged.

Thus, communication (or a lack thereof) appears to have played an important role in shaping perceptions of legitimacy in the New Brunswick fishery examined by King. More importantly, the perception that the DFO's management interventions were illegitimate was attributable to the DFO's failure to reflect the Mi'kmaq's cultural beliefs in the design of their management plans. Clearly, the two issues are linked; with better communication, the Mi'kmaq may have been able to convey how management could reflect their cultural beliefs, and in turn the DFO could have demonstrated how they had adjusted their plans accordingly.

The conclusions drawn from the critical analysis of King's research are at odds with the conclusions from the statistical results. Culture and traditions can have an impact on perceptions of legitimacy in resource management systems, but only insofar as a management system reflects cultural beliefs and traditions. Thus, it is not culture or tradition that leads directly to legitimacy or illegitimacy; instead, design flaws in the management system that fail to account for the essential continuity of culture and tradition in the life experiences of resource management system stakeholders lead to illegitimacy.

This argument extends to other exogenous factors. The statistical results suggest that class or labour identities do not have a significant effect on legitimacy, but critical analysis indicates otherwise. In particular, class or labour identities can group people much like unions do and therefore have an impact on communication and participation. (In turn, it is hardly surprising that unions often represent one particular class or trade.)

For instance, Holm and Rånes (1996) and Olson (1996) describe how fishermen distinguished between themselves based on the particular fleet and sector to which they belonged. In these case studies, coastal fishermen viewed themselves and their interests as separate from offshore trawler fishermen. Furthermore, coastal fishermen felt that there was a tension between their interests and those pursued by government. These beliefs are important to perceptions of legitimacy at two levels. Firstly, they probably reduce goodwill and trust in government and other stakeholders, and therefore have a direct impact on legitimacy. Identifying as a small-scale coastal fisherman can lead to the perception that there are other groups with interests that are not necessarily aligned with one's own. A divergence of opinions on the design and objectives of a resource management system, say, can be sufficient to cause a loss of trust between different groups and therefore undermine a management system's or a group's legitimacy.

Secondly, a failure to account for class or labour identities in a resource management system may mean that the system is inappropriately designed and therefore illegitimate. Thus, class or labour identities can have an impact similar to culture and traditions, in that their reflection in a management system can shape perceptions of legitimacy. Class or labour identities are perhaps types of biases or predispositions which can be carried into a resource management system and prejudice one's conduct. We have already seen one example of this in the paragraph above – the belief amongst coastal fishermen that government was pursuing an

agenda inimical to their own interests would have had an impact on coastal fishermen's trust in government. However, having an awareness of these biases and prejudices can allow resource managers and stakeholders alike to account for them. Thus, when entering into a resource management system, it is important to 'leave behind' one's predispositions and recognise the impact they can have on one's conduct and perceptions. In some instances, a voluntary commitment to do this may be sufficient; in others, it may be necessary to require managers and stakeholders to sign a 'code of conduct' that binds them to be conscious or mindful of predispositions like class or labour identities to the extent that these prejudices may undermine resource management decision-making processes.

The final exogenous factor that the statistical results suggest has a non-significant effect on legitimacy is discontent with government ($p > 0.05$). Discontent with government is defined broadly as disagreement with government decisions, interventions and regulations that are not directly related to the fisheries management system in question. In the meta-analysis case studies, the causes of discontent with government were varied; they ranged from bureaucratic hold-ups (Rova, 2004) to concerns that fisheries management organisations were withholding information and refusing to communicate on party political grounds (Delaney, 2006). Although these are likely to be irritants, it is difficult to see how they could threaten the legitimacy of a resource management system directly. They are not serious enough to represent a threat to the legitimacy of government organisations themselves. Instead, the causes of discontent with government (if any) are likely to impact the legitimation function criteria. For instance, withholding information on party political grounds clearly fails to satisfy the communication criterion. It may also be deemed procedurally unfair, in that withholding information because of party politics is biased and favours some people over others.

The statistical results for discontent with government therefore match the expectations produced by a critical explanation of its impact on legitimacy. Any impact it does have seems to be through the legitimation function criteria. Marginalisation is the other exogenous factor for which the conclusions from the statistics are similar to those from critical analysis. The statistics suggest that marginalisation does not have a significant impact on the legitimacy or illegitimacy of a resource management system ($p > 0.05$), but the result is only weakly insignificant. Indeed, a χ^2 test produces results that are only just insignificant ($\chi^2 = 2.991$, d.f. = 1, $p > 0.05$). Although both tests indicate that marginalisation does not have a

significant role in shaping perceptions of a resource management system's legitimacy, the weakness of the results suggest further analysis is worthwhile.

One way in which marginalisation would appear to shape legitimacy is through its impact on trust. Almost by definition, marginalisation means people are isolated from and even at odds with government and other authorities. A situation like this is bound to influence how people think about government. For instance, powerlessness – manifested perhaps as an inability to express one's concerns to government, and evidence that government does not respond to these concerns in any case – can lead marginalised people to conclude that government or other authorities are fundamentally inimical to their interests. Mistrust emerges and grows in such situations. Other features of marginalisation like disenfranchisement or poverty can also shape trust. Thus, it is reasonable to argue that marginalisation can and does have an effect on perceptions of legitimacy. However, the effect is not direct; it is mediated through legitimation function criteria like trust.

It is worth noting that the key point in this argument is not that resource management systems lead to marginalisation, and that marginalisation in turn causes a perception that the system lacks legitimacy. An argument along these lines would connect legitimacy to management outcomes, even though I suggest in chapter 4 that legitimacy is frequently independent of outcomes. Instead, I am suggesting that marginalisation changes the way one thinks about government and its objectives, which in turn can establish the conditions that cause one to question government's legitimacy. The role that procedural fairness and trust play in this process may be of some importance. Tyler (2001) notes that the 'key antecedent of being viewed as trustworthy is to use fair procedures'. But marginalisation may induce the perception that government is failing to treat people fairly, especially if marginalised people attribute their difficulties to government actions (or inaction). Without positive perceptions of procedural fairness, trust in government is diminished and perceptions of legitimacy are damaged.

6.3.1 Other exogenous factors

Of course, the meta-analysis included some exogenous factors for which we do not have statistical results (for instance, socio-economic status and colonial legacy). This limits discussion of these factors. Nevertheless, there are some interesting parallels between the

two sets of factors. In particular, there are similarities between the impact that class or labour identities can have on perceptions of legitimacy, and the effect of socio-economic attributes like caste.[40] Kurien (1991) provides an example that demonstrates this idea practically. In Kerala state, India, fishing has historically been caste-bound; that is, only members of a particular caste could seek their livelihoods through fishing. Up until the 1960s, fisheries in Kerala were artisanal and relatively low-impact ecologically. But modernisation reforms in the 1960s changed fishery dynamics, especially with the introduction and spread of shrimp farming. The response of fishing castes to the degradation of their fisheries is noteworthy. They organised state-wide protests to demand state regulation of what they perceived were destructive fishing practices. This reaction was not defined by narrow self-interest; it also depended on what fishermen perceived as an 'infringement of their traditional rights at sea' (Kurien, 1991). In addition, it created a 'new sense of unity' (*ibid*) amongst the fishermen.

Thus, caste-bound fishermen formed groups in response to fisheries reforms that did not just threaten their livelihoods but also offended a perceived right to access and use the fishery in a traditional way. Arguably, this right was tied in with caste identities because the reforms had opened up fisheries to people of different castes who would not traditionally have been able to access them. Kurien's case study therefore provides us with some support for the argument that the perspectives and values produced by particular cultural outlooks, class identities or socio-economic attributes (like caste) can unite people and cause them to perceive resource management initiatives as inimical not just to their interests but also to their values. Indeed, it is unsurprising that caste fishers should protest reforms that were damaging fisheries and weakening fisheries management systems that had probably existed for decades, if not centuries. As with BVCs in Malawi and the Mi'kmaq in New Brunswick, the reforms described by Kurien failed to reflect important cultural and socio-economic attributes and so lacked legitimacy.

Two other exogenous factors for which we do not have statistical results also merit discussion. The first of these is questioning government competence in, and use of science. The paper from Wright (2008) is especially useful in this respect. In Wright's case study, officials from the Skeena Salmon Management Committee in British Columbia, Canada, used

[40] Of course, it is debatable whether caste would be more appropriately coded as 'class or labour identities' than 'socio-economic status'. The rationale for including caste in the socio-economic status code was that caste is not merely a question of class or trade; it also has ramifications for an individual's economic, social and political standing, and was therefore seen as being a broader issue than class or labour alone.

science to legitimate the management decisions they made. Scientific data provided the evidence needed to show that management decisions were impartial and objective. In effect, the use of science and scientific data demonstrated procedural fairness in decision-making processes.

