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Stream: Fisheries
Discipline: Geography

"Geographical Problems in Implementing ITQ: New Zealand's Quota Management System"

Conflicts between different users of the coastal and marine areas of nations have grown as increased pressures are placed on these environments. Over-exploitation of fisheries and the growth of marine aquaculture are two areas that have become the centre of much concern (FAO 1995, Bailey et al 1996). These conflicts have led to international acceptance of the need to develop integrated coastal and marine resource management systems (de Fontauberg et al, 1996).

Concurrent with this move towards Integrated Coastal Management (ICM) there has been increasing recognition of the need for greater involvement of communities in the decisions that will effect them and the resources on which they depend. However, two distinct approaches have evolved to implement enhanced community management. The first is a planning system based around some form of planning agency or body (exemplified in New Zealand by the Resource Management Act 1991 framework). The second approach is one in which individuals are allocated property rights to the resource through a mechanism expected to provide incentives for the individuals to work together to plan and manage their community development.

This second approach is exemplified in New Zealand by the Fisheries Act 1996. Under this Act the Quota Management System uses the allocation of individually transferable quota as a form of private property right to enable individuals to commercially harvest fish from specified quota management areas. The two approaches overlap, but are philosophically and technically oppositional and the consequent management regime is not well-integrated (Rennie, 1993). This institutional separation is common among developed countries and because of its significance to the planning approach that results, it requires careful attention. But before exploring this further it is necessary to place this discussion within its geographic context.

New Zealand's Cultural Coast

New Zealand has a long coastline and in 1978 declared a 483 million hectare Exclusive Economic Zone (EEZ). Estimates of the extent of the coastline vary dependent on map scale and precision of measuring instrument, but it is in excess of 15,000km and the territorial sea is approximately 16.3 million hectares. The coastal environment is richly diverse, but, despite its size, has relatively low-productivity seas. The annual marine catch peaked at over 650,000 tonnes (530,000 tonnes of fish; nearly 120,000 tonnes of invertebrates, excluding illegal and

discarded catch) (Ministry for the Environment 1997). The diversity reflects the combination of geologic and geomorphic history; the relative isolation from other landmasses and the consequent opportunity for biological evolution to proceed with limited interference; the country's position as a natural barrier to major wind and oceanic current circulation systems; the latitudinal spread of the country across 20 degrees; and the interaction of the land-forming processes with those of the sun, sea, air and biota to create the various coastal, marine and submarine environs.

Since humans first arrived in New Zealand, the coast has played a prominent part in the everyday life, culture and economy of those who have settled here. Marine-based recreation has continued to grow. Marine reserves (no-take areas) and taiapure (arguably Maaori/Government co-management controlled fishing areas) have increased in number and spread across the territorial sea. About 16 percent of the nation's population is involved annually in recreational fishing (Kilner and Teirney, 1997). Access to the coast and the related freedom for the recreational fishing and other activities has been regarded as part of our birthright, and is jealously guarded. New Zealand, therefore, has a strong cultural connection to its marine endowment, but one that rests as much on recreational use as it does on commercial development.

The QMS and ITQ

New Zealand implemented a Quota Management System (QMS) for its commercial fisheries in 1986. Fundamental to the system is the concept of Individual Transferable Quota (ITQ) the holding of which determines who has the right to access the commercial fishery. Effectively this is a system for distribution of property rights to individuals over a geographically situated common pool resource. Despite generally positive claims made for the effectiveness of the system, there are significant difficulties in its implementation, some of which have ended in, or are currently before, the courts. *It is argued in this paper that the failure to take into account simple geographical understandings of the nature of the ITQ system lies at the heart of these difficulties.*

The QMS is well explained elsewhere (eg. Annala 1996, Dewees 1989, 1997, Sissenwine and Mace 1992) and the presentation here is therefore not comprehensive. The QMS is based on a Total Allowable Catch (TAC) being set by the Minister of Fisheries for each stock of a quota fishery. It is set, essentially, at a Maximum Sustainable Yield (MSY) level with some qualifications that I will not go into here. Within that TAC, a Total Allowable Commercial Catch (TACC) is set by the Minister. The TACC is then automatically distributed to holders of individually transferable quota (ITQ).

The ITQ represents a *right to harvest from a particular quota management area (QMA)*, and hence requires a geographical perspective. It is calculated as a proportion of the TACC for that species for that QMA. Thus if a quota holder owns the right to harvest 10% of the TACC, and the TACC is set at 1000 tonnes one year, and 2000 tonnes in a subsequent year, then the actual tonnage the quota holder is entitled to catch (the Annual Catch Entitlement (ACE)) is 100 tonnes and 200 tonnes respectively.

ITQ are *in perpetuity* rights which can be traded (or inherited) in the market-place. They are effectively bankable property in a similar manner to shares or land titles. The ACE, a

relatively recent specific addition to the structure, is dependent on the holding of quota, but can be traded provided it maintains a connection to the original ITQ. I do not intend to go into the mechanics of the ACE relationship to ITQ, the rationale or its implications. *It is the ITQ that is the critical element in the privatisation of the New Zealand fishery resources.*

The underlying concepts of the QMS are:

- ITQ distribute the right to commercially harvest fish;
- ITQ are output based;
- ITQ are intended to facilitate market rationality in achieving efficiency in the operation of the *commercial* fishing industry.

