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### Identifying fisheries regions in New Zealand: some conceptual difficulties

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*The importance of fisheries to nations is reflected in the production and employment statistics of the country. It is also reflected in socio-cultural symbols (for instance songs, tales), and in socio-political hegemonies. Just as these may vary from one nation to another, they may also vary from region to region within a nation. Several nations speak openly in terms of 'fisheries regions' and there have been a number of attempts to identify such regions in the social science literature. An understanding of these regions is seen as a step towards defining appropriate policies for the sustainable management of their resources.*

*In 1986, New Zealand established an innovative fishery management system based on individually transferable quota (ITQ), and subsequently removed the (never-implemented) region-based, fishery management planning structure from the statutes. These changes might be indicative of a loss of geography, a flattening of the nation's "fishing topography", and might be expected to result in significant changes in the nature and location of fisheries regions.*

*This paper outlines the changes in the management structure of New Zealand's fisheries. We then attempt a preliminary analysis of fishery regions in New Zealand as the basis for a "new regional" geography of New Zealand's fisheries. In the process we discuss various criteria for defining fishery regions and present our initial categorisation of New Zealand into those regions. The relationship between these regions and related institutional structures is then discussed. This raises a number of additional questions regarding the concept of a fisheries region, especially in the context of a resurgent indigenous (Maaori) culture, the emergence of new fishing peoples in New Zealand, and the respective size of recreational and commercial fishing sectors.*

Over the last three decades nations have increasingly become aware of the pressure on marine resources, especially fisheries, and related ecosystems. Approximately 70 percent of the world's fish stocks are fully-exploited, over-fished, depleted, or rebuilding from previous over-fishing (FAO, 1995). Recognition that the world's marine fisheries resources are limited has led to a search for means to sustainably manage them. Concurrently, aquaculture has grown rapidly as a potential alternative source of marine food. However, marine aquaculture has predominantly occurred in the coastal margins and in sheltered bays, which has led to a host of other conflicts with users of these areas. These issues 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 affect 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 may overlap (as in the New Zealand case), but are philosophically and technically oppositional and the consequent management regime is not well-integrated (figure 1) (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.