However, the case study is instructive because these same data were used by aboriginal stakeholders to dispute some of the Management Committee's decisions. Even with scientific backing, the Management Committee was not able to legitimate its management interventions consistently. In particular, as much as science can provide an impartial and objective basis for management decisions, it can also create uncertainties that cloud decisions. For instance, Wright notes that aboriginal groups in British Columbia were quick to spot inconsistencies between the science used by the Management Committee and its application. In one case, the Management Committee had proposed opening sub-areas outside the mouth of the Nass River to fishing before allowing fishing on the Skeena River. These sub-areas were of interest because pink (*Oncorynchus gorbuscha*) and sockeye salmon (*Oncorhynchus nerka*) swam through them on their way to the Skeena, a fact that had been confirmed in tagging studies organised by the Management Committee. However, aboriginal leaders used this information to argue that it was illogical to allow these salmon to be caught outside of the Skeena River when fishing was prohibited in the Skeena itself. It was also inconsistent with the Skeena Salmon Management Committee's stated conservation aims. The argument was successful, and the Management Committee backed down on its proposal.

In another case, the methods used to collect data on salmon were criticised by aboriginal people. Wright notes that a fisher from the Gitxsan community objected to tagging studies and the practice of catching smolts[41] in screened traps to count and mark them. The fisher claimed that the latter method 'increased mortality of young fish' (Wright, 2008). Similarly, at a meeting in an aboriginal community well upstream on the Skeena River, people complained about counting fences and the stripping of pink salmon eggs for an experimental hatchery. These methods interfered with the salmon in a way that was ecologically damaging and culturally inappropriate, insofar as many aboriginal people felt that salmon should not be interfered with unless they were being caught for food.

[41] A smolt is a juvenile salmon that is approaching the stage where it can swim to sea for the first time.

Thus, the Management Committee's use of science and scientific data did not always give their decisions legitimacy. Interestingly, the science that was disputed by aboriginal groups was, perhaps, not as rigorous as it might have been, thereby giving people some justification for their complaints. For instance, the proposal to open sub-areas outside the Nass River before fishing on the Skeena River was allowed was irrational in light of the evidence that showed Skeena-bound salmon swam through those sub-areas before reaching the Skeena itself. The conservation objectives implicit in closing the Skeena would have been contradicted by permitting fishing in those sub-areas. Similarly, people's complaints that egg stripping was interfering with salmon were reasonable. Handling salmon can damage their skin and increase the likelihood of infections (Rottman et al., 1992).

Questions about the use of scientific data therefore arise when there are problems with the methods used to collect it, or problems with its underpinning logic. Conversely, science that is properly executed is difficult to contest, and therefore unlikely to contribute to perceptions of illegitimacy. This conclusion is important in the context of this chapter because it suggests that questions about how science is used, and the competence with which it is applied, can indeed shape perceptions of legitimacy. However, it is difficult to determine whether its impact on legitimacy is truly exogenous or whether it is mediated by legitimation function criteria like procedural fairness. On one hand, the key issue is the rigour with which scientific data is collected and used; on the other, questions about impartiality and objectivity and therefore procedural fairness are inextricably linked to these issues. In either case, it is incumbent on resource managers to demonstrate that the science they have used to justify their decisions is the best available. Doing so avoids the problems described by Wright. It also re-emphasises the importance of designing management systems appropriately.

The other exogenous factor that merits discussion despite the lack of statistical results is historic land treaties and legal decisions that provide aboriginal people with rights to their traditional territories. These treaties and judgements may shape perceptions of legitimacy in and of themselves. Resource management systems are frequently nested in legal frameworks that include these treaties. For instance, Spangler (1998) describes how fisheries management in Wisconsin, United States, was influenced by treaties signed in 1836, 1837, 1842 and 1856. These treaties ceded traditional territories to the U.S. government (1837 and 1842), but also described the natural resources to which Native American tribes were entitled.

Of course, the legality and therefore legitimacy of a natural resource management system is questionable if it contravenes any of these treaties. Furthermore, because many treaties address delicate questions about the traditional rights and sovereignty of aboriginal groups, they raise the kinds of cultural issues already discussed. The impact of treaties and legal decisions on legitimacy is therefore twofold. There is the narrow question of a resource management system's legality within the framework provided by the treaties. There is also the broader question of cultural sensitivity, and the extent to which the treaties adequately capture deep-seated cultural beliefs and values. If a treaty fails to encapsulate these values, then it may be deemed illegitimate in a cultural sense. By extension, a resource management system that is nested in a framework of illegitimate treaties may itself be illegitimate. This argument is similar to the one made in the introduction to this chapter, in which a resource management system is perceived as illegitimate because it is a branch of an illegitimate government. Thus, treaties can provide a management system with a culturally appropriate frame. They can also fail to provide such a frame, in which case the legitimacy of the management system is itself questionable. This analysis also calls to mind Coicaud's discussion on legitimacy and legality, in which he points out that claiming legitimacy on the basis of due legal procedure is unsatisfactory because it ignores the *content* of the law (see section 4.1, chapter 4).

6.3.2 Do exogenous factors affect legitimacy through the legitimation function criteria?

Throughout this discussion, I suggest that exogenous factors can have an effect on legitimacy through the legitimation function criteria. Marginalisation, for instance, may influence perceptions of legitimacy because it shapes people's trust in government. Unionism can increase access to the polity and therefore facilitate communication and participation. Discontent with government is often the result of government agencies failing to satisfy one or more of the legitimation function criteria. These observations raise an interesting question – do exogenous factors have an impact on legitimacy in and of themselves, or is their effect mediated through evidence for the presence or absence of the legitimation function criteria in resource management systems?

The data produced in the meta-analysis do not provide a firm answer to this question. Any conclusions drawn are therefore tentative at best. However, the preceding discussion does point toward a number of possibilities. For some exogenous factors – notably discontent with

government, a history of unionism, and marginalisation – the analysis suggests that at least part of their influence on legitimacy is a result of their effect on the legitimation function criteria. For instance, a history of unionism shapes perceptions of legitimacy in part because it facilitates communication and participation. It may also have an impact on legitimacy through procedural fairness. Consider, for example, the factors that underpin procedural fairness (see Leventhal, 1980, and chapter 4). Leventhal suggests that neutrality of decision-making, and consideration of group opinions, are both important in determining whether or not a process is fair. It is evident that political processes skewed in favour of elites are unlikely to satisfy either of these criteria. By changing political equilibria, unions increase the likelihood that political processes do not benefit elites alone. In turn, these processes are more likely to be neutral and consider group opinions. Perceptions of their procedural fairness will improve. Thus, unionism's impact on legitimacy may be mediated through the legitimation function criteria even in instances where its proximate impact (changing political equilibria) is not obviously related to the criteria.

If this line of argument is correct, it is not a history of unionism *per se* that influences perceptions of legitimacy. Instead, it is the effect that unionism has on the criteria that underpin legitimacy. In addition, satisfaction of the legitimation function criteria will give unionists no cause to complain about the legitimacy of a resource management system, even if the system's outcomes are not in their interests. This argument can be extended to marginalisation and discontent with government. Discontent with government is often attributable to a failure to satisfy one or more of the legitimation function criteria. The example from Delaney (2006), where fishermen were not furnished with information they requested on party political grounds, is a case in point. There is a clear communication failure that provides fishermen with good reason to complain and to question the legitimacy of management authorities. Similarly, marginalisation can affect people's trust in government. A failure by government or other authorities to engage with marginalised people and their concerns can give these people the basis on which to question an authority's legitimacy.

Conversely, culture and traditions and class or labour identities may have an impact on perceptions of legitimacy that is independent of the legitimation function criteria. Both these factors provide a lens that shapes an individual's perception of the world, including their understanding of SESs and the natural resources contained therein. Both factors can also

unite people into groups on the basis of shared identities and values. These facets of culture, traditions, and class or labour identities are significant for legitimacy. They can cause people to have conceptions of resource management systems that are fundamentally distinct to those espoused by resource management authorities. King's (2011) case study of the Mi'kmaq in New Brunswick is an excellent demonstration of this point. Crucially, a failure to reflect aspects of culture, traditions and class or labour identities in a resource management system can lead to the perception that the system is illegitimate. In New Brunswick, the DFO's management proposals were illegitimate because they did not account for the Mi'kmaq's beliefs about sovereignty. Thus, exogenous factors like culture and class identities influence a management system's legitimacy only when a broader sense of illegitimacy (or legitimacy) resonates within the management system itself.

Of course, one way to ensure that exogenously-derived illegitimacy is not reflected in a management system is to communicate clearly and honestly, to facilitate participation, and to make decisions in a way that meets basic standards for procedural fairness. Thus, the legitimation function criteria continue to have an important role to play even in instances where culture, traditions and class or labour identities shape perceptions of legitimacy. A resource management system may be illegitimate because it contradicts cherished ideals, but a process of dialogue and participation can ensure that the system does in time account for those ideals. Indeed, it is reasonable to suggest that the legitimation function criteria represent the best way to ensure that exogenous factors are appropriately reflected in a management system.

6.4 Conclusions arising from the meta-analysis

There are three main conclusions to draw from the discussion above. The first is that - despite statistical evidence to the contrary in a number of cases - exogenous factors like a history of unionism, class or labour identities, culture and traditions, discontent with government, and marginalisation may indeed have an impact on perceptions of legitimacy in resource management contexts. These factors can colour attitudes to new management systems. Secondly, the effect that some of these exogenous factors have on legitimacy is not direct. Instead, their influence is mediated through the four legitimation function criteria introduced in chapter 4. In particular, marginalisation, a history of unionism and discontent with government may shape legitimacy because they affect trust (marginalisation), or

facilitate or are symptoms of a lack of communication and participation (a history of unionism and discontent with government). They may also have consequences for procedural fairness.