Although these are interlinked, I will address each in turn. It is the implications of these which need to be understood and I wish to ensure that the distinction between what ITQ do achieve and what they do NOT do is clearly established.

ITQ Distribute the Right to Commercially Harvest Fish

Whoever owns ITQ owns the right to harvest from a particular area. This does not mean that they will harvest the full amount to which they are entitled. There may be various reasons why quota holders do not seek to harvest the full amount (eg. vessel difficulties, cultural or financial reasons, etc). In promoting ITQ systems it is often claimed that they are a means to ensure sustainability of the fishery. This argument is based primarily on the belief that the owning of ITQ provides a quota holder with considerable certainty for making investment decisions. This should lead to quota holders taking a long-term perspective on the fishery, and therefore seeking to maximise their long-term returns, rather than short-term gains.

However, if ITQ are effectively similar to a shareholding in an industry, then the owners' perception of the value of the ITQ reflects their investment strategies. Are they "in the business" (as a vocation) or are they an investor, a "Wall Street" accountant, trading shares in pursuit of the highest return possible on their capital, regardless of effects on the industry?

Just as in any other business, there are built-in incentives to "talk up" the value of quota by predicting growth. Talk of declines in the fishery will lead to devaluation of the quota. At different times, different companies may be more or less stretched for cash, for instance to purchase new gear or vessels. In such situations they may be less inclined to have their quota devalued in the eyes of potential lenders. They are therefore likely to contest any attempt to reduce the TACC even though, in the long-term, it might be beneficial to the industry to reduce a TACC and thereby allow the fishery to rebuild.

Distribution is also dependent on the mechanism for initial allocations of ITQ. If ITQ are distributed on a simple tendering basis, then those with the most capital resources at the time of tendering will accumulate the most quota. Unless some limits to quota aggregation are put in place this could lead to the fishery becoming, if not a monopoly, at least an oligopoly. If an attempt is made to recognise the sunk costs of existing fishers, who most likely have been the people who have found and proven the resource as commercially valuable and therefore viable, then how and to whom will this be distributed? If on catch history, over how many years should this be calculated, and how do you avoid fishing for quota in fisheries before the fishery is moved into the QMS? How are the interests of crew and other implicit shareholders (eg. family) to be recognised?

ITQ are Output Based

The standard approaches to fisheries management prior to the introduction of ITQ type arrangements tend to be based on controlling *inputs* of effort (eg. boat length, mesh size/gear type, closure of areas, adjustments of season lengths, etc). A key argument for the introduction of ITQ was that ostensibly with ITQ you no longer needed input controls, or face had the difficulty of enforcing them. You are only concerned about the tonnage of fish being harvested. If the TAC is set appropriately then the means of harvesting the fish do not matter in terms of sustainability of the fish stock and the ITQ provides an incentive for the owner to ensure the ongoing viability of the stock. If the fish are required to be landed and processed through licensed fish receivers, and adequate records are also required, then enforcement is much simpler and more cost-effective than trying to have people out in the boats, policing the fishing effort. Distance, population size and character, and the physical geography of an area are all critical parameters in the effective 'on-water' logistics of fisheries enforcement which are removed from the equation if ITQ are implemented and fish receivers become the focus of enforcement.

In New Zealand, the advantages of output-based approaches were put very forcibly by proponents of ITQ. On some occasions I heard it argued that there should be no form of input controls at all, and that all adverse effects could be addressed through the appropriate setting of TAC. This approach clearly overlooked two things: the potential impact of different methods of fishing on the ecosystem and environment in which fishing took place, and the impracticality of setting TAC for very small areas, or for parts of the water column.

In other words it ignored geographical realities of the management of fisheries and, in particular, it overlooked the spatial context of the property rights encompassed in the ITQ. As subsequent court actions were to prove, there was a strong legal argument that, once having bought a 'right to harvest within' a QMA, any attempt to restrict the area within the QMA was effectively an imposition on that right and the Crown might be liable for compensation. This could be argued whether the restrictions were imposed on gear types for matters of fishery conservation or for the purpose of establishing marine farms or marine reserves (no take areas). It also applies to changing the QMA boundaries.

In a recent Parliament Select Committee report on requests from the Chatham Islands' community (arguable the closest to being a fisheries dependent region in New Zealand (Rennie and Holmes 1998)) to grant them management over their adjacent inshore fisheries, perhaps by altering fishery boundaries, the Committee commented:

“We do not support this suggestion. The implementation of this option would seriously infringe on the property rights of non-Chatham Islanders who hold quota in the existing QMAs surrounding the Chatham Islands. Quota allocated under the QMS is a property right which allows the quota owner to harvest fish throughout the appropriate QMA.. To subdivide an existing QMA by statute would be confiscation of property and would require compensation. Legislating for the reallocation of property rights would seriously destabilise the QMS which is based on ownership of individual tradeable property rights.” (NZ House of Representatives 1995:7)

(Instead the Committee recommended the preferential allocation of any new quota to a community trust to ensure that over time the trust gained increased control over the area. This trust is the closest to a community quota in the New Zealand QMS.)