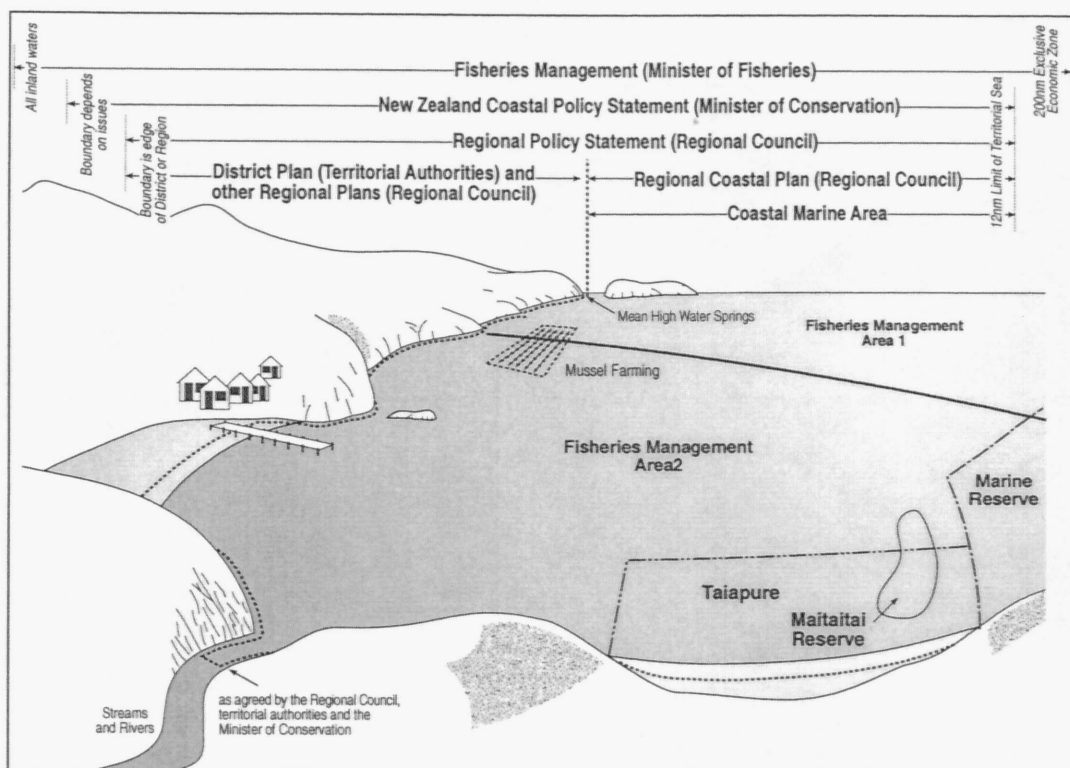


Figure 1: Boundaries of the Fisheries Act 1996 and Resource Management Act 1991 coastal governance regimes (NB also illustrated is a marine reserve, these are established under the Marine Reserves Act 1971).

The different approaches to planning will affect, and be affected by, the way in which resources are perceived and utilised. It seems sensible therefore to try and match management regimes to their setting if one wishes to retain the key features of that setting. Alternatively, the planning/management regime can be used to transform the existing situation, in effect to create a new socio-political and economic topography. The planning and management regime may therefore reflect or dictate the geography of a nation, or of the regions and other places, within it.

The significance of these issues has been recognised. Social scientists are devoting research time to the identification of regional distinctions in anticipation that this may

assist the design of appropriate governance systems, or that they will be able to better monitor and assess the impact of new approaches (see, for instance, Finesse 1998). In this paper we wish to address the nature of fisheries regions in New Zealand in the context of monitoring the implementation of the Quota Management System (QMS). We are particularly interested in identifying any fisheries 'dependent' regions because changes in such regions might have greater significance for the region as a whole than changes in non-dependent regions. As will become apparent, our preliminary research has raised a number of difficulties that have caused us to reflect on the construction of the 'fisheries region' concept.

### *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 (figure 2). The coastal environment is richly diverse, but despite its size, has relatively low-productivity seas, with the annual marine catch peaking 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, lying 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 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. In some Maaori (the indigenous people) histories Maui fished North Island from the sea while standing on his canoe. Subsequently, New Zealand's many bays have provided tauranga waka (canoe landing sites) and safe anchorages, marinas and port facilities. The sea and coast have provided mahinga mataitai (seafood gathering areas), taonga raranga (e.g pingao grass for weaving) and other resources (e.g. silica sands for glassmaking) for Maaori and Pakeha (non-Maaori New Zealanders). With no town further than 120 kilometres from the coast, it is natural that it should also hold many of our special places; places of particular significance culturally, the wahi tapu (sacred places) of the Maaori, and similar windows to the Pakeha's much shorter past.

Marine-based recreation has continued to grow, with surfing joining sailing as established major competitive recreational and sporting events. Marine reserves (no-take areas) and taiapure (essentially Government/iwi (Maaori tribe) co-management controlled fishing areas) have increased in number and spread across the territorial sea (figure 2). Integrated, planned marina and lifestyle subdivisions have developed at Gulf Harbour and Pauanui, and 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 recreational fishing and other activities has been regarded as part of our birthright and is jealously guarded. To enhance foot, vehicle or boat access many authorities have created walkways, sand ladders, wharfs, jetties and boat ramps and included provisions in plans requiring esplanade strips along the foreshore and carparks as part of subdivisions. New Zealand therefore has a strong cultural connection to its marine endowment, but one that perhaps rests as much (or more) on recreational use as it does on commercial development.