Thirdly, the remaining exogenous factors – class or labour identities, and culture and traditions - also affect legitimacy. Both of these factors can shape perceptions of legitimacy in contexts outside a resource management system. When these exogenously-derived perceptions of legitimacy or illegitimacy are not addressed in a resource management system, the perception (whether positive or negative) can transfer through to the management system itself. The solution to this problem is to ensure that a management system's design accounts for and reflects exogenously-derived perceptions of legitimacy. Of course, it is not possible to correct for exogenous factors entirely. The best that can be hoped for is a management system that is designed in a deliberate fashion with these factors (and the legitimation function criteria) in mind.

This analysis and the conclusions drawn from it are a useful point of departure for further research. In particular, it would be interesting to extend the meta-analysis to a significantly larger sample. Coding a larger sample of papers would produce higher counts for individual factors and therefore increase the power of any statistical tests performed on the data. One of the limitations of the present study is that the final meta-analysis sample is so small that the results produced by statistical techniques require cautious interpretation. In addition, it would be worthwhile developing a coding procedure that is more closely linked with existing literature. This is another weakness of the meta-analysis in this chapter. The definition of external factors is not grounded in the SES framework, say, or in existing coding protocols. As mentioned, this is in part because other coding protocols were not immediately suitable for this chapter's research question. Nevertheless, the standalone nature of the coding protocol is problematic because it limits the chapter's relevance to other meta-analysis studies. It cannot be compared to other meta-analytic approaches, for instance. Indeed, the only way in which this chapter could form the foundation of comparative research is if other studies adopt the coding protocol. Finally, we cannot come to a quantitative or qualitative conclusion about the relative importance of exogenous factors. This is a 'degrees of influence' problem. The answer is likely to be context-dependent.

Despite these limitations, the meta-analysis has produced some worthwhile results. Most importantly, it suggests that legitimacy in resource management contexts is not solely a product of satisfying the legitimation function criteria. Instead, exogenous perceptions of legitimacy can flow into a resource management system if there is no evidence in the management system itself that the exogenous perceptions are being accounted for and addressed. Interestingly, a similar conclusion is drawn by Brown and Lassoie (2010) in a study of decentralised community-based forest management in Cameroon. They found that inappropriate forest management institutions are those that 'did not reflect local systems of accountability in resource management'.

Chapter 7 Primary research conclusions

This thesis has two distinct strands running through it. The first strand is an exploratory investigation of two government-led resource management systems. The investigation attempts to outline, in broad terms, why these systems are both achieving and failing to achieve their ecological and socio-economic goals. The second strand builds on an observation made in both case studies, namely that perceptions of the legitimacy of the resource management systems has had a material effect on their performance and outcomes. I have attempted to build a richer understanding of the factors that lead to positive perceptions of legitimacy. I have also tried to establish whether or not some of these factors are present in the two resource management systems under study.

There are broad conclusions to draw from each of these strands, and I will outline them chapter by chapter in the sections that follow. Before I do so, however, it is worth coming to a summary conclusion of the thesis. Arguably, there are two key points that emerge from my research. The first is that perceptions of legitimacy are important to the success or failure of resource management systems. In other studies, the focus is on the design principles that characterise successful community-based resource management systems (see, for instance, Cox et al., 2010), or on the impact of property rights (Agrawal, 2001; Baland and Platteau, 1996). There is also an extensive literature on the impact of factors like communication, heterogeneity (Cardenas et al., 2011), reciprocity, reputation, and trust (Ostrom, 2009) on CPR management (and collective action). Legitimacy is often mentioned in this literature, but has received little attention. Nevertheless, at both a theoretical and empirical level, it is apparent that legitimacy can have an effect on resource management outcomes that is as significant as these other factors.

From a theoretical point of view, there is a clear connection between legitimacy and compliance with management rules (Nielsen, 2003). Compliance is often interpreted in narrow economic terms. Individuals are seen to choose to comply depending on the benefits and costs of rule-breaking. However, it is indisputable that compliance can also be attributable to an internal perception that following rules is ‘right’ and rule-breaking is ‘wrong’. In these circumstances, a sense that the rules are legitimate increases the likelihood that an individual will follow them because it is the ‘right thing to do’. Thus, compliance is

not always and solely a question of cost-benefit analysis; it is also grounded in the norms subscribed to by an individual, and his belief in the legitimacy of authorities and rules.

Of course, this conclusion has significant implications for resource management. It suggests that the perception that a resource management system is legitimate can benefit rule compliance. Although it is too simple to conclude that a successful resource management system is one with high rule compliance, it is clear that having stakeholders comply with the rules framework helps a great deal. Consider systems where rule compliance is negligible. In cases where there is a limit on resource extraction, and that limit is ignored, low compliance is likely to be problematic and detrimental to long-term resource sustainability. Thus, legitimacy can shape the success of a resource management system through its effect on compliance.

There is an additional theoretical consideration with legitimacy, namely that legitimacy is overlooked in the resource management literature. However, it is possible to infer it in several of Ostrom's design principles for long-lived, sustainable resource management systems. In particular, the principle that resource users should be able to make and modify the management rules that affect them (Ostrom, 1990; 2010) could, in theory and if actually elaborated, relate to questions about legitimacy and the procedural fairness criterion of legitimacy. Arguably, the reason why this design principle is important is that management rules which stakeholders are unable to design or modify are unlikely to be perceived either as fair or as legitimate. This sentiment is probably exacerbated further if the management rules also produce outcomes that are detrimental in some way to the stakeholders themselves. Thus, although Ostrom does not refer to legitimacy in describing the design principle, it is the issue at the principle's core. Clearly, however, legitimacy is merely implicit in the principle and so a more sophisticated elucidation is needed to understand legitimacy more completely.

At an empirical level, the data from the two case studies suggest that perceptions of legitimacy are acknowledged implicitly, if not directly by stakeholders in the two management systems. In the Paraná delta, the feeling that PIECAS lacks legitimacy was evident during interviews with a range of stakeholders. The converse was true in Seattle, where almost every interviewee was convinced that IFQ management is at heart a legitimate system. More importantly, both the interview data and the survey data suggested that stakeholders believed legitimacy was a significant factor in influencing management

outcomes. Although these data cannot tell us anything about the causal mechanisms that link perceptions of legitimacy to management outcomes, it is striking that there was a belief that a factor as intangible as legitimacy could have a material effect on the way in which a management system performs. In this respect, legitimacy is perhaps similar to factors like trust or social capital. It is difficult to define or to quantify, but nevertheless has a profound influence on the function of resource management systems.

Thus, there is at least some reason to believe that legitimacy has a), an important role in CPR and SES management; and, b), merits further investigation, especially in light of the limited attention it has received in the CPR management literature to date. Of course, the thesis is built around these two observations. In the section that follows, I summarise the conclusions and contribution made by each chapter. In the first half of the thesis, the aim is to develop a broad understanding of the institutional success and failure observed in the fishery and in the Paraná delta. The chapters that make up the second half of the thesis improve the precision with which we talk about legitimacy (Geertz, 1973).

7.1 Chapter conclusions

7.1.1 Chapter 3 – 'Two resource management case studies'

There are a number of distinct conclusions to draw from the exploratory case studies that make up the core of this thesis. Firstly, and perhaps most importantly, the case studies provide us with an indication of some of the factors that shape and have shaped PIECAS and halibut IFQs. The former's difficulties are arguably attributable to: legislative fragmentation; un-implementable objectives; a lack of communication and participation; factors relating to political economy; a lack of familiarity with the delta amongst the decision-makers in charge of PIECAS; the plan being a short-term political fix to a crisis; and a lack of legitimacy. The latter's overall success relative to the derby fishery is linked to: the appropriateness of IFQs as a tool to solve the derby fishery's fundamental economic problems; the leadership effect from British Columbia's IVQ programme; the bottom-up trajectory followed during the IFQ programme's development; the expertise of the scientific and management organisations involved in the fishery; the separation of risk assessment from risk management in the fishery; a cultural legacy that encourages conservatism; and positive perceptions of legitimacy.

Clearly, the range of factors putatively affecting PIECAS and the fishery is broad. Given that the factors identified were based on people's opinions rather than experiments, and in light of the case-specific nature of the studies, I was unable to draw conclusions about causal mechanisms or the relative importance of the factors. Nevertheless, the sheer variety of factors in the case studies is striking. So too is the observation that the design of the management system, and the conduct of the management organisations, is not the only issue at play. In each case study, there are wider political and socio-cultural issues that ostensibly have an important effect on each management system.

The literature has identified an equally large and complex variety of conditions or factors that facilitate successful CPR management (see, for instance, Agrawal, 2002; Wade, 1988, chapter 10). Wade, for example, found 14 different conditions to be important in managing south Indian commons. Thus, the observation that a number of factors play a role in PIECAS and the fishery is consistent with previous studies that also identify a range of conditions in successful CPR management. More importantly, there is some overlap between the specific factors themselves. The significance of communication has already been noted in this chapter, and it appears in dozens of research articles (see, for instance, Hackett et al., 1994; Balliet, 2010). Similarly, Baland and Platteau (1996; page 255) note that 'a lack of genuine involvement or participation of user communities is at the root of the failure of social forestry programmes'.