However, despite the presence of community interest in fisheries management, the mid-1980s proponents of the QMS and ITQ successfully used the theoretical arguments for output-based management to remove the provisions for community-based fishery management plans (FMPs). These FMP provisions had only been introduced into the fisheries legislation in 1983, and enabled the wider community to participate in decisions on the type of gear restrictions that could be employed. They attempted to recognise the geography of the resource system. These plans also incorporated elements of social planning, a matter I will return to shortly.

ITQ Facilitate Market Rationality

Because ITQ are tradeable, they enable the market to determine the most appropriate levels of investment in the industry relative to investment in other sectors. There is no need for government subsidies to the fishery. This meant that New Zealand could more easily take the international high ground when arguing for the removal of subsidies and trade barriers in the primary sector, while at the same time cutting government costs. The government's desire to 'keep out of business' was coupled with a wish to avoid the implication that it was involved in social 'engineering' by directing where development should take place (eg. through prescriptive or restrictive planning approaches).

The expectation was that, once ITQ in a fish stock were distributed, the quota holders would form quota holder organisations with internal contracts. These contracts might lead to the industry self-policing its use of the fishery. There was a possibility also that depleted stocks would be more rapidly rebuilt because the internal quota holder association contracts would enable the holders to set a lower catch than that specified by the Minister.

It was also clearly accepted that the industry would have to meet the full costs of setting the TACC, and a substantial portion of the TAC. This was based on the principle that if the industry did not exist there would be no need to spend the money in setting TACs (because no species would be threatened without an industry). In other words the externalities (the costs born by society as a consequence of the effects of the industry - in effect a hidden subsidy) would be internalised by the industry. The corollary was that, adopting the 'user pays, user says' principle, the fishing industry would have a much greater level of control over the nature of the research to be undertaken.

To ensure efficiency such research should be competitively tendered. Consequently, the fisheries research capacity of MAF was shifted to NIWA (a Crown Research Institute) in 1995 and there is now a competitive process for gaining research funds to meet research priorities which are largely set by the fishing industry.

Key Problems

It is unclear whether the fisheries are fished more sustainably than previously. If they are, it is also doubtful that this could be attributed to any one factor, and certainly not to the

implementation of ITQ alone (see Sissenwine and Mace, 1992; Annala, 1996; Wallace, 1998). My gut feeling is that some form of ITQ is a useful tool, but it could equally be a community-based quota, or be within a framework that encouraged producer cooperatives. There is no doubt that the QMS has resulted in quota aggregation, with all except one of the QMS species in New Zealand having fewer quota holding entities than when they were first issued (Table 1). The 10 largest companies currently own 75% of ITQ (Clement and Associates 1996). Aggregation may well have been greater were it not for statutory limits (35% of a quota in a QMA for a species).

The key avoidable problems with the approach in New Zealand have been the pressures placed on the TAC setting system, and the failure to understand the nature of the rights over and governance of the marine environment. These rights form part of, and are affected by geography.

Governance and Rights Over the Commons

The ITQ approach reflected the rhetoric of Hardin's 'Tragedy of the Commons'. Consequently it overlooked alternative management systems and approaches, including concepts of co-management which are well-grounded in Canada. It assumed that, as fish are 'fugitive' resources and unowned in the wild, the only rights to the resources were those obtained by actual capture of the fish. Once caught the fish belongs to the fisher. So the ITQ was related to the right which government owns/creates, on behalf of the people of the nation as a whole, to allow access to areas to harvest fish. This ignores the possibility that communities might already have well-established social processes for allocating certain areas for fishing purposes through *de facto* processes. It also ignored the New Zealand cultural reality, which is that New Zealand was, and is, *not* a fishing nation (in the sense that Iceland or a province like Newfoundland might be considered fishing nations (Rennie and Holmes 1998)).

New Zealand's domestic fishery was dominated (in numbers) by part-timers. In some regions these were often people who included fishing as one seasonal commercial activity in a year of varied commercial work (eg. together with forestry, etc). The expansion of the commercial fishery reflected heavy subsidisation by the pre-1984 interventionist governments, coupled with the declaration of the Exclusive Economic Zone in 1978. However, ***a key to the successful establishment of the ITQ system was the government's 1983 decision to remove the commercial status from all fishers who gained either less than 80% of their income or less than NZ\$10,000 per annum from fishing. This affected an estimated 1500-1800 fishers, but reduced actual catch by less than 5% (Wallace, 1998). It also had a more significant impact on Maaori than on Pakeha for a variety of reasons that I will not explore here.***

Basically this regulation made it simpler to introduce the ITQ system. No compensation was considered for the former part-time fishers. In New Zealand, Northland was among the most affected regions. With a high unemployment rate and high proportion of Maaori, it now also is recognised as one of the main areas for growing marijuana and having an illegal drug problem. It is not surprising that the successful Maaori challenges to the legality of the Crown's claims to be able to allocate rights of access were initiated in the North (Memon and Cullen, 1992).

