

OWNERSHIP AND BELONGING IN THE BLUFF OYSTER FISHERY OF NEW ZEALAND

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Abstract The Bluff oyster fishery became part of New Zealand fisheries Quota Management System (QMS) in 1998 and management responsibility fell to the owners of individual transferable quota (ITQ). A group of conservation-minded Bluff oyster fishermen believe that the owners of ITQ are locked into a need for exploitation that will ultimately result in the fishery's demise. The proposition that private property rights encourage conservation through the self-interest of owners is questioned in a situation where establishing those property rights has meant the exclusion of the conservation-minded fishermen. Conservation-minded fishermen play an important role in the fishery viewed as a socio-ecological system. The concept of belonging is proposed as a complement to the idea of ownership in the theory of property-rights regimes aimed at managing local resources.

Introduction

The town of Bluff is located on Foveaux Strait at the southern tip of New Zealand, and is the home port for one of the world's last remaining wild oyster fisheries. For more than 130 years the Bluff oyster fishery has been a source of prosperity for the community. Bluff oysters are famous throughout the country and, while no longer easily affordable, they remain available in shops and restaurants during the winter harvest season. Since the mid-1980s the Bluff oyster fishery has faced a serious decline, and now produces less than seven percent of its former catch (Ministry of Fisheries 2006a:4). In December 1999, an insightful report by the New Zealand Parliamentary Commissioner for the Environment recognized the sad decline of the Bluff oyster fishery and posed the question: 'Where did we go wrong?' The same report signaled the need for fisheries research at the local level in New Zealand (NZPCE 1999).

The present study results from an on-site investigation based in the Bluff fishing community.¹ A total of more than four months was spent living in Bluff between 2002 and 2006 in order to interview more than fifty oyster fishermen in their own environment. In March 2006 the first

of an ongoing series of community meetings was held in Bluff and was attended primarily by retired oyster fishermen, community elders, and members of the Bluff Oyster Project team of the University of Otago. This research is primarily based upon the information provided by these members of the Bluff community. In helping with the research the oyster fishermen have provided more than thirty years of documentary evidence pertaining to the fishery including, records of meetings, official correspondence, newspaper clippings, photographs, and scientific reports. The fishermen have taken pains to maintain these documentary records in the community for many years.²

The Bluff oyster fishery currently supports eleven fishing boats with crews of between three and five men.³ The number of current oyster fishermen may therefore be less than fifty. However, until the mid-1990s there were up to twenty-three operating oyster boats in Bluff, most of them with five-man crews. The community of oyster fishermen and their families therefore number in the hundreds in Bluff and comprise a significant percentage of the town's total population of approximately two thousand.

The oyster fishery was licensed throughout most of the twentieth century. Oyster licenses were attached to individual oyster boats and were non-transferable. There were twelve boats in the oyster fleet until 1963 when the fishery was deregulated and the fleet expanded to twenty-three boats. From 1970 to 1996 the fishery was governed by advice from the Foveaux Strait Oyster Advisory Committee (FSOAC) made up of fishermen, oyster openers, scientists, boat owners, and government officials. Something of a balance between the voices of conservation and exploitation attitudes was achieved during this period though signs of overexploitation were present.⁴

In 1996 the Bluff oyster fishery was included in a government programme that aimed at progressively bringing all the nation's fisheries under the New Zealand Quota Management System (QMS). The government strategy was a broad-brush approach carried out with very little study of the particular situation with respect to the Bluff oyster fishery. The Bluff oyster fishery has a distinct industrial character in the separation between fishermen and boat owners. Fishermen are paid according to the amount of oysters they catch, and have no capital investment in the fishery. The oyster boats, the shore facilities (processing and distributing operations), and the licenses to harvest oysters (more recently the 'quota' are owned by the oyster merchants.⁵ With the introduction of the Quota Management System to the oyster fishery (circa 1996), property rights in the fishery were assigned, by the New Zealand Government, to the holders of oyster licenses, in other words, exclusively to the oyster merchants. In this way access to management of the fishery by fishermen was practi-

cally eliminated.⁶ The facilitating and mediating role that the Ministry of Fisheries had previously played in fishery management became neglected, and the presentation of a unified fishermen's voice, previously accomplished through the oystermen's union, fell silent.