Other factors identified in the case studies also appear in the literature. Culture and political economy are highlighted by Oakerson (1992) as factors that affect collective decision-making arrangements in community-based management systems. In general, then, many of the factors identified in the case studies are consistent with existing research on CPRs and SESs, even though there is a tendency to focus more on community-based management systems than government-led systems in the CPR management literature.

There are a number of ways in which the case studies could be improved and expanded. Firstly, the decision to make the case studies broad and exploratory meant that they are more descriptive than explanatory. To produce a study with more explanatory power, is would be useful to return to the Paraná delta and Seattle with an explicitly defined causal model to test (Agrawal, 2003). This would require focusing one or two specific factors that are of theoretical interest. The work on legitimacy outlined in subsequent chapters is a first step in

this direction. Secondly, it would be worth designing a comparative study, so that the conclusions drawn from the delta and the fishery could be contrasted against similar environments elsewhere in the Americas or the rest of the world. Doing so would reduce the number of factors of interest, because in all probability only some of the factors identified in this research would also appear in these new systems. It is worth noting that any comparative study would also require the definition of a causal model linking theoretically relevant factors to putative outcomes.

7.1.2 Chapter 4 – 'Legitimation function – a framework'

Chapter 4 builds on the observation made in the two case studies that legitimacy was in some way important to the operation of and outcomes produced by PIECAS and halibut IFQs. It also attempts to fill a gap in the CPR management literature, which frequently mentions legitimacy but does not explore it in any real depth (the notable exceptions being the papers by Jentoft (1989, 2000), Nielsen (2003) and Pinkerton and John (2008)).

The chapter's two key conclusions – and its primary contribution to the literature – is, firstly, that perceptions of legitimacy can be shaped in a deliberative way by resource managers, and secondly, that four particular criteria – communication, participation, procedural fairness and trust - serve a 'legitimation function' Legitimacy requires the satisfaction of these four criteria. The idea of a legitimation function is itself important because it reveals the way in which resource managers can design and operate a legitimate resource management system. These ideas are part of a wide and rigorous intellectual tradition harking back to Weber.

Of course, an implication of these two conclusions is that management systems and management authorities should behave in a deliberative way where legitimacy is concerned. However, it is apparent from the literature that, although legitimacy is recognised as important, it is rarely actively considered during the design or the operation of a resource management system. Arguably, this may be the result of a belief that legitimacy is so intangible that it cannot be addressed in any meaningful way. Chapter 4 suggests this belief is mistaken. Indeed, in light of legitimacy's importance to quantifiable measures of management success like compliance, consciously accounting for and designing legitimacy into a management system is essential. This conclusion also suggests that resource

management authorities like the IPHC can conduct themselves in a way that improves how people perceive their legitimacy.

The second conclusion from chapter 4 is that satisfying the legitimation function criteria depends in part on ensuring that each criterion is characterised by certain attributes. For communication, there is an emphasis on clarity, honesty and sincerity, and the absence of deception, distortion and manipulation. In addition, communication is conceived of as a two-way process. Management authorities need to communicate clearly, honestly and sincerely with stakeholders in the management system. Equally, stakeholders must have the opportunity to express their concerns and ideas to management. At some point, there may even be discourse between managers and stakeholders. A resource management system that lacks one or more of these features is less likely to be legitimate.

The need for stakeholders to have the opportunity to communicate with management is closely related to the participation criterion. At one level, participation might be thought of as 'having voice' in a management process. This does not imply, however, that participation is synonymous with communication. Participation entails something additional to communication. It includes opportunities to attend events and meetings in person, and to express one's concerns and opinions at these events and meetings. Ideally, however, a resource management system will also provide for 'representative participation' in advisory or decision-making bodies, and participation in scientific processes like data collection. A management system that does not guarantee its stakeholders the ability to 'have voice' in the most basic sense of attending events and meeting is likely to be illegitimate; but once this minimum standard is satisfied, additional opportunities for representative participation and participation in research are equally important.

The third criterion that a legitimate management system is likely to satisfy is procedural fairness. There are different ideas about what constitutes a fair process, but a useful framework is found in common law jurisprudence and in Leventhal (1980). In a legal setting, a process is fair if it satisfies three rules: the bias rule, the evidence rule and the hearing rule. The bias rules states that the person making decisions or judgements should not have a personal interest in the case at hand. For instance, a management system where quota allocation decisions were made by people who also owned quota would break the bias rule. The evidence rule states that decisions should be made on the basis of evidence and reasoned

argument, not emotion or speculation. The High Level Committee for PIECAS could be accused of breaking the evidence rule because it lacks expertise in and familiarity of the delta. Its decisions may therefore lack the evidence-base required to meet the evidence rule. Finally, the hearing rule states that individuals adversely affected by a decision should have a say in the decision-making process that leads to the decision.[42] The hearing rule is therefore closely related to communication and participation. A number of facets of IFQ management in the halibut fishery satisfy the hearing rule, notably the ability of fishery stakeholders to become members of advisory boards and decision-making bodies.

The last criterion that contributes to legitimacy in resource management systems is trust. Trust is different to the other three criteria in that it is not necessarily contingent on the features of the management system itself. Instead, trust in management authorities, for instance, can pre-exist the design and operation of a management system. However, trust is also something that can be earned. In the legitimation function, therefore, two elements of trust are considered: pre-existing trust, and trust that emerges because of the attributes of the system and its managers. The former 'type' of trust is exogenously derived and depends on the presence of institutions and norms that encourage trusting and trustworthy behaviour. The example used in chapter 4 is norms of reciprocity that make it more likely that trusting behaviour is reciprocated. The second 'type' of trust emerges when a resource management system and management authorities satisfy various 'micro-situational attributes'. These attributes include participants in the system being able to communicate fully, and the ability to sanction or reward past behaviour as appropriate. (See chapter 4 for a full list of the micro-situational attributes underpinning trust.)

The final conclusion that flows from the work presented in chapter 4 is that existing ideas on legitimacy – particularly those of Habermas and Weber – are useful to our understanding of legitimacy in resource management contexts, but do not provide the entire picture. Habermas stresses the importance of discourse to legitimacy, which ties in neatly with the emphasis on communication and participation here, but he does not discuss procedural fairness or trust. Equally, Weber argues that legitimacy rests on 'traditional', 'charismatic' and 'rational' grounds, but does not suggest that communication, participation, procedural fairness and trust are important.

[42] The hearing rule is remarkably similar in purpose to Ostrom's third design principle, which – as we have seen – suggests that people affected by rules should be able to have a say in making and modifying them.

It is worth stressing that my conclusions are not a challenge to Habermas's or Weber's work, and certainly do not mean to imply that they are wrong about legitimacy. Indeed, it is evident from chapter 4 that I draw on Habermas extensively. Although I believe that Habermas's work on legitimation crisis in particular is distinct from my own in a number of important ways, his ideas on 'ideal' dialogue inform my analysis on communication as a criterion for legitimacy in an important way. Moreover, there is a sense that my work on the legitimation function is both an empirical and theoretical extension of Habermas's research on administrative institutions, because resource management systems form a specific category of administrative institution that have not been studied in the Habermasean tradition. More generally, the analysis informs ideas on what constitutes legitimate authority (a tradition in which Weber worked). Indeed, ideas about the nature and exercise of authority – whether in a resource management or other administrative system – are inextricably linked to legitimacy.

7.1.3 Chapter 5 – 'An application of the legitimacy framework'

Chapter 5 attempts to demonstrate the utility of the legitimation function framework by evaluating to what extent PIECAS and IFQ management satisfy the four criteria included in the framework. There is a potential methodological problem with the chapter, namely that the legitimacy and illegitimacy of PIECAS and IFQ management are already known. As a result, it is possible that the analysis in chapter 5 is shaped to fit this observation. I have tried to avoid this problem by considering as much data as possible in drawing my conclusions. I used document evidence and surveys sent to stakeholders in both the delta and the fishery.

The key conclusion that flows from the analysis presented in the chapter is that PIECAS lacks legitimacy because it has failed to satisfy communication and participation criteria in particular, with a concomitant effect on trust in PIECAS. The plan is insufficient in these criteria at a number of levels. Communication between the High Level Committee and agricultural stakeholders living and working in the delta appears to be limited. Furthermore, communication between the High Level Committee and other stakeholders like NGOs appears to have slowed significantly, to the extent that many NGOs have not communicated or participated in the plan for a number of years. Participation is equally poor. There is no representative participation on the High Level Committee, and its meeting are not open to the public. Many stakeholders – especially agricultural stakeholders – do not even have voice in the process. These multiple failures in both communication and participation are almost

certain to have affected trust in PIECAS and in the High Level Committee, and perceptions of procedural fairness. Certainly, agricultural stakeholders are unlikely to view the PIECAS design process as procedurally fair given their near total absence from it.

Conversely, IFQ management in the fishery is considered 'legitimate by almost all players' (see chapter 3). IFQ management is more effective than PIECAS at every level. There is clear communication between stakeholders and the IPHC and NPFMC, and many opportunities for participation (both representative participation and participation in public meetings and processes). Trust between the IPHC and NPFMC and the fishery's stakeholders is generally strong, although the NPFMC fares less well than the IPHC. Finally, IFQ management satisfies many of the criteria that make a process fair. For instance, the IPHC's management decisions are based purely on scientific evidence. As a result, they satisfy the evidence rule. Furthermore, the IPHC goes some way toward demonstrating the impartiality of its decision-making by organising collaborative research trips with fishermen. These research trips also satisfy participation. Fishermen are involved in collecting the data that is subsequently used as the basis for management decisions.