In addition to the existing part-time fishers and Maaori rights to fish, New Zealand has a strong marine recreational fishery. In New Zealand, surveys indicate about 16% (about 390,000 people) of the population is involved in recreational fishing annually (Kilner and Teirney, 1997). There is only one region (the Chatham Islands) which has a percentage of its workforce greater than this level of recreational fishing. New Zealanders seem to consider it part of their birthright to be able to go down to the sea to 'catch a feed' or just to fish for fun. In one of the major commercial fisheries (snapper, in the Auckland region) the recreational fishery is estimated to catch almost a third of the TAC.

The value of the recreational fishery is unclear, but it seems likely that the investment into catching one fish in the recreational sector is much higher than the equivalent of one commercial fish. When the sport fishing industry is included this becomes an even more significant form of investment, and, for many, a preferred lifestyle. This raises the issue of representation in the fishery decision-making process, but also brings into question the allocation of *in perpetuity* ITQ.

If ITQ had been introduced in the days of whaling, would the multi-million dollar, sustainable, whale *watching* industry in Kaikoura have been established? What future industries are we foreclosing by unnecessarily providing *in perpetuity* harvesting rights to areas? Under the alternative regime, the Resource Management Act, permits have a maximum life of 35 years, and are not automatically renewable. Changes in community views are expressed through the planning process and this guides investment in permits, and in the technology to avoid damaging the environment. Consequently, flexibility exists to enable new industries to develop without government intervention.

The non-extractive recreational interest in fish and ecosystems has also grown considerably over the years, almost in parallel to the growth in commercial fishing. Many new marine reserves are being established. Tourism growth has followed and there have been benefits to fisheries, as these areas provide habitat and seed stock for the neighbouring fishing industry (Rowley 1992). I have already indicated the difficulty posed in closing areas (for marine reserves or marine farming) to commercial fishers once ITQ rights to harvest have been allocated.

TAC/TACC Setting

The system for setting TACs was initially characterised by a failure to recognise that fish are part of an ecosystem. The process essentially requires that the TACC is the residual tonnage of fish available for sustainable harvesting once an allowance has been made for ecosystem functions (eg. food for protected species like penguins or seals), and for fish harvested by scientific, recreational (includes sport and subsistence), and traditional (ie. Maaori customary as opposed to commercial) fishers. Consequently, growth in any of the sectors (eg. recreation) that compete with the commercial sector, reduces the amount of fish that the commercial fishery is able to harvest. This is not a reduction in the actual proportion of the TACC and so no compensation is payable to the commercial fishers.

In theory, a precautionary approach is taken to allow for sudden environmental changes (eg. blooms, disease) and lack of scientific certitude. An increase in scientific certainty should

reduce the level of the precautionary buffer required and thereby enable a larger TACC than would otherwise occur. This is a clear incentive for the commercial sector to promote research and data collection. However, industry has seemingly been unable to absorb the full costs of the cost recovery regime. The competitive bidding process appears also to have reduced access to data and models. Each 'research provider' jealously guards its intellectual property to enable it to maintain a competitive edge in the bidding process.

The legislation places considerable emphasis on the supposed neutrality of scientific advice and the need to have a high level of scientific certainty to be able to reduce the TACC. Alternative means to achieve sustainability goals are also supposed to be considered (ie. input controls, the very thing that the fisheries sector wished to avoid). Advice to the Minister on the setting of the TACs is basically hammered out through working groups and open plenary sessions.

Traditionally, the commercial sector's approach has been to challenge the quality of the science on which decisions to reduce the TACC are being advocated. It attempts to create sufficient doubt about the data, or the models used, so that implementation of reductions is delayed while alternatives are explored. By 1997, no agreement had been reached on the state of 55% of the 164 stocks in the New Zealand fishery (Wallace, 1998). The TACC setting process seems to have failed to provide the appropriate incentives to industry to adequately fund research, and without sound data on which to manage the fishery the foundation of the ITQ system is very shaky as a long-term proposition.

The second industry strategy is to argue that the recreational fishers should all be licensed, and required to fish within a recreational quota. While this might have some appeal in a country where commercial fishing significantly predominated over the recreational fishery, in the New Zealand context this is not so clear. The costs involved in policing such a regime would be prohibitive, and the tradition of being able to get a feed from the sea may be a casualty. In effect, New Zealand society would be drastically changed and the recreational fisher might be displaced by the paying-tourist, sport-fisher in the same way as the part-time fishers were displaced from the commercial fishery.