The Bluff oyster fishery had been managed for decades under a system of quota limits. The key change that took place with the introduction of the QMS was the introduction of individual transferable quota (ITQ), a property right that radically altered the management structure of the fishery. Decision-making power was concentrated in the hands of the 'owners'. One fisherman said of the changes that, 'The owners must have had to pinch themselves to see whether they were dreaming (Murray Black, personal communication).' The Foveaux Strait Oyster Advisory Committee was replaced by an owner's group called the Bluff Oyster Management Company. The New Zealand Quota Management System relies on a certain direction by the Ministry of Fisheries. The Ministry of Fisheries can emphasize the property rights aspects of the system, allowing that rights holders should have full management responsibility (to the exclusion) of others, or it can emphasize the sustainability criteria of the Fisheries Act which might be interpreted as allowing more 'stakeholder' access to management. At the outset of the QMS in the Bluff oyster fishery, the Ministry of Fisheries stood back and let the Bluff Oyster Management Company take almost exclusive control of management, hence the disbanding of the FSOAC which at one time had provided a model of inclusive fisheries management in New Zealand.⁷

Management of the Bluff oyster fishery from 1996-2006 relied largely on the setting of quota by the Minister of Fisheries on advice from the Ministry's science providers. Meetings at which the information relevant to the setting of quota levels was discussed took place in the capital city of Wellington many hundreds of kilometres from Bluff, and while the meetings were technically 'public', and attended by representatives of the merchants, they were practically inaccessible to fishermen.

In 2006, after a period of ten years in which the fishery was managed by quota, but with no plan, the Ministry of Fisheries, (perhaps responding to its duty under the New Zealand Fisheries Act 1996 to ensure a sustainable fishery), has initiated a process of plan formulation for the Bluff oyster fishery. A number of conservation-minded fishermen (many of them now retired) objected that there was little input from fishermen in this plan, that it was 'a done deal', simply reflecting the merchant's position. However, there has been a great deal of media attention to the Bluff oyster fishery in the past year including TV and radio news, front-page headlines, and magazine articles (see Ansley 2006; Cranfield 2007; McKinlay 2006; Tipa 2006). The fishermen's story is becoming known and the Ministry has asserted in the media that fishermen will be allowed to be part of

the management process. At a fishermen's meeting on March thirteenth, 2007 a Ministry representative invited those present to an open meeting (for the purpose of data presentation) to be organized by the Ministry at a future time. Fishermen have expressed an openness and willingness to participate in planning for the fishery. However, it is one thing to be invited to attend data presentation sessions (at which, in the past, fishermen have felt talked down to by scientists), quite another to be respected as part of the institutional foundation on which the management system is based, and accorded rights enforceable by law.

This paper discusses the effects of the QMS at the community level in the Bluff oyster fishery. It introduces the concept of *belonging* in contrast to that of *ownership* as a way of understanding current problems and envisioning improvements in management. The paper describes how management by property rights can exclude cultural factors essential to the health of the fishery, and considers the importance of the concept of *belonging* alongside that of ownership in a property rights regime.

Knowledge, culture, and place are essential prerequisites for framing a sense of belonging. In turn many interesting aspects critical to sound management of the fishery are revealed when discussing the fishery in these terms. Also, a development in the theory associated with the study of common pool resource systems that links social and ecological systems leads to the suggestion that *belonging* might play an ecological role in the management of the Bluff oyster fishery (Berkes, 1998; 2003).

Ownership and Belonging

About fifteen years ago, Jim Roderique, now over eighty years old, and a Bluff fisherman all his life, had an encounter with the late Stan Jones, a member of the Bluff oyster fishery's influential oyster merchants group. A newspaper article from that time had appeared in which Jim had warned of the destruction of the oyster environment caused by the use of heavy oyster dredges.⁸

'You keep your bloody nose out of it', Stan told Jim, and then continued, 'We merchants own the Foveaux Strait.'

'The Foveaux Strait belongs to the people of New Zealand', Jim protested, 'and what about the future generations?'

