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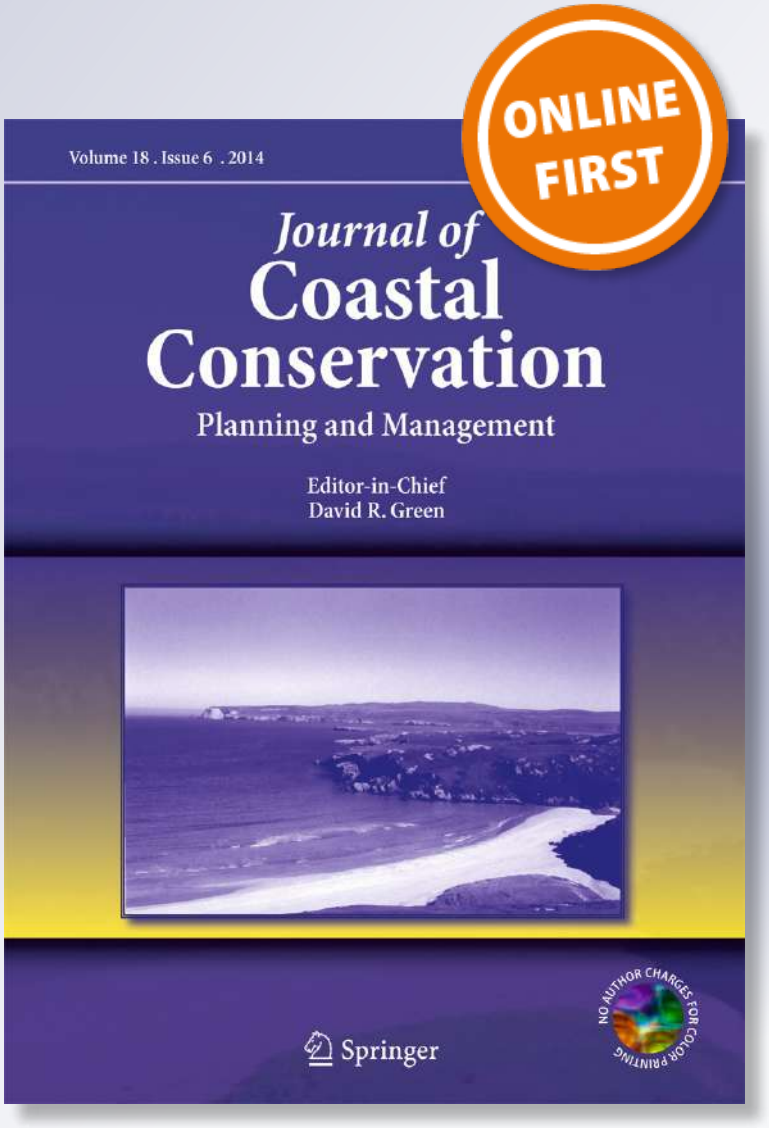

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Abstract Collaborative models for environmental management are emerging in New Zealand. At the forefront are processes for coastal and freshwater environments. It is proposed that application of sociometric methods and skilled facilitation can produce leadership from local communities, creating more enduring solutions than occur from central and regional government initiatives. This paper presents examples of how this approach has been adopted in situations at local and regional scales. Three case studies of integrated management initiatives are analysed in a sociometric framework at stages of development from pre-initiation research to completed legislation and implementation, in the context of a national legal framework. The full development of a community led programme is demonstrated using the Kaikoura integrated coastal management programme. An analysis of the Top of the South Marine Biosecurity Partnership shows how scope reduction can aid successful collaboration. Finally, the Hauraki Gulf Sea Change project is used to describe how the approach is being adapted and scaled to a more complex situation in the area of highest population density in New Zealand. These three case studies are compared and contrasted to draw out commonalities, lessons learned, and the potential for these approaches to be applied elsewhere. Systemic, sociometric and structural analyses are used to define the elements needed for consensus to emerge at the local level and to be translated into regional and national administrative systems. Collaborative processes are found to be useful for complex issues involving multiple parties with overlapping interests, making these approaches suitable for integrated coastal management.