There has been progress since 1986. The 1996 Fisheries Act has focussed the management of the fishery on the ecosystem rather than on single stocks, and the changes during the 1990s have also forced a greater degree of internalisation of the costs of a sustainable fisheries management regime. However, privatisation does not appear to have provided the incentives expected for data collection to provide a sound basis for fisheries TAC setting. Moreover, it has provided a stronger base for the commercial sector to argue for 'club' benefits through its stakeholder groups (Wallace, 1998). By mid-1997, 12 commercial stakeholder groups had formed (or were forming) incorporated societies or limited liability companies. Some of these are effectively fishery cooperatives and are working as the theorists had originally intended (eg. the Southern Scallop Enhancement Company). But the failure to integrate the commercial fishery management regime with the wider community means that other stakeholders who do not own quota (eg. groups representing the interests of the environment) are increasingly left outside the management processes, despite stated government intentions to be more inclusive (Wallace, 1998).

The ITQ system was established on the presumption that the Crown held unfettered rights to allocate access to fish harvesting and that this could be linked with sustainability. This would be achieved through providing individual rights to harvest.

Initial problems arose from the failure to make allowance for the existing aboriginal and common law rights of the indigenous New Zealanders, the Maaori. Subsequent settlements with Maaori have spawned a new set of problems. Many of these relate to the competition for access to fisheries and to the physical realities of Maaori tribal locations in respect to fisheries grounds and tribal demographics. The very definition of the concept 'iwi' (tribe) is currently being considered by the courts after urban Maaori challenged the legitimacy of the existing iwi structures' control of the flow of benefits to Maaori from the fisheries settlements.

Associated with this debate is whether the distribution of benefits should also reflect the size of the marine area (moana whenua) over which the iwi has jurisdiction (mana moana, based on historical coastal boundaries of iwi, but now extended to encompass the EEZ), or the size of the tribe's population. In many respects, New Zealand had little difficulty establishing a 200 nautical mile EEZ because it was geographically isolated from other nations with competing claims. However, the settlement has reactivated the tribal boundary disputes between iwi as they seek to have their rights recognised. Subsumed within this process are the attempts of hapu (sub-tribes) to gain independence from their existing iwi. Iwi are now essentially analagous to different European nations seeking to establish their own EEZs for the North Sea. A new geopolitic of the fishery will emerge, but only after lengthy and costly negotiations.

Coastal Planning Under the Resource Management Act

On a less publicised front, and perhaps of greater relevance to other countries considering ITQ as a solution to fisheries management, conflicts have emerged between fishers, marine farmers, Maaori, and conservationists with regard to the allocation of space for different types of marine space users groups. Some of these have also resulted in litigation.

As indicated previously, New Zealanders' relationship with their marine environment is not simply that of a commercial fishing nation. Indeed, it is hard to identify 'fisheries regions' within New Zealand (Rennie and Holmes 1998). Our use of the marine resource is one involving heterogenous interests, therefore 'community' boundaries are not readily discernible. The allocation of all fishing space to a single use group, within a heterogenous group of users of that marine space, is certain to create foreseeable conflict and should be addressed in the design phase of a QMS system.

I have already discussed this in relation to arguments for compensation for protecting marine areas, recreational fishing, and Maaori rights. But perhaps the most significant example currently is the concept of coastal tendering and its implementation for marine farming. To understand the nature of this process it is necessary to have a grasp of the Resource Management Act 1991 coastal planning regime for the non-fishery resources within New Zealand.

In New Zealand the Ministry of Agriculture and Fisheries (MAF) had responsibility for the commercial fishing industry, marine farming, marine reserves, and marine mammals until 1987. In 1984 a reformist Labour Government decided that too many decisions were being made by bureaucrats within agencies that had conflicting mandates (ie. MAF's role to promote marine reserves was in conflict with its role to promote the fishing industry). The government reformed the state sector to establish a 'competitive' policy-advice environment, wherein departments had clear mandates and presented their arguments to elected politicians. The politicians would therefore make the decisions in a clear and transparent manner. As a consequence, the Department of Conservation (DoC) was created in 1987 with a mandate to advocate for the conservation of natural resources (which include fish).

DoC was given responsibility for marine reserves (no-take areas) and marine mammals. It also had responsibility for freshwater fisheries, unless there was a potential commercial catch available (ie. eels), in which case MAF had responsibility for the commercial fishery. In addition the Department inherited from other Ministries the licensing of structures, discharges, sand extraction, and the *allocation of space* for structures in the territorial sea. This gave it joint responsibility for marine farms. Rather than a conservation mandate for these responsibilities it had to act in the public interest, but it was expected that it would give more weight to conservation values than the previous Ministries (Transport, and Works and Development).

In 1991, the Resource Management Act added the requirement that DoC prepare a New Zealand Coastal Policy Statement for the coastal environment, and, with some exceptions, that the elected regional councils would take over coastal planning and licensing roles for activities in the territorial sea. Fisheries were excluded from this regime after a long fought battle between DoC and MAF (Rennie, 1993). However, in 1995 the Ministry of Fisheries was separated from Agriculture, and the 1996 Fisheries Act incorporated many of the principles of the Resource Management Act, but without the planning regime. New Zealand remains a long way from achieving integrated coastal management. However, the community planning, the treatment of exclusive occupation of space, and the effects-based nature of the planning regime, offer a potential mechanism for meaningful community-based co-management.