'What have they done for me?' Stan replied. (Interview data)

The usage of the terms *own* by Stan, and *belongs* by Jim are interesting and meaningful in the context of this exchange relative to their implications for the relationship of people with place, and with the socio-political issues on which the fishery depends. The word *belong* suggests a wider

and deeper relationship than does ownership in that it is an inclusive rather than an exclusive concept. The words *own* and *belong* highlight a contrast between the limited needs of ownership of an individual, and the limitless ability of people to participate in the world surrounding them. *Ownership* puts the power of possession in the hands of the owner, while *belonging* implies a deeper and almost metaphysical association of people and place.

A strong feeling of ownership of the resource resides with the Bluff oyster merchants (this group is also known in Bluff as the 'owners'). The merchants' claims to exclusive rights in harvesting and managing the fishery are based upon the ownership of individual transferable quotas (ITQs), which are administered through the QMS. Because ITQs are property rights they carry with them connotations of the *fee simple* exclusive enjoyment of a full bundle of rights associated with private property on land. The problem with this view of ITQ is that the powerful connotations of exclusivity associated with ownership appear to carry more weight than do other rights, including the right of participation in management for those who do not possess ITQs. Stakeholder groups have some management rights under the New Zealand Fisheries Act, but they are not at all well defined, and are unable to prevail against the much better defined and indulged rights of ownership associated with ITQs (Knight 2004:18). This raises a question of whether the connotations of exclusivity and ownership associated with ITQs are excessive. Neither the seabed nor the oysters, in their wild state, are owned by the ITQ holders. The owners possess only the right to harvest a certain quota of oysters within the sustainability criteria set out in the New Zealand Fisheries Act 1996.⁹

Recognizing the importance of community as well as stakeholder participation in modern fisheries management, a concept is needed that can stand up to the powerful connotations of exclusivity associated with the ownership of ITQ. The concept of *belonging* is suggested as it seems to transcend the concept of ownership and to connect with the broader contexts of community and society. The verb *belong* infers a relationship between fishermen and the fishery. The noun *belonging* denotes a relationship between people, between people and place, and between people and their resource systems. *Belonging* is a potentially powerful concept, because it contains a social and moral foundation which can contribute to the virtual, if not legal, legitimacy of property rights. *Belonging* also leads to a deeper and wider context in which to situate the fishery. Just as property rights have an object, something that is owned, the relationship of *belonging* implies something that individuals, communities and societies belong to. A community is one important object of the relation of *belonging*. At a more general level, society or culture might form the object of *belonging*. Place is also an important object of *belonging*, and the fact that

community, culture and place are interrelated also helps to develop the concept.

Fishermen's Knowledge

One of the principal informants interviewed for the current paper used the term 'practical' to describe fishermen's knowledge. The term is used by fishermen to indicate an approach gained from the practice of fishing. Fishermen contrast this practical knowledge with the ideas and approaches promulgated by the consortium of industry, government, and science agencies currently managing the fishery. This management is dominated by measures, which although based on the rational model supporting scientific data, may be difficult for the fishermen to reconcile with the evidence on hand, i.e. the poor catches that end up on the decks of the oyster boats.

Most available information on the Bluff oyster fishery is shared between the Ministry of Fisheries (MFish); the Ministry's science provider, the National Institute for Water and Atmosphere (NIWA); the oyster industry, and the fishermen. Hence, it is not the facts themselves, but the way in which the facts are emphasized by one or other of the parties, and the consequent implications for management that are at issue, and that create the variances between the different modes of knowledge in the fishery. In discussing fishermen's knowledge the principal aim is not to try to establish whether or not the fishermen are right or wrong, as even they often take opposing positions on certain issues. The discussion is more concerned with the diversity of the knowledge base and drawing attention to the existence of a fund of knowledge, namely fishermen's practical knowledge, that should be given formal recognition in fishery management.¹⁰ In the descriptions that follow, it is differences rather than similarities that dominate the discussion. This sometimes unfortunate divergence of thought illustrates one of the themes of this paper, which is that an imbalance in the social ecology of the fishery has occurred. The situation is addressed through a discussion of ownership and belonging, and it is argued that giving equal recognition to these two concepts could serve to bridge divisions and restore balance in the fishery's management.