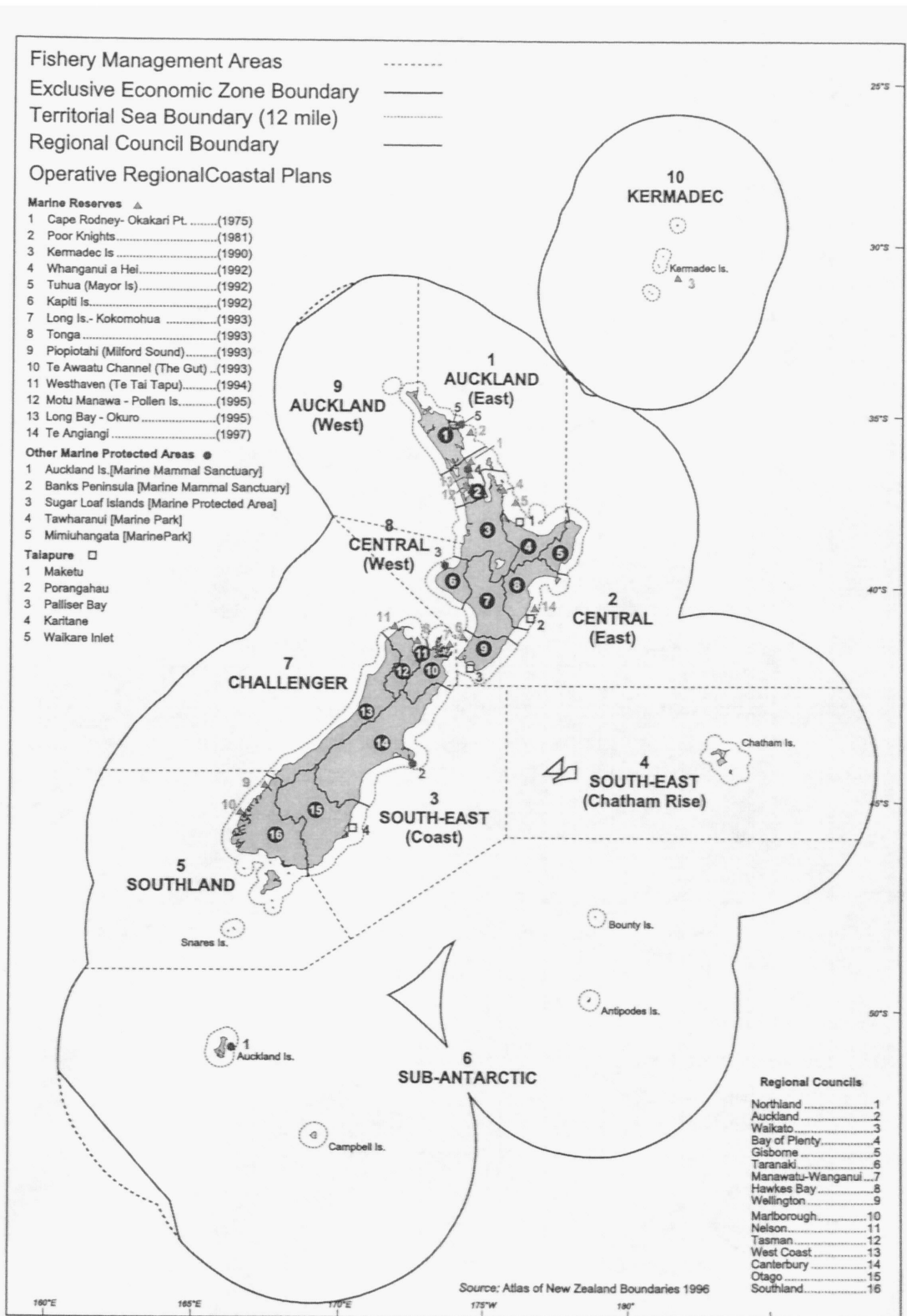


Figure 2: Boundaries and locations of New Zealand's EEZ, Fishery Management Plan areas (numbered), territorial sea, regional councils, taiapure, marine reserves and other protected marine areas.