The application of the legitimation function framework helps us to understand why PIECAS and IFQ management are perceived as illegitimate and legitimate, respectively. However, the analysis cannot prove that their legitimacy is attributable to their ability to satisfy the legitimation criteria. It may be the case that other factors are involved, and the four criteria are simply confounding variables.

There are a number of reasons to believe this is not the case, however. Firstly, many interviewees focused on, for instance, problems with communication when they discussed the legitimacy of PIECAS. Thus, at least some interviewees attributed a lack of legitimacy to issues arising with communication. This is important because it implies that these interviewees were making a direct connection between their perception of a plan's legitimacy and their experience of communication in and around the plan. Secondly, the four legitimation function criteria cover a number of key processes in a resource management system. Indeed, it is difficult to see what other aspects of a management system could explain legitimacy. The obvious candidate is legality, but both PIECAS and IFQ management are legal and there are theoretical reasons to believe that legitimacy as legality is an unsatisfactory explanation (see Coicaud, 2002). Alternatively, legitimacy could rest (as

Weber suggests) on the charisma or traditional authority of a particular leader – but neither in PIECAS nor in the halibut fishery is there one 'figurehead' driving the plans forward. The legitimation function criteria are therefore a good choice for the factors that could be contributing to legitimacy in these management systems.

The potential difficulties caused by confounding variables point to avenues for further research. It would be interesting to use survey methods to evaluate whether there is indeed a significant correlation between the legitimation function criteria and perceptions of legitimacy. If there is a significant correlation across a number of case studies, it would increase our confidence that the legitimation function criteria do have value in helping us to understand legitimacy. Of course, this approach entails large sample sizes. In order to collect suitably-sized samples, special surveying strategies like hiring surveying companies might be sensible.

7.1.4 Chapter 6 – The influence of 'exogenous' factors on legitimacy

The legitimation function criteria do not address the possibility that legitimacy in resource management systems is exogenously derived; that it is not the criteria themselves that affect perceptions of legitimacy, but beliefs or ideas that are actually independent of the resource management system in question.

Chapter 6 attempts to explore this problem. Its primary finding is that exogenously-derived perceptions can influence legitimacy if those perceptions are reflected in some way in the management system. This conclusion has two implications. Firstly, it suggests that, in some cases, it is not exogenous factors *per se* that influence a resource management system's legitimacy, but rather the failure to account for those exogenous factors or replicate them in the management plan. Secondly, the design of a management system is crucial not only in terms of the legitimation function criteria, but also in reflecting exogenous legitimacy. A management system may satisfy all of the legitimation function criteria, but not consider, for instance, traditional structures of tribal authority. As a result, an exogenous factor (tribal authority) is not accounted for in the management system and the system's legitimacy is threatened. However, a design fix – namely, to shape management organisations in such a way that they do align with tribal custom – may resolve the problem.

Of course, there will be instances where taking exogenous factors into account in a resource management system will call for difficult compromises and trade-offs. In some cases it may not be possible to design a management system around exogenous factors. This is not necessarily fatal to legitimacy. Communication and participation offer one way to demonstrate that the exogenous factor is not being ignored intentionally.

The second conclusion that emerges from chapter 6 is that the effect of some exogenous factors – particularly those relating to marginalisation, unionism and general discontent with government – is actually mediated via the legitimation function criteria. Thus, these factors do not have a direct impact on a management system's legitimacy; instead, they shape opportunities for and the degree of satisfaction of the legitimation function criteria.

This conclusion is interesting because it further reinforces the idea that the design of a management system is crucial. All management systems are nested in wider cultural and socio-economic structures. Some of these structures have influence on the operation of these management systems. In chapter 6, I argued that a history of unionism, for instance, encouraged greater communication and participation in management plans. But communication and participation can only occur if management systems have appropriate mechanisms in place (public meetings, say). Without these mechanisms, unions that want to express the views of their members will struggle to do so and therefore have cause to complain about the management system. It is not the exogenous factor that is important, but its effect on the legitimation function criteria in a suitably designed system that matters. Thus, some exogenous factors manifest themselves in the extent to which the legitimation function criteria are satisfied. As a result, the management system should be properly designed to achieve that goal.

7.2 Limitations

Of course, the thesis has a number of limitations. The conclusions drawn in each chapter should be interpreted in this light. In particular, the thesis is based on just two case studies – PIECAS and the fishery. As a result, the observations made in the case studies – and the ideas developed from those observations – should be seen as specific to PIECAS and the fishery, rather than generalizable to other resource management systems. This is potentially problematic for the emphasis made in the thesis on legitimacy. The argument in the thesis is

that legitimacy is a factor that is likely to be of interest across resource management systems. This justifies the exploration of legitimacy that follows. However, it is possible that legitimacy is a factor unique to PIECAS and the fishery, and that the focus on it is misplaced. Only additional case studies can provide further empirical support for the idea that legitimacy is an important factor in a range of management systems, although as mentioned there are strong theoretical reasons for believing that it is indeed of general significance.

The two case studies are themselves constrained by relatively small sample sizes in both the interview data and survey data. It is possible that the factors identified during interviews would have changed considerably if a larger number of interviewees had been approached, which in turn would have shaped the subsequent analysis. Similarly, reaching a larger number of respondents in the surveys may have led to different results on perceptions of legitimacy, honesty, trust and so on in PIECAS and the fishery. Despite the limitations imposed by small sample sizes, however, the results presented are not without merit. Above all, the interview and survey data record faithfully the views of individuals with expertise and/or close involvement in both management systems, and are therefore likely to represent at least a portion of perceptions on the drivers of success, failure and legitimacy in PIECAS and the fishery.

The thesis also has limitations in its more theoretical sections. One clear limitation is that legitimacy is such a broad topic that many aspects of existing thought are beyond the scope of the thesis. As a result, the review of legitimacy in chapter 5 is not as extensive as the literature might suggest desirable. For instance, Habermas's ideas on legitimacy and legitimation crisis are condensed to a few essential points. The defence to these criticisms is that much of the literature I review is so abstract that it is of limited value to a functional treatment of legitimacy. I argue as much about Habermas's ideas on legitimation crisis in chapter 5. In general, the discussion of legitimacy in the thesis attempts to strike a balance between the thesis' ultimately practical purpose, and satisfactory coverage of a complex and well-studied theme.

A final limitation of the thesis is that the legitimation function framework remains theoretical – it is not empirically validated to any significant degree. The survey data go some way toward providing an empirical foundation for the ideas presented in the framework, but as mentioned these are limited by small sample sizes and the low number of case studies.

Further research is needed to extend the evidence base that supports or disproves the framework.

7.3 Reflections, cross-cutting themes and other implications

There is a tradition in the British Foreign Office that ambassadors leaving the service and departing from their embassies for the last time write a 'valedictory' telegram summarising their thoughts on their careers and postings. As I come from a diplomatic family, I thought this was the appropriate moment in the thesis to write my own valedictory despatch. There are a variety of themes that emerge from the preceding chapters and my own experience of producing a PhD on which I would like to reflect.

The first theme concerns legitimacy's place amongst the issues that resource managers must consider when designing and operating a resource management system. Legitimacy is perhaps easy to ignore or forget in a resource management context. It does not offer immediate solutions in a way that 'technical' fixes like ITQs apparently do. The resource manager who focuses on introducing technical management measures that rapidly 'solve' a system's problems is likely to win more plaudits and political capital than one who focuses on a factor like legitimacy that is difficult to understand and whose impact is uncertain. But it is indisputable that legitimacy is crucially important to the success of a resource management system. Indeed, I would go as far as saying that an illegitimate resource management system is likely to fail – irrespective of the effectiveness of the technical fixes imposed.

This point of view raises a number of interesting questions. Firstly, what explains the tendency to concentrate on technical rather than non-technical issues in resource management and resource sustainability problems? Clearly, one aspect of an answer is that resource sustainability issues are technical in nature and therefore intuitively require a technical response (and resource managers rely upon or execute technical analysis in devising these responses). However, I would argue that another reason why non-technical tools are neglected is that they are more difficult to operationalise and their outputs are less immediate than technical tools. Legitimacy specifically is something that is 'hard to get right'. Furthermore, non-technical tools do not lend themselves well to situations where short-term solutions are a pressing need. But short-termism is increasingly prevalent, especially in

resource management (consider the EU's CFP). I suggest that short-termism has skewed the way we think about resource management systems, and focused our attention on factors or tools over which we believe – superficially – we have more control. This trend has been to the detriment not only of legitimacy and related issues, but resource management systems themselves. Indeed, one might argue that in systems where problems appear intractable – climate change negotiations, say - a focus on legitimacy as well as technical solutions may prove more beneficial.