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Introduction

Globally coastal and marine environments are under increasing pressure from fishing, pollution, harmful organisms, mineral extraction and increasingly at smaller scales from tourism (Doney 2010; Douvere 2008; Halpern et al. 2008; Lotze et al. 2006; Mee 2012; Murawski 2007). Integrated coastal management has been a catch cry since the 1970s (Wilkinson and Brodie 2011), but in practice in New Zealand fisheries management, marine protected areas formation and general environmental protection have more often followed separate pathways. Top-down approaches driven by agencies have created elaborate legal frameworks, while community initiatives have struggled to gain institutional recognition. This paper is written from the perspective of practice in working with these issues to develop integrated management in a local context. In particular we have applied the sociometric methods of Moreno (1934, 1951) to the multi-stakeholder environment of the coastal environment in the New Zealand context. This has focused particularly on creating an environment for collaboration and the creation of social mandate at local and regional scales.

Sociometry

Dr Jacob Moreno developed sociometry in the 1930's and this has been furthered developed and tested by psychodrama practitioners. Sociometry provides a developmental and sociological understanding of the development of group

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cohesion and collaboration. As used in the context of the case studies in this paper, sociometry has provided methods of:

1. Measuring the relationships that make up the organisation of social systems;
2. Classifying the positions of individuals in groups, and the position of groups in the community; and
3. Aiding individuals and groups to develop mutuality and productive working relationships.

In the complete sociometric procedure detailed by Moreno, all these methods are united into a single operation, one method depending on the other. In this approach, it is recognised that people choose or reject each other based upon specific criteria. These criteria are responses formed in relation to the specific way each person is enacting in response to the other, characterised as 'roles'. Role theory enables us to understand how members of a group develop the capacity to continue to choose each other in times of stress, and sociometry defines the diagnostic methods to identify where in the group or social system this development is needed for successful collaboration.

New Zealand context

The case studies described in this paper are set in New Zealand which has the fifth largest Exclusive Economic Zone in the World, about 430 million hectares or 15 times the size of its land area. Population is 4.4 million and stable, indigenous population is 15 % and growing. The coastline has a total length of around 17,000 km, with valuable natural assets including fisheries, aquaculture, and landscapes that support a growing tourism industry. Key threats to coastal and marine environments are associated with run-off from land, and more recently pressure for oil and gas exploration and seabed mining.[1] Coastal areas hold significant values for the local indigenous Maori populations who have relied on these natural systems for their livelihood and wellbeing for over 800 years (Te Rūnanga o Kaikōura 2005).

The relatively late colonisation of New Zealand has shaped the country's recent history, characterised by a unique combination of rapid loss of indigenous biodiversity and a nuanced interaction between the indigenous Maori and colonising Europeans. This has taken place within a developed nation prepared to take bold steps in legal and social arrangements. The small size and unicameral legislature has made legal change more rapid than in most other nations. It also means that central government is much closer to local communities than is the case in larger nations. Within a broad context of centralised Government regulation, particular communities have taken leadership and created unique solutions for fine scale management of their coasts. This paper explores the conditions that made this possible and generalises these for application in other jurisdictions.

Legal environment

In the 1980's reforming Governments established a legal framework that was more empowering than prescriptive for environmental management. One exception was the requirement for regional government for each area to have regional coastal plans within a framework of a National Coastal Policy Statement.[2] This set a foundation for regional communities to take a lead in managing their coastal marine environment. In practice this proved to be a mirage as key aspects such as fisheries, the creation of marine protected areas and marine biosecurity were mostly outside the regionally led system. Earlier approaches to integrated coastal zone management have involved

1. The formation of regional coastal plans dealing with the management of space, pollution and structures;
2. Nationally driven marine protected areas processes;
3. Fisheries management planning; and
4. Ad hoc solutions such as the Hauraki Gulf Forum created by the *Hauraki Gulf Marine Park Act 2000*.[3]

These had success in resolving issues within their mandate, but none integrated coastal management across the full range of issues as occurred in two of the three case studies examined in this paper (Peart 2007 and 2008).

In response a body of professional practice is emerging that facilitates comprehensive community led approaches. We show below that for this professional practice to be effective the following characteristics need to be present:

1. Community leadership positively connected to all stakeholder interests;
2. Acceptance by agencies with statutory agencies to implement community mandated strategies through legal instruments;
3. Engagement by people with generational commitment to place, including indigenous people, in leadership roles; and
4. Processes that engage at appropriate levels of complexity.

The coastal management issues discussed in this paper are all within the legal framework Territorial Sea of New Zealand.