In developing an understanding of fishermen's knowledge it is enlightening to compare and contrast fishermen's practical knowledge with that of the reports by the Minister of Fisheries which represent a 'scientific' approach (for example New Zealand Ministry of Fisheries 2006a).¹¹ There are some firmly held positions on the major issues that can be attributed to one or the other of these approaches to knowledge of

the fishery. The differences are illustrated here by reference to two inter-related issues, the rate of exploitation in the fishery and oyster disease.

Rate of Exploitation

At least two key research informants (former oyster skippers) believe that MFish has overestimated oyster populations for decades (interview data). They believe that this fact is corroborated by historical evidence in the form of catch effort landing returns. However, the argument is difficult to prove due to the fact that oyster populations are calculated on a different scale from that which informs the practical experience of the fishermen. Fishermen know that fishing pressure is intense on local populations of oysters, and that specific oyster beds have been targeted and fished to commercial extinction (Moore *et al.* 2005).¹² MFish, in contrast, calculates oyster populations based on statistical methods that average and extrapolate population values over areas much larger than the individual oyster beds targeted by the fishermen.¹³ Thus an attempt has been made by MFish to show that only a sustainable portion of the total population of oysters is fished in any year (less than ten percent of the standing stock). However, fishermen have stated that in targeting specific populations of oysters over ninety percent of the mature oysters are taken from fished areas.¹⁴ The Ministry of Fisheries and their science providers, NIWA, have created abstractions (for example population models and associated exploitation rates) that have allowed the industry virtually unabated exploitation despite dwindling catch rates.¹⁵ The conservation-minded fishermen, trusting the evidence they see brought in on the decks of oyster boats, warn of the consequences of continuing in such a manner. The result is that the practical knowledge of fishermen and the particular scientific perspective on which management is based, have become polarized and confrontational, and appear to be working to opposite ends.

Greed was often cited in interviews among the Bluff community as the cause of unhappiness in the oyster fishery. In economic terms it could be said that decisions in the industry are based on short-term economic needs. Those that have wealth will protect and enhance it by any means possible, and those criticizing the practices of those in control are discounted as envious have-nots. But it should be possible, as a result of the analysis begun here, to see the problem in another light. In this way division in the fishery is not the expression of inevitable human conflict, but the result of the absence in management of an appropriate knowledge held by the conservation-minded fishermen. Division then becomes a systemic problem, a problem of institutions, in other words, a problem with the organization of the fishery and not with the nature of the fishery. If knowledge from an important source, i.e. the oyster fishermen, is lacking then a way should be sought to re-include it in the decision making

process. In a management regime based on property rights, it is about how to work to include fishermen in the institutional framework of the QMS. Having knowledge is not sufficient *per se* for establishing property rights, but as part of the larger category of *belonging*, it might reasonably entail a right to be included in management.

Oyster Disease

Samples taken from Foveaux Strait oysters in the early 1960s have indicated the presence of *bonamia sp.*, a parasite which, although harmless to humans, can rapidly invade and destroy large populations of oysters. The presence of *bonamia* is suspected to be the cause of at least one poor oyster season in the early 1960s though scientific information from the period is sketchy. In 1985 a catastrophic epizootic caused by *bonamia* resulted in a closure of the commercial season. The fishery was reopened in 1986, but closed from 1993 to 1996 after new waves of oyster mortality again appeared. Disease reappeared in 2001, and is still highly prevalent in the fishery (New Zealand Ministry of Fisheries 2006:17).

The position of the oyster industry is that mortality from oyster disease outweighs any negative impact on the total oyster population that fishing pressure might cause. 'The oysters are going to die anyway, you might as well catch them', is a view that MFish has encouraged (New Zealand Ministry of Fisheries, 2006,15,17). In contrast to this view a conservation-minded fisherman has stated that it is not possible to know which oysters will die of disease and which will not, and so it is better not to catch any oysters at all.¹⁶ Once again, practical knowledge that is related to belonging in the fishery is seen to hold a potentially important message for conservation. The age-old problem in fisheries is how to avoid over-exploitation of the commons due to open access. To suggest that oysters should be caught before they die of disease, or disappear due to natural causes, is no different from suggesting they be caught before someone else catches them; the view runs counter to fishermen's efforts at resource conservation. The difference between the practical approach of simply not fishing when the stress of disease is present, and the elaborate justification for continued fishing based on an arrangement of data 'at the scale of the fishery', is indicative of the difference between *belonging* and *ownership* and is a point requiring reconciliation.