This is reflected in New Zealand's popular culture, with virtually no modern "pop" songs about marine industrial culture, for example fishing (Colin McLeay, pers. com.). There are many marine-based Maaori myths, legends and songs. However, perhaps

strangely for an island nation with such extensive marine resources, the more traditional folk music of the Pakeha has few tales of the sea, and even fewer of fishing. A comparison of collections of folk songs of Canada (Fowke and Mills 1984) and New Zealand (Charles 1981, Hoskins 1977) indicates that New Zealand has a terrestrial focus, on goldfields and farming, similar to that of inland Canada. This stands in stark contrast to a province like Newfoundland and Labrador, whose relationship to the sea and fisheries dominates its song anthologies (eg. Lehr 1985). Until it exhausted its fishery resources, Newfoundland was clearly a fishery dependent region. However, in a context such as New Zealand's, we felt that while some individual communities intuitively stood out as being 'fisheries dependent', we were less clear as to which regions might be intuitively identifiable as fisheries regions. Although this suggests a post-modern, or 'new' cultural geographical, approach might have been useful for defining regions (eg. through an analysis of song texts) we followed the social science fisheries literature and turned to more 'objective' measures.

### *Constructing Fishery Regions*

In New Zealand, the Fisheries Act 1983 identified ten fisheries management areas that subsequently doubled as the basis for Quota Management Areas (QMAs) for New Zealand's QMS. The basis for determining these regions is not yet clear to us, but it seems to rest on the state of knowledge of the distribution of fish stocks at the time combined with readily identifiable topographic features, such as capes. These regions also formed the basis for the Fisheries Management Plans (FMPs) for which the Act made provision.

The FMPs were a form of community, or regional, planning system administered by the then Ministry of Agriculture and Fisheries. These plans focussed on input control (eg. closed areas and gear restrictions) and were intended to be a means for all those with an interest in fisheries in an area or region to have a say in its management. Although significant starts were made on some FMPs, they were never made fully operational and were abandoned in the early 1990s in favour of the QMS. In other words, a comprehensive community-based planning approach was replaced by an output (total allowable catch) system of 'effects management' that depended on individual property rights to commercially harvest fish. For many, this was seen as a move to privatise the fishery 'commons' (Deweese 1997, Rennie 1993). However, data collected as part of the FMP process could assist in the assessment of temporal changes if a regional analysis was based on the FMP regions.

Because our interest is primarily in the social impact of the Quota Management System, we turned our attention to matching the QMA regions to the socio-economic data that might prove useful for identifying fisheries-dependent regions. However, the QMAs are defined in relation to each species of fish and although based on the FMP areas, the each QMA may combine different FMP areas to reflect the distribution of individual stocks of the species. Furthermore, for some species the areas have been subdivided. The FMP areas had been the most static during the period under

investigation and fishers in an area could be expected to catch a variety of species. For these and the reasons already given, we decided to use the FMP areas as the base for our regions rather than the QMAs.

To assist international comparison we drew on the framework elaborated by Otterstad et al (1997). In particular we sought to develop a database using their minimum set of dependency indices:

1. Number of fishers based in an area (based on home port or main port of operation)
2. Fishers based in area as a % of total area employment
3. Fishers based in area as a % of national fishing employment
4. Total value and volume of landings into area
5. Total value and volume of landings into area as a % of total national landings.

Our intention was to expand the database in due course to include the other socio-economic variables Otterstad et al (1997) had identified. In the New Zealand context, and perhaps in other nations (eg. Norway), it would be essential to add ethnicity to account for fundamental cultural differences apparent in attitudes to the QMS noted by other researchers (eg. Dewees, 1997).

The data variables we used include employment statistics, population structures of communities and levels of fishing activity. Unfortunately data on home ports of fishers is not collected at a national level, and due to government restructuring it has also proven, temporarily at least, difficult to locate centralised data on home ports of commercial vessels. As the Quota Management System was implemented in 1986, data spanning from 1986 to the present was collected as the maximum time frame within which to observe noticeable affects resultant from its implementation.

The major data source for such studies within New Zealand can be obtained, at a cost, from Statistics New Zealand. The database used by Statistics New Zealand is based on the Census of Population and Dwellings survey completed for every individual within New Zealand on a five-year basis. Data can be purchased for various territorial units. These include urban areas, regional council jurisdictions, territorial local authorities and mesh blocks. Ideally, data obtained for each mesh block would provide the best data for a detailed account of the impact the QMS has had on fishing and related employment. It also may have allowed the quota management areas to remain intact as fishing regions. However, our financial constraints did not permit this level of detail.