[1] http://www.nbr.co.nz/article/government-opens-eight-areas-oil-and-gas-exploration-bd-154112

[2] http://doc.org.nz/publications/conservation/marine-and-coastal/new-zealand-coastal-policy-statement/new-zealand-coastal-policy-statement-2010/

[3] http://www.legislation.govt.nz/act/public/2000/0001/latest/DLM52558.html

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This is jointly managed by central and regional government. From the shoreline the Territorial Sea extends 12 nautical miles seaward from its baseline[4] at the shore and across the mouths of bays as shown in Fig. 1 below. The community led initiatives covered in this paper have not yet dealt with the wider issues in the Exclusive Economic Zone, such as offshore oil exploration and the management of the continental shelf.

Coastal management in New Zealand involves coastal land in a coastal environment that can extend as far as the land plays a role in the management of the sea and a legally defined *coastal marine area* that includes open water and estuaries (*Resource Management Act 1991*). The overall regime is split between the national, or central, Government and regional government. Central government has held to itself all regulation for protecting species and places and for the exploitation of fisheries and minerals. Regulation of use and development to protect the general environment has been delegated to regional government within a national policy framework. Protection and management of coastal environments and values is provided through several key pieces of legislation. Protection of iconic species such as seabirds and marine mammals is provided for in a suite of statutes under the *Conservation Act 1987*.

Marine protected areas

In 1971 New Zealand passed the *Marine Reserves Act*, and the formation of marine reserves began with the formation of the Cape Rodney to Okakari Point Reserve in 1975. Initially the formation of marine reserves was very slow but accelerated with the formation of the Department of Conservation in 1987. New Zealand had 34 marine reserves at the beginning of 2014 (see Fig. 2) with approvals for 5 further being announced in April 2014. These reserves comprise 7 % of New Zealand's Territorial Sea, but most of this area is located at isolated offshore island groups and far less is around the coastline of the two main islands where most of the people live. The legislation also allows for specially protected areas for wildlife and marine mammals. There are currently six marine mammal sanctuaries around New Zealand and a number of wildlife management reserves and wildlife sanctuaries.

Fisheries management

In common with many other countries, New Zealand experienced localised over fishing as fishing technologies improved and the regulatory environment lagged behind. New Zealand's response was the development and implementation of the "Quota Management System" in 1986 under which fish stocks are managed nationally in large "Quota Management Areas". The approach, however, does not deal so well with finer scale management and the capacity of the national agency, the Ministry for Primary Industries, to engage with management at the level of individual communities is very limited due to the resource needs of dealing with very large and complex national fisheries (Randall and Dewees 2003). While the core of fisheries management in New Zealand is the Quota Management System, the legislation also provides for fisheries management plans, recreational fishing regulations and customary Maori fisheries. These provisions allow considerable scope for dealing with the finer scale management issues that concern local stakeholders. Recreational and traditional fishers, still have significant concerns with the Quota Management System, as it only deals with abundance at the very large scale of Quota Management Areas, and has no influence over issues of localised depletion.[5] Shifts of commercial harvest up and down the coast, to areas of current higher abundance or value, is at variance with attempts to increase fish abundance locally.

Environmental protection

The *Resource Management Act 1991* is the core statute providing for sustainable management of human uses of the environment. It deals with pollution, competing land uses and developments such as the establishment of structures in the coastal environment. It contains special provisions for coastal management including a mandatory *New Zealand Coastal Policy Statement* promulgated by the Minister of Conservation rather that the Minister for the Environment who administers the Act. Much of the direct regulation under the *Resource Management Act* is done by regional and local government through plans created by those bodies with nationally mediated appeal processes. This means that communities wanting to influence management of their coastal environment have to deal with a multiplicity of agencies at three levels of government.

Role of Maori

Understanding the development of collaborative coastal management in New Zealand requires insight into the role of the indigenous Maori people. Maori occupy a unique constitutional position as a result of the way the nation formed and processes of redress that have taken place since 1975.