Fishermen's Culture and Morality

The discussion of fishermen's knowledge has been presented in connection with, and to help describe, the concept of *belonging*. Another aspect of *belonging* related to fishermen's knowledge, but slightly wider in scope is

the association of *belonging* with fishermen's culture. Here the focus of interest is on the unique way of life and the culture that has developed over a hundred and fifty years of Bluff's fishery. There are probably many aspects of the fishermen's culture that are relevant to the theme of *belonging*, but here the focus is on the fishermen's moral sense. The word moral is used not in the narrow sense of adhering to prescriptive rules, although this may result of such adherence, but rather in the wider sense of responsibility to the fishery and the behaviour and commitment that goes with that responsibility. Moral values complement fishermen's knowledge and play an important role in conservation of the fishery. If *belonging* is characterized by a certain kind of thinking, and this paper has begun to describe that this is the case, *belonging* will also be characterized by certain ways of behaving. In this section aspects of fishermen's culture and morality are described. Once again, the purpose of the examination is to identify a quality of *belonging*, and to make a case for the existence of a relationship that cannot be experienced directly.

The wharves of Bluff are home to a fisherman's culture that reached a high period in the middle of the last century. The fishing culture of the time was exemplified by the gatherings that took place in the fo'c'sle of oyster vessels on stormy winter mornings. On such days, crews of several vessels, attracted by a welcoming light in the fo'c'sle of one of the boats, would descend for the warmth of the stove, a cup of tea and the company of friends. The eyes of older fishermen sparkle at the recollection of these times, marvelling at the extraordinary company and story telling that were part of these gatherings (interview data).

In addition to their social aspect, the fo'c'sle meetings were an opportunity for fishermen to exchange information and to agree upon their fishing strategies. In such a society norms are formed and peer respect is obtained by becoming a 'good' fisherman. A good fisherman was expected to catch high tallies of oysters while respecting other fishermen and also the health of the fishery. 'Mollyhawking', meaning following other boats around and encroaching on another skipper's 'tow', was discouraged.¹⁷ Skippers worked their tows individually, and were able to husband the resource by moving from area to area practising a form of rotational fishing of the oyster beds. When catch rates in sacks per hour dropped beneath a certain level (historically approximately eight sacks), fishermen moved to other areas. Though this strategy has broken down with the fishery's depletion to the extent that eight sacks might represent a good day's catch in the current (2007) season, fishermen know of the conservation efforts of their elders, and continue to judge whether one is a good oysterman, or not according to the norms established by their elders (interview data).

The arguments presented here rely on the existence of a conservation ethic among fishermen. The existence of this ethic does not mean that its opposite, a taste for unbridled exploitation, does not also exist among the fishermen. The Bluff fishermen have admitted to the wilful destruction of several important oyster beds in the past.¹⁸ However, the admission of poor practice and the willingness to discuss, and to potentially rectify these wrongs is itself a part of a conservation ethic. The conservation-minded stance of the fishermen in opposition to the exploitative attitude of the oyster merchants is well documented by many years of evidence in the form of minutes of management meetings and newspaper articles. Fishermen in Bluff have been speaking out against overfishing at least since the 1930s, and it is difficult to ascribe self-interest as a reason for doing so.¹⁹ Fishermen risk social consequences within their community for taking an unpopular conservationist stance, as well as loss of income that is the result of reduced catches.

One difficulty encountered in sounding out the views of fishermen was the difference between those currently working the fishery and those that have 'given it up' for one reason or another. Currently employed oystermen were reluctant to discuss their experiences and views on the fishery. Some of these are circumspect concerning their livelihood, and refuse to participate in any activity that poses any risk to their immediate income. Thus they are not likely to engage at the community level in suggesting improvements to the management of the fishery. The energies of the currently fishing skippers are focused on earning a living from a decimated fishery, and negotiating as best they can for the sale of their considerable and highly specialized skills and experience in a very small and tightening market. They are likely to be contemptuous of the conservation efforts of retired or former fishermen based on a supposed superior knowledge of the fishery based on current experience.