Consequently, the data purchased from Statistics New Zealand concerning employment in the fishing industry was obtained for each territorial local authority (ie. city or district council) in New Zealand. Arguably, local authority boundaries primarily represent community concepts of cohesiveness and connectedness, rather than the ecosystem boundaries (such as water catchments) used for determining the boundaries of regional councils. Local authority boundaries may still cover a substantial area.

Some revisions were found necessary, to the quota management areas established by the Ministry of Fisheries, in determining our fishing regions. The boundaries of the territorial local authorities did not align precisely with quota management area boundaries. We attempted to minimise the magnitude of any change. The most significant change made was in connection to the Auckland and Bay of Plenty/Coromandel regions. The Ministry of Fisheries had established two Auckland fishery management regions, each beginning at North Cape and running down alternate sides of the north of the North Island. These areas could not be maintained in our structure due to the division it caused in the Far North District territorial authority. Parker and Hufflett (1993) had also identified difficulties in matching council boundaries with relevant fishing ports and had 'stretched' the Northland region a little to accommodate a key fishing port. Therefore it was determined that an Auckland region would be established incorporating the Northland, Auckland and Waikato authorities. A second region was established that incorporated the Coromandel and Bay of Plenty authorities. This does not align with regional council boundaries, especially for the Waikato, but it appeared intuitively to be the best compromise.

The Challenger region provides a useful demonstration of the approach. This region, or quota management area, as referred to by the Ministry of Fisheries, covers approximately a third of the South Island. It stretches along the coast from Awarua Point, on the southwest coast, northwards to Clarence Point, located on the northeast coast. Included in this fishery region are all the territorial local authorities situated on the coastline. Identifying the territorial authorities for this fishing is simplistic because of the non-existence of inland territories. In contrast, the Coromandel/Bay of Plenty region includes inland authorities.

The initial fishing regions included only coastal authorities. Albeit, after some investigation into locations of fishing companies and associated fishing services it was decided to include inland territorial authorities. This also enables freshwater fisheries to be included and reflects the reality of New Zealand as an island nation where most people live within 100 km of the sea.

The criteria for determining to which of the fishery regions the inland territories belonged were difficult to identify. Essentially, the decisions were based on physical proximity of a territorial local authority to a coastal region. However, some consideration was taken into account of the social and economic relationships between neighbouring territorial authorities. For instance Taupo District Council is approximately the same distance from either the Coromandel/Bay of Plenty, Central (Egmont) or Central (East) regions. The Taupo District was included into the Coromandel/Bay of Plenty region because it has links with other territories in this region, but a strong argument could also be made for placing it with Waikato, to which it is joined for regional management responsibilities. The regional breakdown is illustrated in figure 3 and table 1.