Effects-Based Planning

Effects-based planning underpins and is exemplified by the Resource Management Act. The principles of this approach are the need to focus on the environment; to ensure that externalities are internalised; and to 'enable' sustainable development. Effects-based planning is rooted in the environmental impact assessment practices of the last thirty years and the entire planning process tends to be focussed on enabling activities, provided they do not adversely affect the sustainability of the environment. As a corollary, the approach adopts, from environmental impact assessment, the principles of community participation in the identification of the effects and in negotiating acceptable compromises where adverse effects cannot be avoided. It also adopts the libertarian perspective that property owners have the right to determine the use of their property. However, the approach also requires that the owner must internalise the externalities (ie the adverse effects/costs incurred by others) created as a consequence of exercising the property rights.

To understand the difference between the effects-based approach and the type of activity-based planning which brought Fisheries Management Plans into disrepute as 'social

engineering', it is useful to consider the example of a salmon farm. This activity is usually carried out in a net suspended above the sea bed from surface platforms. One of the primary environmental effects associated with salmon farms has been the potential for the sea bed under the farm to accumulate enriched sediment from uneaten or digested waste food from the salmon farm. If a bryozoa bed of some value existed on the seafloor an activity-based plan might contain a rule prohibiting any marine farming from using that area. This would not however protect the bryozoa bed from other damaging activities (e.g. mining, dredge fishing, or moorings for boats).

By contrast, an effects-based plan for the same area might contain a rule prohibiting the deposition of detritus or the disturbance of the sea floor. This would leave open the possibility for a salmon farm to operate in the water column above the bryozoa if the farmer adopted technologies to ensure that the farm's operation did not affect the sea floor. The costs of developing or adopting the technology, and thereby addressing the adverse environmental affects (the externalities) of its operation, are thereby internalised to the salmon farm developer. In the process the effects-based planning enables the potential developer to use areas that would, under the older activity-based system, have been unavailable.

Devolving Decisions to the Community?

The Resource Management Act 1991 provided a vertically integrated structure based on the Act, national policy statements, regional policy statements, regional plans, and district plans (figure 1). Each level was required to be not-inconsistent with the levels above it. Moreover, the Act provided for communities to have effective control of planning in their areas through a planning process dominated by consultative processes. The major constraint placed on communities was that the planning should be effects-based and should not be used for "social planning", but be focussed on ensuring the biophysical bottom-lines that the community sought would be secure. Once these effects-based plans were implemented, the expectation was that a level playing field would exist on which entrepreneurs could play out their development games in response to market forces, rather than be channelled into someone's vision of where particular activities should take place. Under the Resource Management Act if a developer sought to undertake an activity that had effects that were not permitted by a plan then a resource consent process, again operated at the level of government which reflected the community of interest, would be initiated.

However, there remained four very significant differences between the terrestrial- and marine-based Resource Management Act planning regimes. First, on land, landowners were expected to do what they wished with their land, provided it did not affect others, in which case the appropriate planning and consent processes were implemented. In the marine area the Crown was presumed to be the owner and to be administering the area as a national commons. Moreover, the feedback from the consultation process of the Resource Management Law Reform indicated that people were unimpressed with the previous management of the marine areas and wished to see the coastal marine areas better protected and conserved. The Act therefore took a very precautionary approach and essentially prohibited all use of the coastal marine area unless permitted by a rule in a plan or by a coastal permit. The Department of Conservation also retained the role it gained in 1987 as the central government's lead agency in administering the coastal marine area under the Act (see Rennie 1993, Review Group 1991).

Second, to enable devolution to local communities and to assist integrated management across the land sea interface, an appropriate tier of government had to be given the responsibility for developing community-based plans. Because regional councils had authority for other common property resources (e.g. freshwater and air), and their boundaries were essentially based on an ecological unit (freshwater catchments), they were considered to have the expertise and to be the appropriate level of government to undertake day-to-day management of the coastal marine area. It was therefore made mandatory for them to produce regional coastal plans. However, to ensure that the wishes of the nation were effectively and unambiguously transmitted to the community it also became mandatory for the Minister of Conservation to produce a New Zealand Coastal Policy Statement.

The New Zealand Coastal Policy Statement and the regional coastal plans each had to be prepared through consultative processes set out in statute and within fixed time frames. The regional coastal plans had to cover the coastal marine area, defined as the area between mean high water springs and the limit of the territorial sea (i.e. 12 nautical miles). They could be extended inland by being joined with regional plans to integrate the land area of the regional council with that of the marine. Thus, although the regional coastal plans effectively replaced the district plans, they integrated at the regional plan level across the land sea interface. Moreover, the New Zealand Coastal Policy Statement covers the 'coastal environment'. The coastal environment has been left undefined in the legislation to enable it to be interpreted to suit the circumstances, but clearly crosses the administrative interface in an ecosystemic fashion (i.e. the specific effects of concern may differ in different situations and the environment to which it applies may therefore be more or less extensive). In addition, some regional and district councils were combined as unitary authorities. Their functions also combined, thus becoming integrated management agencies for the regions' coastal environments administered under the Resource Management Act.