This research claims to have identified a conservation ethic located principally in the elder and retired fishermen.²⁰ The arguments presented here do not claim an exclusive version of the truth, but they do help to describe aspects of the quality of *belonging* as represented in a number of aspects of the Bluff fishing culture. Conservation, it seems is closely tied to *belonging*. And it would seem that a management regime that incorporates both *ownership* and *belonging* in its institutions would be more in keeping with the ethic of sustainability than one based primarily on *ownership*.

Discussion and conclusions

This paper has advanced an argument for the building of a concept of *belonging* based on fishermen's knowledge and culture. However, a review of the history of management of the Bluff oyster fishery reveals that something similar to the concept of *belonging* has been part of the fishery for many years. The Foveaux Strait Oyster Advisory Committee (FSOAC), which managed the fishery between 1970 and 1996, was comprised of merchants, fishermen, oyster openers (plant workers), retailers, and science workers, all of whom owed their membership in the committee to the fact that they *belonged* to the fishery.

When the QMS was introduced to the Bluff oyster fishery in 1998, it replaced a system of management, based on the concept of *belonging*, that was much more inclusive and that provided the opportunity for stakeholders within the fishery to present and discuss opposing views (Knight 2004). The institutions of ownership and property rights that now restrict involvement in the QMS to those with ITQ have resulted in the exclusion from management of a range of viewpoints that had traditionally informed the fishery, and the association between belonging and the resource has broken down. Key knowledge about the fishery, combined with a conservation ethic, is now held by a group other than those who currently hold the resource rights. For this reason it is suggested that the QMS lacks an important ingredient necessary to the management of the fishery. If management is considered part of the ecology of the whole fishery then *belonging* has an ecological role presently missing from the system.

The fishermen's culture is a product of their fishing activities, and yet it is overlooked or undervalued as a part of the fishery that warrants attention. The Parliamentary Commissioner's report of 1999 makes no mention of the oyster fishermen, neither do any of the annual reports of the Ministry of Fisheries concerning the fishery, nor does the Ministry's recently formulated Foveaux Strait Dredge Oyster Fisheries Plan (NZPCE 1999; Ministry of Fisheries 2006a, 2006b). Re-inclusion of fishermen, and explicit recognition of their practical knowledge in management will require political will together with an advance in the theory of management by property rights that would include *belonging* as a complement to *ownership*.

The institution of property rights is a powerful and perhaps necessary tool with which society accomplishes the sharing of resources. However, in certain cases property rights might contribute more to the demise than to the success of a fishery. Given this, they need to be reviewed in the light of local conditions. The Bluff oyster fishery possesses a particularly rich social history and culture that is the result of more than a century of

belonging of the fishermen, their community and broader society to the resource through common ownership. For property rights to work well they must refer to this social basis and they should be embedded in the culture of the commons (Jentoft *et. al.* 1998). Individuals do not *own* the culture of the commons, rather they *belong* to it and symbiotic property rights are needed that reflect this fact.

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Notes

- ¹ The Bluff oyster fishery fieldwork took place as part of the author's PhD studies at the School of Surveying, University of Otago (see Knight 2006).
- ² See Knight (2006: appendices) for a catalogue of the fishermen's documentary sources.
- ³ Bluff oyster fishing vessels are mainly wooden vessels 20-25M long, (4.5-6.M beam), deep-draughted, with a round bilge. Many were converted from steam to diesel having served the fishery for generations. See Knight (2006) for a description of Bluff's fishery history, fishing techniques *et cetera*.
- ⁴ See Knight (2004) for a detailed discussion of the fishermen's concerns with respect to overfishing; see also this paper below.
- ⁵ There are a few cases of fishermen who are also boat and quota owners. The vernacular term 'owner' is synonymous with that of 'merchant', and used in Bluff to denote the oyster boat and oyster factory owners. While there are some owner-fishermen, most owners are shore-based business people.
- ⁶ See Knight (2004) for a detailed account of the rationalising of the oyster fleet that occurred in the mid-1990s as a result of the QMS, and that resulted in many fishermen losing their employment.
- ⁷ See Knight (2004) for more detail on the Foveaux Strait Oyster Advisory Committee and power relations within the fishery.