New Zealand formally became part of the British Empire in 1840 with the signing of the Treaty of Waitangi. Under this

[4] The territorial sea of New Zealand comprises those areas of the sea having, as their inner limits, the baseline described in sections 5 and 6 and 6A of the act and, as their outer limits, a line measured seaward from that baseline, every point of which line is distant 12 nautical miles from the nearest point of the baseline. *Territorial Sea, Contiguous Zone, and Exclusive Economic Zone Act 1977.*

[5] See http://www.legasea.co.nz/snapper1.php#main for expression of these concerns

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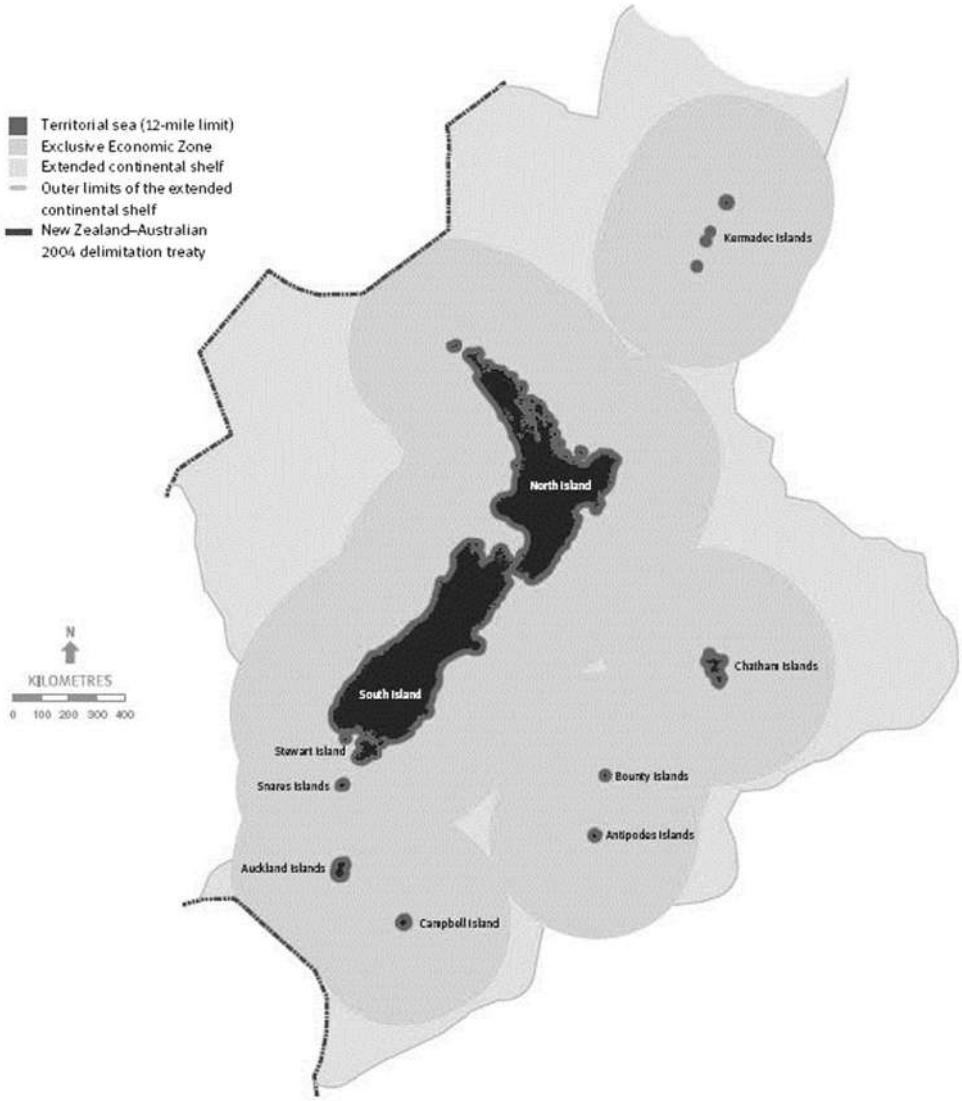

Fig. 1 The Territorial Sea and Exclusive Economic Zone of New Zealand

Treaty Maori chiefs ceded sovereignty to the British Crown in return for citizenship and guarantees of protection for their rights and their lands and fisheries. In practice the Treaty was not honoured (Waitangi Tribunal 1991).

Between 1860 and 2000 the percentage of land owned by Maori fell from 80 % to 4 %. Many Maori became impoverished and were displaced to the cities. In 1975, however, the *Treaty of Waitangi Act* was passed and processes to redress past wrongs commenced. Redress included changes to the laws, and in fisheries 20 % of all Quota was given to Maori in recognition for the alienation of their fishing rights guaranteed under the Treaty. The *Fisheries Act* was amended *Treaty of Waitangi (Fisheries Claims) Settlement Act 1992* to allow for customary fishing and two forms of Maori fishing reserves were provided for – mataitai and taiapure. At the time Ngai Tahu Maori were blocking the formation of marine reserves around the South Island until their mataitai had been put in place. The Guardians process in Fiordland (Teirney 2003) unlocked this conflict by giving Maori interests recognition and an equal voice in decision making. This has then shaped the processes developed in the three case studies.