In many ways, this argument relates to Habermas's ideas on the colonisation of lifeworld by system. As I argue in chapter 4, legitimacy is a factor that belongs to lifeworld rather than system. But as system colonises lifeworld, an emphasis on legitimacy is lost in favour of the instrumental, technical measures that belong to system. Unsurprisingly, this in turn means that resource management systems become less legitimate. Legitimacy is neglected as a point of negotiation, and is therefore not reflected in the final design of a resource management system.

This analysis also speaks to the importance of keeping issues like legitimacy at the forefront of resource management. As I have already argued, doing so is not easy. It requires a commitment to communication, participation and procedural fairness that may test the integrity of stakeholders. There are no short-cuts to legitimacy. Decisions made for expediency's sake will undermine the legitimation function because it provides a reason to mistrust management authorities. But behaving in a way that satisfies the legitimation function contributes to successful resource management outcomes a great deal. Indeed, a central message of this thesis is, perhaps, that things that are difficult to do well – achieving legitimacy, acquiring trust, leading by example – are as important, if not more so, than technical fixes. We should therefore not be seduced by the apparent efficacy and neatness of technical fixes to resource management problems; their success depends in part on achieving intangible goals like legitimacy.

These ideas are not just limited to resource management contexts. One could argue that similar biases in favour of the technical versus non-technical are evident in the move toward quantitative (technical) research methods over qualitative (non-technical) research methods in the CPR and SES management literature (and this literature suffers from the problem to a far lesser extent than, say, economics). I would argue that it is often assumed that qualitative

methods lack the rigour of quantitative methods, and that the preponderance of quantitative methods in the CPR and SES management literature is justified on this basis. But my experience as a doctoral candidate has taught me that qualitative methods can be just as rigorous as quantitative methods. The difficulty is that it takes decades to develop anything approaching real expertise in qualitative research. Few people are able to make such a commitment, especially if quantitative methods produce interesting results that resonate in the research community.

This discussion raises one final point about expertise and evidence. In favouring the technical over the non-technical, the assumption is made that technical (or quantitative) approaches require greater expertise than non-technical approaches. We place a premium on this expertise, which in turn explains why technical approaches are seen as superior in some way to non-technical approaches. However, this discourse fails to consider the importance of appropriately evaluating evidence in making sound decisions, whether in resource management or other spheres. Expertise is not enough for good decision-making; it also requires a dispassionate and logical analysis of data and evidence, and the honesty to come to the conclusions to which the data point. We therefore over-emphasise expertise at the cost of non-technical issues inherent in evaluating evidence.

7.3.1 The uses and abuses of policy research

My second theme concerns the way in which policy-relevant research like this thesis is used. There is always a danger that ideas like the legitimation function criteria will be used as the basis for a 'box ticking' exercise in which legitimacy is claimed simply because the four criteria have ostensibly been satisfied. Box ticking is arguably a form of reductionism that is short-term and technical in nature. Indeed, 'box ticking' is especially likely where resource management is politicised and apparent satisfaction of the legitimation function criteria represents a convenient way of justifying management decisions. But to use the legitimation function in this way is to abuse it. It will lead to outcomes that lack legitimacy, because the four criteria will not have been satisfied in any meaningful way.

One reason why using the legitimation function criteria in a box ticking exercise cannot lead to 'true' legitimacy is that satisfying the legitimation function criteria requires crossing a relatively high threshold on a continuous basis. The legitimacy of a resource management

system might be claimed easily enough, but the characteristics of the legitimation function criteria mean that it should be obvious when those claims are disingenuous. It is straightforward to claim that a resource management system is satisfying 'communication', but harder to do so in practice. Resource managers might have started publishing a monthly newsletter, say, and used this as evidence that there was sufficient communication between managers and stakeholders. But if it is apparent that the motivation underpinning the newsletter was not honest or sincere – that is, that the reasons for producing the newsletter were not a genuine attempt to improve communication – then stakeholders in the system are likely to disagree with the idea that communication has been satisfied. The legitimation function criteria need to be culturally, institutionally and temporally present at a minimum level over time. A lapse in the criteria leads to a reduction in legitimacy. Thus, using the legitimation function criteria to 'tick boxes' and claim legitimacy should in theory be easy to see through. The key point is that the legitimation function criteria are effective when they are satisfied pre- and post-decision in the same spirit as they were written.

There is another possible criticism to aim at the legitimation function – that it is authoritarian because it tells people how to design a resource management system. Interestingly, Habermas's ideas on legitimacy and legitimation have also been criticised for being authoritarian. His theory of legitimation can be construed as an attempt to 'tell people how to do their politics' (Blaug, 1997) or how to design their institutions, which has ramifications for the manner in which people live their lives. It is worth paying attention to these criticisms when considering the legitimation function criteria. Certainly, there is a danger that a resource management system could stray into authoritarianism if resource managers coerce stakeholders in the system to follow processes that are recommended by the legitimation function criteria. Blind application of the criteria in this way is not just coercive; it can also ignore local context and the spirit in which the legitimation function criteria should be treated. But the way in which the criteria are designed guards against authoritarianism. In particular, communication and participation embed local context into the management system and therefore undermine coercive top-down approaches. Furthermore, an authoritarian system cannot be procedurally fair because it is at some level unethical (Leventhal, 1980) or otherwise favours one interest (that of a powerful elite, say). Arguably, the legitimation function is a partial answer to the tyranny of a powerful minority.

Perhaps the final conclusion to draw from this analysis is that good leadership is crucial in establishing legitimate resource management systems. Problems with box ticking reductionism and authoritarianism are much less likely to occur with good leadership. Almost by definition, strong leaders are able to demonstrate that management decisions and interventions are guided by motivations that make for legitimacy. For instance, good leaders are often those who communicate effectively and who are impartial and fair. Equally, good leaders are unlikely to use the legitimation function criteria in a dishonest or disingenuous way.

7.3.2 The importance of design in resource management systems

I suggested in the introduction to the thesis that, if there was one overriding to conclusion to draw from this research project, it was that the design of a resource management system is a – perhaps the – crucial element in shaping its success. It is certainly striking that PIECAS – which has suffered, as we saw in chapter 3, from a long and complicated design process – is even now not at a stage where its implementation is feasible. In contrast, the reform of the halibut fishery was meticulous. Although it took an equally long period of time to conclude that IFQs were the best available option for the fishery, the process that led to their introduction covered almost all bases. The quota allocation appeals process, the regular meetings between managers and stakeholders, and management's deep understanding of the potential impact of IFQs, all point to a design process that was measured and well executed. Furthermore, the final IFQ management system contained within it provisions to count halibut by-catch in other fisheries and to protect small, rural communities that were perceived to be vulnerable in an IFQ system. Thus, there was consideration of the interplay between the halibut and other fisheries and communities.

Despite my emphasis on the importance of 'design', the term is perhaps confusing. Ostrom (1990) defines her 'design principles' as 'a characteristic that helps to account for the success' of local, long-enduring institutions (see chapter 2). In a similar vein, I would argue that the design of a resource management system refers to those elements of the system that have been crafted in a deliberative way by the management authorities charged with operating the system. Thus, instituting regular public meetings in a resource management system might be considered a design element; so too might separating risk assessment

processes from risk management (like the separation between the IPHC's and NPFMC's roles in the halibut fishery).

The legitimation function framework adds weight to the idea that design is a crucial consideration in resource management. The framework suggests that a resource management system can be designed in a way that increases the likelihood that it is legitimate (see chapter 4). Design remains important even though we are dealing with an issue (legitimacy) that is hard to define or quantify.

Of course, the importance of design is already emphasised by Ostrom, Wade and others. However, the explanatory power of the design principles is questionable because they could as easily be 'features or consequences' of successful systems as actual causes (Taylor, 1992). This ambiguity is significant. It suggests that there is perhaps a need to identify with greater precision design factors or principles that are definitively causal in nature. However, given the methodological constraints that accompany research in this field, untangling causal chains or links is, in my opinion, challenging. Perhaps the only way in which we can come to firm conclusions about causality is through randomised control trials (RCTs). Although RCTs may be difficult to implement, I believe there is scope to do so, particularly in areas where different villages have implemented their own community-based systems.

One other problem that my emphasis on design raises is whether it is meaningful in a context-heavy field like CPR management. One might argue that talking about appropriate design in generalised terms has little explanatory power given that each unique resource management system will have to be designed in a unique way. I would dispute this, because the key issue is the nature of the problems causing resource management dilemmas, and these may be similar across multiple contexts. For instance, the economic problems that afflicted the halibut fishery prior to the introduction of IFQs are found in other fisheries with significantly different characteristics. The challenge for researchers is to make generalised statements about the design features that are best suited to solve particular management problems. Context makes this difficult, but not impossible. Furthermore, we have already made progress: in fisheries suffering from over-capacity problems, it would seem that IFQs are an appropriate design choice.

There are, then, three brief conclusions to draw from the preceding discussion. The first is that design and design processes (that is, the processes that shape the final design of a resource management system) are critical in influencing the effectiveness of a management system. Halibut IFQs and PIECAS provide some evidence to support this conclusion. The second conclusion is that researchers in the field should focus much more on establishing causality between design elements and management outcomes. Current research does not distinguish clearly enough between design elements that are potentially causal and those that are merely consequences of a successful management system. Finally, an avenue for further research is to identify design elements that are well suited to solving particular problems, even if the heavy influence of context in resource management systems makes this challenging.