- ⁸ Oysterman fears for future of beds. Southland Express, Invercargill, July 16th, 1992: 4.
- ⁹ See also the New Zealand Fisheries Amendment Acts 1998-99. The following question may be raised: To whom do the oysters belong if not to the oyster merchants? Leaving aside legal arguments pertaining to the ownership of wild creatures in their natural environments, it is perhaps important to note that there exists a general perception, often voiced by fishermen, that the resource 'belongs to the people of New Zealand'.
- ¹⁰ Some informal recognition of the value of local knowledge in the fishery has recently taken place. The New Zealand Ministry of Fisheries sent a researcher to Bluff in June 2006 to collect information from fishermen. However, the collection of local knowledge by MFish does not mean that fishermen are provided a role in management of the fishery. In order for local knowledge to be appropriately used, the fishermen's knowledge should be contributed by the fishermen themselves in the context of fisheries management.
- ¹¹ It is important to recognize that not all science surrounding the Bluff oyster fishery is in conflict with the practical approach advanced by fishermen. In fact the majority of the published science on the oyster fishery (see Cranfield 1999; 2003; 2007) has incorporated fishermen's knowledge in its findings, and is in essential agreement with the position of the conservation-minded fishermen.
- ¹² That oyster beds can be fished to commercial extinction has been known since the 19th Century when the Stewart Island beds in which the fishery originated were closed to commercial fishing due to their depletion. Overfishing is nevertheless denied by the industry, and, as a word or idea, is singularly absent from the vocabulary of official reports on the fishery (see, for example: New Zealand Ministry of Fisheries 2006a).
- ¹³ Oyster population is calculated from surveys that use an oyster dredge to sample the seafloor at predetermined intervals or locations. Even the most intense historical surveys were sampled on a grid of no less than 0.3 nautical miles. At this scale it is impossible to delineate oyster beds that the fishermen assert are as small as one or two hundred metres in extent.
- ¹⁴ This statement relies principally on the oral evidence of three former oyster skippers with a combined experience of nearly 100 years in the fishery including lengthy involvement in fishery management. It is confirmed by the historical record of official oyster bed closures, and corroborated by scientific investigation into the changes in the Foveaux Strait seafloor that are the result of oyster dredging (see Cranfield *et al.* 1999).
- ¹⁵ Under the Quota Management System a quota is set thereby ostensibly placing a limit on exploitation. However, conservation minded fishermen argue that the quota simply follows the downward curve of the dwindling supply.

In other words the quota is set close to the maximum possible take for the fishery.

¹⁶ The oysterman in question is Murray Black, a retired oyster boat skipper with thirty years experience in the fishery. Murray Black's lengthy service to his fellow fishermen as union president, and as fishermen's representative on the, now defunct, Foveaux Strait Oyster Advisory Committee have made him a natural leader of Bluff's conservation-minded fishermen.

¹⁷ 'Mollyhawking' is a fishermen's slang word derived from the seabird, Buller's mollymawk (or mollymawk), *Diomedea bulleri*, which is often found following fishing boats in Foveaux Strait.

¹⁸ During the interviews with fishermen for the extraction of geo-spatial information on the fishery numerous accounts of overfishing were documented (see Hall, *et al.* 2007).

¹⁹ See for example the following newspaper article: Bluff Oyster Beds Threatened, Famed Industry Menaced, Immediate Closing of Coast Area Urged, *New Zealand Truth* 1938.

²⁰ Part of this evidence is documentary and is contained in the historical record, while part comes from interviews with fishermen. Further evidence for this conservation ethic may be found in the fact that the elder and retired fishermen have continuing concern for the fishery. Cf. Bluff community meetings of March 13th; June 1st; and August 26th 2006. March 27th, 2007. Video excerpts from the first of these meetings are provided online at: <http://gaia.uwaterloo.ca/bluffweb/index.html>

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