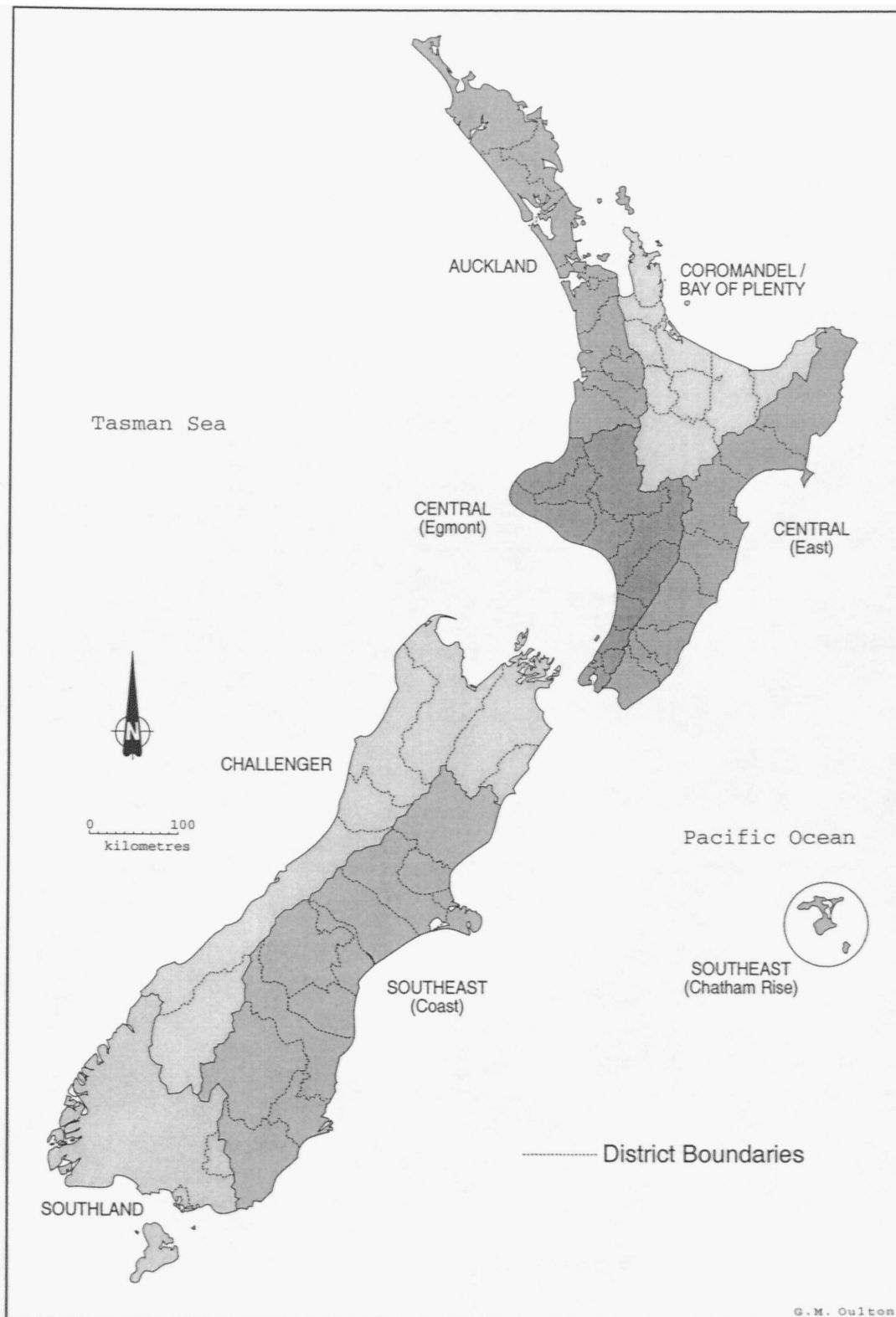


Figure 3: New Zealand's fishery regions.

Table 1 : New Zealand Fisheries Regions.

<b>Auckland</b>	Far North District, Whangarei District, Kaipara District, Rodney District, North Shore City, Waitakere City, Auckland City, Manukau City, Papakura District, Franklin District, Waikato District, Hamilton City, Waipa District, Otorohonga District, Waitomo District.
<b>Coromandel/ Bay of Plenty</b>	Thames Coromandel District, Hauraki District, Matamata-Piako District, South Waikato District, Taupo District, Western Bay of Plenty District, Tauranga District, Rotorua District, Kawerau District, Whakatane District, Opotiki District
<b>Central (Egmont)</b>	New Plymouth District, Stratford District, South Taranaki District, Ruapehu District, Wanganui District, Rangitikei District, Manawatu District, Palmerston North City, Horowhenua District, Kapiti Coast District, Porirua City, Upper Hutt City, Lower Hutt City, Wellington City
<b>Central (East)</b>	Gisborne District, Wairoa District, Hastings District, Napier City, Central Hawkes Bay District, Tararua District, Masterton District, Carterton District, South Wairarapa District
<b>Chatham Rise</b>	Chatham Islands Territory
<b>Challenger</b>	Marlborough District, Kaikoura District, Nelson City, Tasman District, Buller District, Grey District, Westland District, Queenstown Lakes District
<b>Southland</b>	Gore District, Invercargill City, Southland District
<b>South-East (Coast)</b>	Hurunui District, Waimakariri District, Christchurch City, Banks Peninsula District, Selwyn District, Ashburton District, Timaru District, Mackenzie District, Waimate District, Waitaki District, Dunedin City, Clutha District, Central Otago District

*Some conceptual problems*

Our original assumption was that the change from a regional planning approach to one based on a QMS with individual transferable quota might be reflected in changes to the socio-political geography of fisheries regions. The initial run of data did confirm significant changes within the fishing industry (figure 4) which also opens up some interesting areas for further analysis.