Case studies

Three case studies show how both community and institutional leadership can result in integrated solutions:

1. Kaikoura Guardians[6] are used to show how a community initiative can lead to full integration and embedding of legal provisions for implementation and show the use of sociometric analysis;
2. Top of the South Marine Biosecurity Partnership[7] shows how with a narrow scope institution-led initiatives can rapidly produce effective collaboration;

[6] http://www.teamkorowai.org.nz/
[7] http://www.marinebiosecurity.co.nz/

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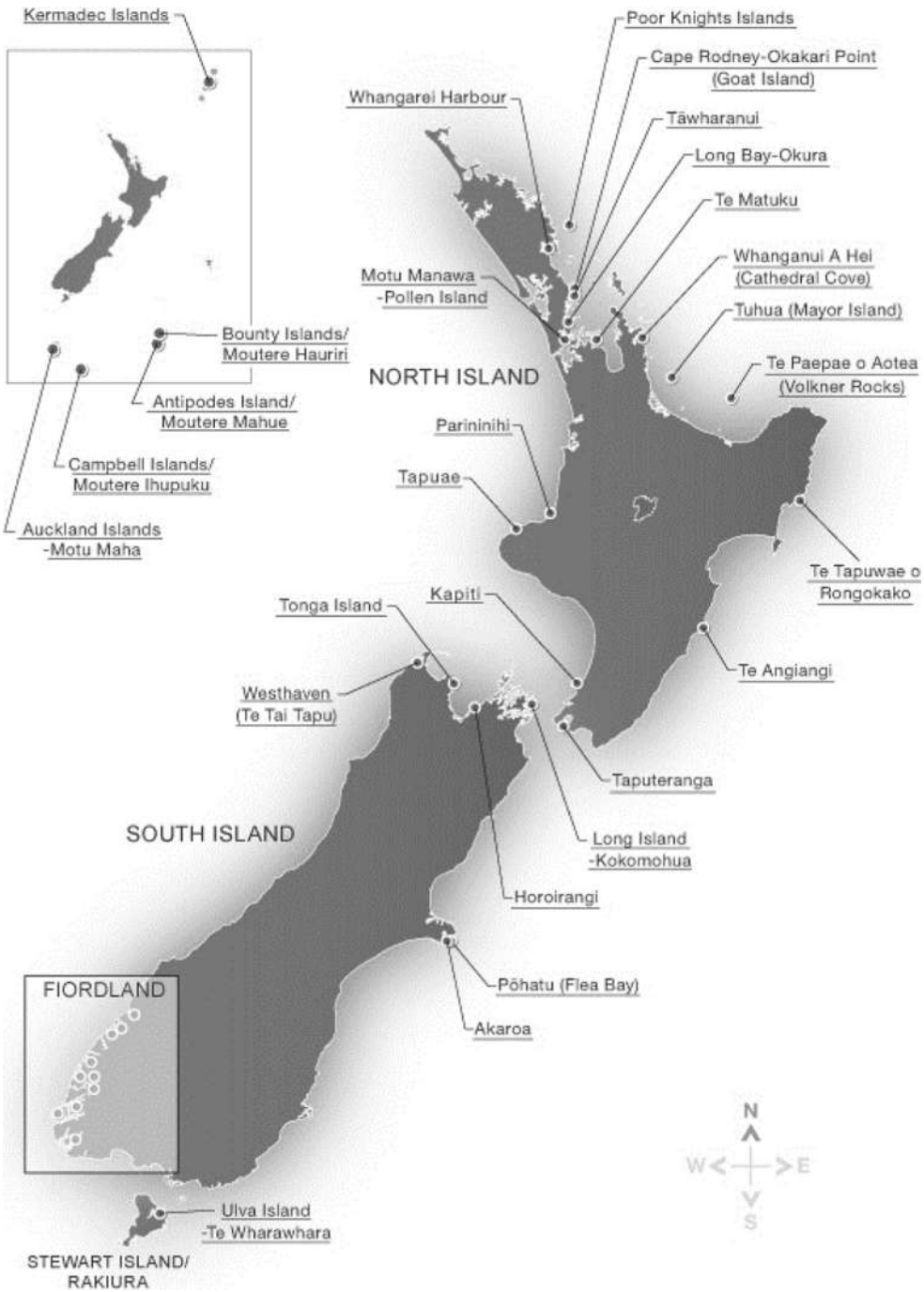

Fig. 2 New Zealand marine reserves January 2014

3. Hauraki Gulf Sea Change[8] examines the potential for a mixed community/agency model to be effective in a situation of much higher complexity.