7.4 Closing remarks

We live in an increasingly resource constrained world. The need for well-designed resource management systems that ensure the long-term ecological and economic sustainability of natural resources like fish or wetlands is pressing. However, despite at least 50 years of government intervention in resource management, too many systems continue to be poorly planned and executed. PIECAS and the European Union's Common Fisheries Policy are cases in point. The contribution of this thesis is to point to ways in which one element of management system design – legitimacy – could be enhanced. Legitimacy may appear intangible and therefore of less significance than quantifiable aspects of resource management, but it is arguably essential to the overall success of management systems. Indeed, establishing the legitimacy of a management system should be a priority for resource managers, in part because legitimacy is an indication that many other aspects of management are being done well. Thus, this thesis is a modest attempt to improve the practice of resource management. In so doing, I hope it will benefit future efforts in a field that is of fundamental importance to the continued sustainability of natural resources and the people who depend on them.

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Appendices

Appendix A. Summary integrated resource management research.

The document below is the conference paper I presented at the 13th International Conference on Environmental Science and Technology. It provides a neat summary of the research I had carried out on integrated resource management. See chapter 2 (Methodology) for additional details.

INTRODUCTION

In his paper evaluating global freshwater resources, Peter Gleick (2003) argues that the way in which water is developed, managed and used is undergoing a major transition. Integrated water resource management (hereafter, IWRM) is, arguably, part of that transition. IWRM is a concept and process that has its origins both in dissatisfaction with traditional approaches to resource management (Bellamy, 1999) and in the work of the international community, particularly the United Nations system (Biswas, 2008, Mitchell, 2005, Rahaman and Varis, 2005). It is an approach to water management that is growing in popularity.

Nonetheless, IWRM has proved difficult to define and challenging to implement (Biswas, 2004, Mitchell and Hollick, 1993). This paper attempts to provide an insight into the latter problem by identifying specific criteria that contribute to achieving IWRM. Two approaches are used to identify these criteria: an in-depth analysis of whole papers; and semi-structured interviews with environmental practitioners. Brief observations are also made from a systematic review of paper abstracts.

WHAT IS INTEGRATED WATER RESOURCE MANAGEMENT?

IWRM lacks a universally accepted definition. It is a pseudocognate term - intuitively easy to grasp but difficult to define precisely. Nonetheless, a number of researchers have offered specific definitions. The Global Water Partnership's version is frequently cited: IWRM is a 'process which promotes the coordinated development and management of water, land and related resources, in order to maximise the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems' (GWP, 2000).

However, what is perhaps more important than an unambiguous definition are the principles that IWRM promotes. Most notably, IWRM specifically (and integrated environmental management generally) is a holistic approach to managing water and natural resources (Margerum, 1999a). IWRM therefore considers a system in its entirety and recognises its interdependencies, rather than focussing on sub-components (Margerum, 1999a, Bellamy and Johnson, 2000). Indeed, 'integrated' (as in 'integrated' water resource management) refers in one sense to holistic thinking of this kind.

IWRM also emphasises the need for collaboration, cooperation and participation between individuals and organisations concerned with water resources (Hooper et al., 1999). This is another principle encompassed by the word 'integrated'. Here, 'integrated' refers to bringing together a variety of stakeholders and their opinions when developing a management plan.

The final principle promoted by IWRM is the prevention of fragmented decision-making and fragmented responsibilities (Mitchell, 2005). This implies that organisations coordinate such that their objectives do not conflict and their efforts are not duplicated (Mitchell, 2005). It also suggests the development of common goals or a shared vision, in order to avoid the pursuit of separate, often mutually exclusive, interests (Mitchell, 2005). Again, the term 'integrated' conveys something of this coordinated approach to decision-making and management.

METHODOLOGY

Two methodological approaches were used for this study. The first approach was an in-depth analysis of 20 papers examining IWRM schemes. Each paper was read in its entirety. Papers were selected by snowball sampling – that is, the references of one paper led to the identification of additional relevant papers. This in-depth analysis produced a qualitative summary of criteria that appear to help achieve IWRM.

The second methodological approach used in this study was semi-structured interviews with two environmental practitioners. One practitioner was developing an integrated catchment plan for the River Wandle in south-west London. The other practitioner had worked in a leading capacity on New York City's Watershed Protection Programme, which has become a paradigm for IWRM. Over the course of three interviews (two with the former and one with

the latter practitioner), ideas from the literature on the criteria and conditions necessary for successful IWRM were tested against their extensive practical experience.

The author initially planned using a third methodological approach to complement the critical literature analysis and interviews, namely a systematic review of 1,000 abstracts from papers found on Science Direct. The abstracts of papers that met specific search terms were analysed for criteria that the authors had explicitly identified as playing a key role in IWRM projects. 43 such papers were found, and the criteria they identified were recorded verbatim in an Excel spreadsheet and subsequently categorised. The systematic review was inspired by quantitative meta-analyses common in the medical and social science literature (see, for example, Stanley, 2001). It aimed to produce results from a large sample of papers that were also amenable to quantitative analysis. Quantitative approaches are noticeably absent in the existing IWRM literature.

However, the systematic review did not produce consistent results. Most problematically, the categorisation was so subjective that different people would likely place the same criteria into different categories. Indeed, this author would categorise the same criteria differently during various attempts at categorisation. In addition, the number of papers that met both the search criteria and had criteria specifically identified by the authors was quite small. As a result of both of these difficulties, meaningful quantitative analysis was impossible. However, it was possible to make interesting qualitative observations from the systematic review.

RESULTS

The results presented here are divided into two sections, one for each methodology used. Table 1 below lists the criteria identified in the in-depth literature analysis. Sixteen criteria were identified from the literature. Each of these criteria is listed on the left-hand side of table 1. A tick is placed below the papers in which particular criteria were identified.

The results from the semi-structured interviews are presented below the results of the in-depth analysis.

Table 1. Criteria identified from the literature.

		Paper																			
		Agyenim and Gupta (2012)	Bellamy and Johnson (2000)	Blackmore (1995)	Bowden (1999)	Butterworth et al. (2010)	Funke et al. (2007)	Gallego-Ayala and Juízo (2011)	GWP (2000)	Hooper et al. (1999)	Ioris (2008)	Macleod et al. (2007)	Margerum (1999a)	Margerum (1999b)	Margerum and Born (1995)	Medema et al. (2008)	Mitchell (2005)	Mitchell and Hollick (1993)	Johnson et al. (1996)	Van der Keur et al. (2008)	Walther (1987)
Criteria	Appropriate institutional arrangements				✓	✓	✓	✓	✓					✓		✓				✓	
	Common/strategic goals												✓		✓		✓				
	Communication/participation mechanisms												✓		✓				✓	✓	
	Conflict resolution mechanisms												✓		✓						
	Data						✓	✓	✓	✓	✓	✓	✓							✓	

	Decision-making		✓			✓							✓		✓						
	Education/outreach		✓										✓								
	Empowerment			✓		✓															
	Enabling legislative and policy environment	✓						✓	✓	✓		✓	✓							✓	
	Financing	✓		✓				✓		✓						✓			✓		
	Leadership						✓				✓		✓		✓			✓		✓	
	Legitimacy		✓										✓		✓		✓	✓	✓		✓
	Local governance/government arrangements		✓			✓										✓					
	Organisational culture												✓				✓	✓			
	Resources						✓				✓	✓							✓		
	Stakeholder commitment												✓	✓							

The results of the critical literature analysis shown in table 1 are noteworthy for the range of criteria identified. The papers examined suggest that everything from common goals to stakeholder commitment play an important role in achieving IWRM. However, there is a notable emphasis on appropriate institutional arrangements, an enabling legislative and policy environment, data, financing, legitimacy and leadership. All of these criteria were identified in at least six different papers. Here, 'appropriate institutional arrangements' refer to the institutions necessary for IWRM. That criterion is closely related to the 'enabling legislative and policy environment' criterion that describes the regulations that make IWRM possible. 'Data' refers to data availability and the ability of organisations to collect and analyse data; 'financing' to the funding available to organisations involved in IWRM; 'leadership' to organisational and political leadership; and 'legitimacy' to the legitimacy of the institutions that influence IWRM.

In addition to these 'key' criteria, the literature review also identified common and/or strategic goals, communication and participation mechanisms, conflict resolution mechanisms, education and outreach, empowerment, local governance or local government arrangements, organisational culture, resources and stakeholder commitment as important criteria for achieving IWRM. Communication, participation and conflict resolutions mechanisms include memoranda of understanding, coordinating committees and informal exchange. Empowerment deals with the power asymmetries that exist between stakeholders. Resources refer to human and technical resources.

Conversely, the criteria discussed during the semi-structured interviews fell into two broad categories. One interviewee identified institutional culture and leadership as key criteria not just in IWRM specifically but environmental management generally. In particular, the interviewee argued that leadership was needed to 'bring people together under new innovations'. The interviewee also mentioned the difficulties associated with creating or redesigning institutions. Institutional culture, leadership and difficulties with institutional change are all criteria that are recognised, directly or indirectly, in the literature. They therefore overlap with some of the criteria listed in table 1.

The same interviewee also referred to the importance of a 'sense of opportunity' in IWRM specifically and environmental management generally. None of the papers in the critical literature review discuss this criterion, although it is perhaps associated with leadership. The interviewee also mentioned barriers to IWRM like a fear of change and poor training in environmental issues.