Third, applications for coastal permits to have effects in the coastal environment which would otherwise not be allowed, had to include an application for the right to exclusively 'occupy' that space for the purposes of that activity. The permit was therefore distinctly different from ownership of a title to land. In effect the occupying of space in the commons was seen to be having an exclusionary effect on those whom might otherwise have wanted to occupy that space. This retained the effects-based integrity of the Act. Exclusive access was to be a right socially granted and exclusive only to the extent necessary for the purpose of carrying out the activity.

Reinforcing this concept was the restriction that an activity could only have exclusive occupancy for the period of the permit, and permits under the Resource Management Act had a maximum life of 35 years. There was no right of renewal. At some stage during the period in which a permit was operative the community might decide that the effects created by the activity were no longer acceptable. The community would be expected to change the rules in its plans to reflect this change in attitude. Accordingly, a new permit would be unlikely to be granted unless the applicant adopted new approaches without the forbidden effects. Therefore, there is clearly an incentive for all players to participate in the policy and planning process to ensure the rules reflect the community expectations while enabling some form of sustainable development or continued use of existing permits.

The fourth major difference is that all applications for use of the coastal marine area have to be lodged with the regional council. This created an efficient 'one-stop-shop' process. However,

in recognition that some activities may occur in a place of such conservation significance to the national community, or that the effects of an activity might be of a scale to make it of national significance, a category of coastal permit called the 'restricted coastal activity' was established. The only difference in process for such activities are that the hearing committee of the regional council is expanded to include a representative of the Minister of Conservation, and the hearing committee does not make a final decision, but a recommendation to the Minister. The recommendation of the hearing committee can be inquired into, at the request of submitters, by the Environment Court (the renamed Planning Tribunal), which in turn makes a recommendation to the Minister of Conservation. The Minister's decision is final.

Marine Farming and Coastal Tendering

The relationship between marine farming and capture fisheries is usefully illustrated by considering the different spatial concepts for different species (eg. mussel and salmon farming in the Marlborough Sounds and scallops in the Golden Bay areas in New Zealand). Mussels and salmon are farmed in the water column and therefore interfere with the rights of others to unmodified seascapes (which they thought they had purchased with their houses) and use of the water column for swimming and boating. Scallop enhancement essentially requires undisturbed (except by the harvesters) exclusive occupation of the seabed, but does not place restrictions on the use of the water column space. Other users may wish to obtain rights to similar areas for no-take marine reserves or for restoration or maintenance of natural character, in which case they may wish to exclude fishers and farmers from the water column or the seabed.

In the Golden Bay Scallop fishery, the scallop quota holders formed a company to enhance their fishery. Their enhancement was based on rotational management, whereby they agreed among themselves to leave certain *areas* fallow for sufficient time to enable scallop to grow to commercial levels and then they would fish these areas. Some seeding was also undertaken. However, some of the fishers and other non-quota holders perceived an opportunity to stake out large hectares of seabed by gaining consents for 'seabed farms' under the Resource Management Act. Effectively, they were 'squatting' on the open 'range land' of the quota holding 'ranchers'. This ended in the courts, and the final decision is somewhat ambiguous.

These examples highlight the need to distinguish the vertical spatial dimension of property rights as well as the horizontal. If a mechanism is set up to privatise the common space for only one of these groups of space users, conflicts are certain. Possible solutions to the allocation of space in such a system include community planning (a form of co-management as outlined above) and tendering of space.

In the Marlborough Sounds, the large number of marine farming applications led the Minister of Conservation to apply the coastal tendering provisions in the Resource Management Act. These poorly understood provisions enable a moratorium to be placed on any applications in a designated part of the coastal marine area. The Minister then tenders the *right to apply* for coastal permits within that area. The successful bidders for each portion of the tendered areas then have two years in which to apply for a coastal permit through the normal processes of the regional council. The intent of the provisions is to limit the number of applications the council and any potential submitters have to address at any one time.

Effectively it is a mechanism for ensuring an orderly and efficient application process. It was not envisaged as a money-making tool, because the gaining of a right to apply had no bearing on the probability that the application might be approved by the council. Without such certainty, it was considered unlikely that the tender values would be high. Effectively, all tendering did was to add a step in the application process to enable a single applicant to be identified. It was considered the tendering provisions would enable coastal managers to prevent applicants applying for sites purely to pre-empt other applicants (i.e. the process would prevent a 'race for space').

When it appeared that applications in Marlborough had reached gold rush proportions the Minister imposed a moratorium on marine farming applications (not on other activities competing for the space). However, the public became confused over the implications of the tendering process. The scale of the area for which the moratorium applied led to apprehensions that the tendering would determine the success of the application. Effectively the public saw the process as privatisation of the coastal environment, with the rich being likely to gain ownership of large parts of the coastal marine area. With the fisheries settlement behind them, Maaori took this opportunity to relaunch their claims to ownership of the foreshore and seabed (arguing that the Crown had no right to tender what it did not own) and had initial success in the Maaori Land Court. The case remains before the courts, and legislation to address aquaculture generally has been sent back to Select Committee processes largely through the effort of Maaori Members of Parliament wishing to see the ownership issues resolved.