However, the lack of any fisheries dependent region, at least on the basis of employment statistics, is also evident. Only the Chatham Islands and Challenger regions showed any noticeable level of fishery employment. This clearly requires further analysis over the coming year, especially in terms of economic value of landings and possibly also the distribution of quota ownership.

However, we were also left wondering about the appropriateness of focussing on the socio-economic variables of a commercial fishery sector in defining a fishery region in the New Zealand context. Iwi (Maaori tribal) boundaries do not align well with the statistical areas chosen and, as already discussed, they have a stronger fishery culture than appears to be the case for the Pakeha community. With their growing prominence in quota ownership (approaching 35% of some fisheries) and the administration of taiapure and customary fishing regulations, as a result of settlements of Treaty claims (Deweese 1997), iwi boundaries may be essential, and need to be differentiated from the residential location of iwi members. Therefore, it may be necessary to consider fisheries regions at several levels and from several perhaps

intertwining perspectives. This would lead to a more fluid structure, perhaps based on the nature of rights and interests.

Davies' (1997) recent related work on the ethnicity and residence of the many recreational fishers who enjoy 'fishing from rocks' (ie. 'rock fishers') has identified different regional breakdowns and significant ethnic differentiation not previously recognised. In particular, Koreans appear to be emerging as a new 'rock fishing' people on our shores (Davies 1997). The respective size of recreational and commercial fishing sectors, both in participation and in the actual increasing tonnage caught by recreational fishers in places such as the Auckland region (Kilner and Teirney 1997), also requires attention. These issues will assume greater importance as pressure is applied from the commercial fishing industry (both Pakeha and Maaori) for recreational fishers to be brought within the QMS system.

### *Conclusion*

The socio-political topography of a country will affect, and be affected by, the nature of the governance regimes it adopts for its resources. To monitor the impact of changes in those regimes requires a sound database. Not surprisingly, the parameters of the data incorporated into the database and the scale of base unit chosen for data aggregation will vary to some degree from country to country, and will also reflect the availability of research funds. The research reported here suggests that the Otterstad et al (1997) parameters, if modified to include ethnicity, provide a useful starting point for exploring New Zealand.

However, the lack of integration of management across the land sea interface has meant that the socio-political units of terrestrial organisation do not readily align with those used in the past by fishery managers to develop their regional fishery management plans. Furthermore, based on employment data, there appear to be no fishery dependent regions in New Zealand, with the possible exception of the Chatham Islands.

Our research also suggests that the basic concept of a fisheries region being defined in terms of its commercial fishery may need to be re-examined. In particular, the introduction of a Quota Management System based on Individual Transferable Quota may require a focus more on the distribution of ownership patterns of quota than on employment. It may also require a focus on the nature of the rights and patterns of use of non-commercial users of the fishery. The indigenous tribal institutional structures should also be explored in this context.

We note also that a more post-modern understanding of 'fishery region' may need to be adopted in a cultural context such as New Zealand's. Until such a theoretical analysis has been completed, we suggest that future research on 'the way in which the New Zealand approach to fisheries management has changed the nature of fisheries dependent places' should focus at the community, rather than the regional, level of analysis.