The other environmental practitioner interviewed for this paper focussed much less, if at all, on institutional culture, leadership, a sense of opportunity and a fear of change. Instead, the interviewee identified the need for 'detailed guidance' on specific ecological assessment tools and ecological restoration techniques, rather than 'large-scale abstract thinking'. Expertise in data analysis was crucial, as was 'catchment specific' information - that is, detail on the ecology, geology and hydrology of particular catchments or types of catchments. These criteria are similar to those identified in the critical literature review that concern data and resources.

DISCUSSION

There are two observations to make with respect to the results presented here. The first is that the criteria identified in the literature and in the interviews are not necessarily specific to IWRM. For instance, appropriate institutional arrangements are important not only to IWRM but, for instance, to the performance of economies (North, 1990). Likewise, leadership is a key criterion in the success of, say, a football team or multinational business. Indeed, the criteria identified in the literature are generalisable to management in many disciplines. This is not to say that these criteria are unimportant to IWRM; they are important, but they are not specific to IWRM.

This observation is particularly striking when compared to the need for 'detailed guidance' on ecological assessment techniques identified by one of the interviewees. Evidently, there is a lack of widely available and focussed advice and information on best practice and specific tools for IWRM. This lacuna may stem in part from IWRM research focussing on the 'large-scale abstract thinking' mentioned by the interviewee, rather than particular tools and techniques. There is, perhaps, a need to encourage research on specific tools that organisations can employ in integrated management schemes. Developing these tools and

disseminating them widely will strengthen the organisational capacity needed to implement IWRM.

The second observation is that many of the criteria identified in the literature concern institutions and organisations. For instance, 6 out of the 16 criteria identified during the in-depth literature analysis related in some way to institutions. Likewise, 8 of 20 papers discussed 'appropriate institutional arrangements'. Here, institutions are defined as they are in the economics literature – the 'humanly devised constraints that shape human interaction' (North, 1990). They are distinct from organisations, which are 'groups of individuals bound by some common purpose to achieve objectives' (North, 1990). In the context of IWRM, organisations include coordinating committees and political parties; conversely, institutions might comprise the regulations that determine land use or water quality standards.

Some criteria like 'appropriate institutional arrangements' are direct references to institutions. The indication by one interviewee that 'institutional culture' was a key part of IWRM is also a direct reference to institutions. Other criteria like an 'enabling legislative and policy environment' allude to the regulations and rules that shape IWRM and other environmental objectives. More subtly, 'conflict resolution mechanisms' and 'communication/participation mechanisms' refer in part to regulations or rules (that is, constraints) that formally or informally influence IWRM outcomes. For instance, voting procedures or memoranda of understanding contain rules that shape the way people involved in IWRM interact. Likewise, 'decision-making' is a criterion of which constraints are a component.

The criteria identified in the literature also relate to organisations. Again, there are direct references – 'organisational culture', for example. In addition, 'local governance/government arrangements' concern government organisations. Criteria like 'leadership' – mentioned both in the literature and in one of the interviews - or 'stakeholder commitment' arguably relate to organisations because they are important to an organisation's success. It is also striking that data and financing were identified in several papers. Data availability and analysis are key if organisations are to make sense of the resources with which they are concerned. Equally, data allows organisations to evaluate the impact of management interventions. Financing is, of course, crucial to the continued operation of an organisation and its management schemes.

The literature's emphasis on institutions and organisations suggests they play an important role in achieving IWRM. If other criteria – data and resources, say – were more important, then logically there would be greater focus on those criteria. The results presented here indicate otherwise: many of the criteria identified do allude to institutions and organisations.

The focus on institutions in particular raises two interesting questions: is institutional reform needed to achieve IWRM? And if it is necessary, how quickly can we expect institutions to change until they are appropriate to IWRM? Neither of these questions have clear answers. However, a tentative suggestion is that institutional reform is indeed a prerequisite for achieving IWRM. The difficulties associated with IWRM's implementation, and the importance of institutions to IWRM, suggest that existing institutions are a barrier to IWRM (although some authors like Medema et al. (2008) argue that there is insufficient evidence to support this contention). In addition, rapid institutional reform is unlikely. As North (1990) points out, most institutions change slowly.

Given the importance of institutions and organisations in IWRM, it is surprising that many papers in the IWRM literature – including those used in the in-depth literature analysis – do not define institutions and organisations. The definitions used here are an attempt to give further discussion a solid intellectual foundation based on the widely cited economics literature. Of course, many papers discuss institutions and organisations colloquially. Although this is not of itself problematic, it does mean that institutions and organisations are used synonymously. Using specific definitions like North's reflects the difference between organisations and the framework of regulations and behavioural norms (that is, institutions) within which organisations operate. This difference is real and should be reflected in the IWRM literature.

CONCLUSIONS

Two clear conclusions follow logically from these observations. The first is that research is needed to develop specific techniques and tools for IWRM. As seen, the criteria for successful IWRM identified in the literature are frequently generalisable to decision-making or management in all kinds of organisations. Although this does not detract from the criteria's importance, it does suggest that future research should focus on developing techniques and tools that will help organisations with the practical elements of IWRM. This

research agenda is particularly relevant in the context of the European Union's Water Framework Directive (WFD), which makes significant demands of data availability, data analysis and data collection (Mostert, 2003). The development of these techniques could therefore contribute to member states' efforts to implement the WFD.

The second clear conclusion is that institutions and organisations are fundamentally important to achieving IWRM. That in itself raises interesting questions about institutional reform and the speed at which institutions change. More generally, the IWRM literature does not define terms like institutions and organisations as precisely as it should. By grounding the IWRM literature's treatment of institutions and organisations in terminology from the economics literature, it is hoped that this paper will encourage definitional precision in future IWRM research.

Appendix B. Proposed 'minimum conditions' for sustainable resource management

1. **Problem definition and solution matching.**
2. **Define the regime's sustainability goal(s).**
3. **Separate risk assessment processes from risk management processes.**
4. **Negate politicisation of risk assessment and risk management organisations and decisions.**
5. **Introduce economic incentives.**
6. **Introduce a resource allocation procedure.**
7. **Incorporate legitimation functions.**

Appendix C. Case study interview questions.

Interview questions for PIECAS case study.

1. Why has PIECAS's design process been so slow?
2. What factors have slowed it down?
3. Is it a purely political issue?
4. Does the plan have sufficiently clear objectives to be implementable in practice?
5. Is there sufficient technical capacity in provincial governments to design and implement the plan?
6. Is there enough money to design and to implement it?
7. Does the plan have legitimacy amongst local communities?
8. Are there cultural factors that have slowed its implementation?
9. From the point of view of each provincial government, does PIECAS make economic sense?
10. Have provincial politicians been bribed/blackmailed to maintain the status quo by extractive interests like cattle ranching or gas fracking?
11. Has civil society been active enough encouraging PIECAS's design and implementation?
12. Is organizational culture in provincial government an explanation for slow design?
13. Were there meetings between government and stakeholders during PIECAS's development?
14. Enough meetings?
15. Is there enough data to understand PIECAS's environmental impact?
16. Is PIECAS an electoral issue?
17. Could its implementation lead to electoral losses?

Interview questions for Seattle case study.

1. Has the ITQ management regime for Pacific halibut been a success?
2. In your opinion, what factors contributed to the ITQ regime's success compared to the TAC regime?
3. Was the decision to maintain the NPFMC and NMFS as management authorities for the ITQ fishery an important factor?

4. Would it have been too costly/legally challenging/too lacking in legitimacy to create new organisations?
5. Was collaboration during the ITQ programme's development an important factor?
6. Was the ITQ's grassroots development (fishers requested it) actually more important?
7. Were the ITQ programme's management objectives clear?
8. Was the quota allocation appeals process an important factor?
9. Did the appeals process help legitimise the new regime?
10. How important was the data collection and data analysis that the NMFS carried out as a matter of course?
11. Was the change in management regime supported by sufficient funding?
12. Was it simply the case that ITQs were the right tool for the problem at hand?
13. Did the Pacific north-west's culture contribute to success?
14. Is the IPHC's presence important?

Appendix D. Output for two-sample Student's T test

Two-sample t test with equal variances

```
Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
      1 |      11    8.545455    .5110352    1.694912    7.406797    9.684112
      2 |      11    6.727273      .30424     1.00905    6.049384    7.405162
---------+--------------------------------------------------------------------
combined |      22    7.636364    .3515301    1.648822    6.905317     8.36741
---------+--------------------------------------------------------------------
    diff |           1.818182    .5947428                .5775701    3.058794
------------------------------------------------------------------------------
    diff = mean(1) - mean(2)                                      t =   3.0571
Ho: diff = 0                     degrees of freedom =       20

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.9969         Pr(|T| > |t|) = 0.0062          Pr(T > t) = 0.0031
```

Output for Shapiro-Wilk W test

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
fairnesssc~e	22	0.99283	0.182	-3.460	0.99973

Appendix E. Documents included in the final meta-analysis sample, chapter 6

Acheson, J. (2004) The development of the Maine lobster co-management law. *Workshop in Political Theory and Politiy Analysis, 2-6 June, Indiana University, Indiana, Bloomington, United States.*

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