The lack of an integrated system for allocating space in the marine area is clearly demonstrated, but the examples discussed above also raise the question of whether or not the increased use of marine resources is resulting in a shift from an open access marine resource to a commons (under ITQ!), thence to a squatter society? In particular is the geography of the fishery under an ITQ system a "commons" or is it "wildfish ranching"? This leads to the suggestion that ignoring the spatial dimension may mean that *an ITQ system does not equate to privatising the marine commons*, but to an unsustainable intermediate regime.

The next governance stage may require full privatisation of marine space by including tighter spatial dimensions for ITQ, or alternatively the implementation of a co-management regime. The only sustainable co-management regime appears to be that offered by the Resource Management Act. This approach has been confused by fishers and QMS proponents as being a form of input rather than effects-based, output focussed planning. It is therefore anathema to the capture fishers, who perceive (perhaps correctly) that their political power-base would be subjugated to the will of the wider heterogenous user group present in the 'community'. They fear also that, at the regional council level, the lack of dependency on commercial fishing will mean that the views of non-commercial interests might win out.

Conclusion

The criteria for assessing the success of the QMS need to be carefully considered when designing an ITQ based solution to commons problems. If equity of impacts of an ITQ approach is a factor, and the paper argues that it cannot be ignored, then geographical issues must be considered. The New Zealand ITQ approach is not a failure, but some outcomes were overlooked and left unresolved in the design of the system within which ITQ were

established. A set of geographical issues to consider in the design of such an approach are needed. It is suggested that the set should, at least, include:

recognition that:

- the marine area is a volumetric space, which can be carved in many shapes;
- the marine area has an existing, possibly implicit, intertwined, multi-layered rights structure reflecting different interests;
- not all rights, or needs for rights, to space are anthropocentric, or for extractive use, but the exercise of one right may exclude another from use of that space at least temporarily;
- the marine space is interconnected with its adjacent marine, freshwater and terrestrial areas;
- the mechanisms for allocation of space rights will be affected by, and affect, the socio-cultural, political and economic geographies of the places and connecting systems involved;
- inadequate consideration of the morality and equity of the systems used to allocate space will lead to injustice and conflict;
- ITQ include spatial dimensions;

and, consideration of:

- the implications of the temporal dimensions of space rights (they should not be *in perpetuity*);
- the nature of the society which exists, and the society which might result from the various options for allocating space;
- the international commitment to integrated coastal and marine management;
- the need to ensure that all sectors of your society/community understand the implications of the various options available for allocating space.

This paper argues that an approach to implementing an ITQ system for commercial users has to be seen within the context of the geography of the resource. It is suggested that the planning approach adopted under the Resource Management Act 1991 is potentially able to address these issues, but caution is advised in the implementation of the approach. An arduous and testing transition is guaranteed, and geopolitics may eventually overturn the best of intentions!

Acknowledgements

The financial support of the School of Social Sciences, the Geography Department and the International Global Change Institute, University of Waikato, Private Bag 3105, Hamilton, New Zealand which enabled me to attend this conference is greatly appreciated.

Table 1
 CHANGES IN QUOTA OWNERSHIP 1986-1996 (BASED ON DATA FROM
 CLEMENT AND ASSOCIATES, 1996)
 (Sorted by total number of entities lost)

Species	Entities	Entities	Total Change	% Change	Current Level of Aggregation	
	1986	1996			Entities	% of quota owned
SNA	750	341	-409	-54.53	22	81
SCH	816	428	-388	-47.55	43	71
SPO	729	407	-322	-44.17	35	68
GUR	710	431	-279	-39.30	37	76
HPB	629	368	-261	-41.49	31	71
TAR	542	309	-233	-42.99	34	86
FLA	667	462	-205	-30.73	38	62
BCO	560	370	-190	-33.93	38	73
LIN	404	217	-187	-46.29	9	81
TRE	452	277	-175	-38.72	19	89
RCO	443	272	-171	-38.60	24	86
MOK	377	241	-136	-36.07	42	77
ELE	269	146	-123	-45.72	23	80
BAR	286	169	-117	-40.91	10	84
JDO	310	198	-112	-36.13	28	85
WAR	301	197	-104	-34.55	30	91
STA	256	166	-90	-35.16	32	92
SKI	187	122	-65	-34.76	23	95
BNS	194	135	-59	-30.41	25	82
HOK	164	108	-56	-34.15	8	92
HAK	101	79	-22	-21.78	7	92
OEO	39	23	-16	-41.03	8	97
ORH	46	32	-14	-30.43	9	86
BXY	49	38	-11	-22.45	13	95
GMU	173	169	-4	-2.31	48	76
SWA	42	39	-3	-7.14	8	95
SQU	117	140	23	19.66	10	91

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