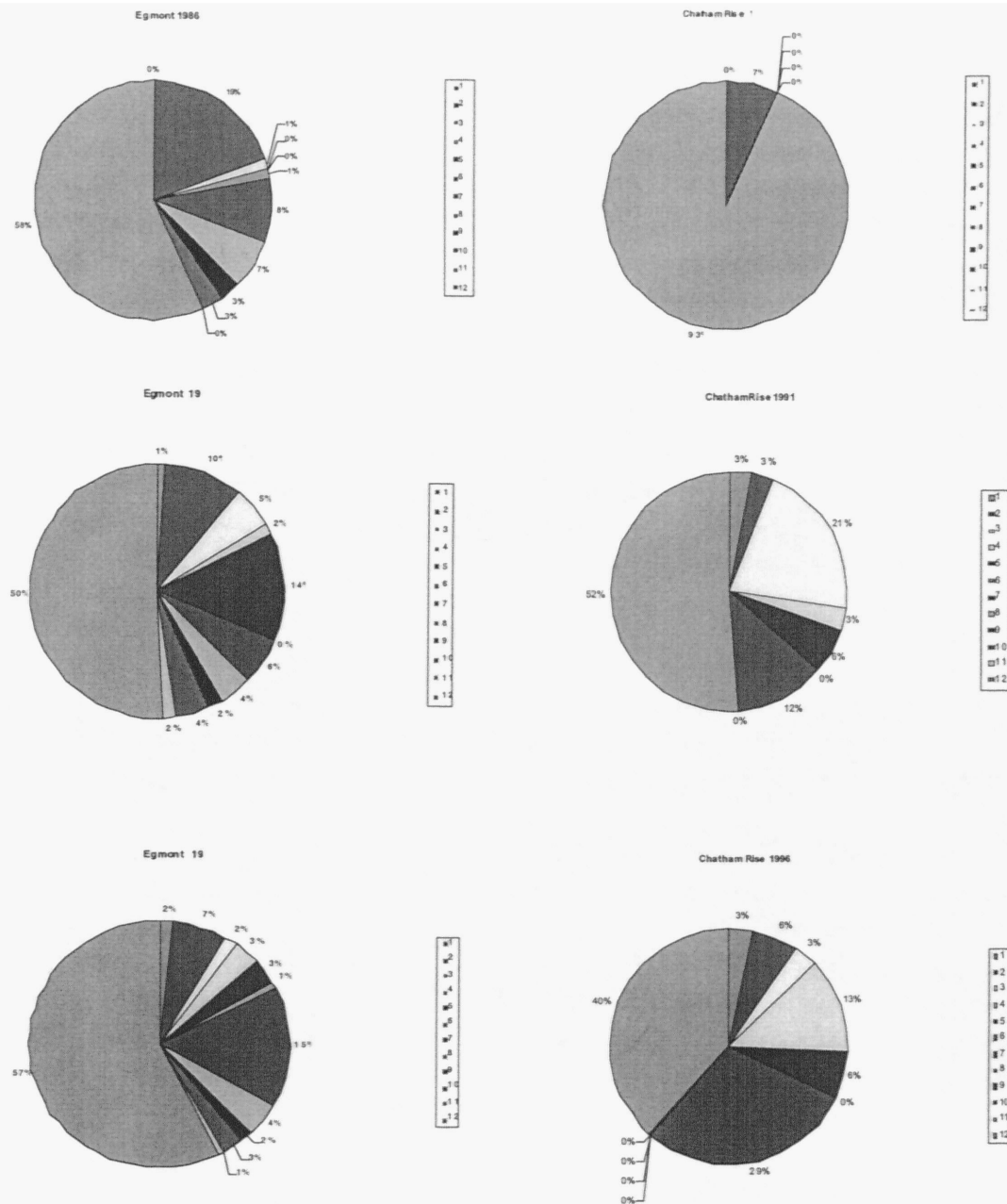


Figure 4: Fisheries Employment by Fisheries Sector for Egmont and the Chatham Regions for the years 1986, 1991, 1996 (Key to charts: 1= dredging, 2 = trawling, 3 = fishing with encircling gear, 4 = fishing with other mobile gear, 5 = gill netting, 6 = squid jigging, 7 = line fishing, 8 = fishing in inland waters, 9 = shellfish farming, 10 = other fish farming, 11 = fishing consultants, 12 = fish and shellfish processing)

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