These case studies are spread around New Zealand as shown in Fig. 3 with two in the South Island and one in the North Island. For each case study the underlying legal arrangements are the same, but the systemic and social forces acting may differ according to local circumstances and history. To elicit general principles for successful collaborative coastal management, each case is examined in terms of its history and social forces.

Case study 1 – Kaikoura Guardians

Kaikoura is New Zealand's premiere area for marine mammal and seabird ecotourism and these values reflect its unique situation (summarised in Te Korowai 2008). Kaikoura is:

[8] http://www.aucklandcouncil.govt.nz/en/planspoliciesprojects/plansstrategies/seachange/Pages/home.aspx

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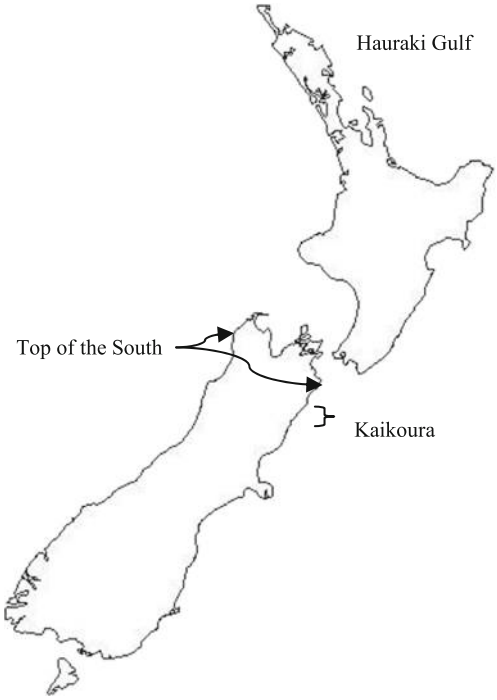

Fig. 3 Location of case studies

1. The site that characterises New Zealand in its current mountain building phase known as the Kaikoura Orogeny.
2. The best national example of a deep sea canyon close to the coastline unusual in New Zealand with its very wide continental shelf (see Fig. 1).
3. A location with outstanding abundance and diversity of marine life flourishing in the nutrient rich upwelling of deep oceanic water and warm and cold current convergence (Schiel and Hickford 2001).
4. A place with great diversity of marine habitats in a small geographic area due to the conjunction of geography and biogeographic zones (Marsden and Fenwick 1978; Marsden 2007)
5. The location in New Zealand with the greatest number and diversity of whales and dolphins.
6. The area with the second highest number of seabird species around New Zealand.

Te Korowai o Te Tai ō Marokura (Te Korowai) is a community group that was formally established in August 2005 on the initiative of the local Maori tribe, Ngāti Kuri of the Ngāi Tahu people. Ngāti Kuri invited all local people to share in the traditional role of *kaitiaki* (guardians) of the natural environment. This was an unusual and important milestone in the maturing relationship between the first peoples of Kaikōura and the local people of today. The Ngāti Kuri chief was also a leader of the tribal federation Ngāi Tahu and was very aware of the Fiordland Guardians success (Teirney 2003 and http://www.fmg.org.nz/content/story-guardians) in providing biculutral management in the marine environment.

The Te Korowai vision is a profoundly bicultural one - *by perpetuating the mauri and wairua of Te Tai ō Marokura, our community, as kaitiaki of Tangaroa's tāonga, are sustaining a flourishing, rich and healthy environment, where opportunities abound to sustain the needs of present and future generations*.[9]

The vision is a future where the moana (sea) of Kaikōura is richer and healthier. They want it to be used sustainably, providing for the needs of present and future generations. In this vision, people will interact with the sea in ways that care for its mauri (life force) and activity will be managed to respect the natural connections between living and physical elements and sustain the sea's dynamic ecological balance.

Drawing on the experience of the Fiordland initiative (Teirney 2003), Te Korowai adopted a model called by participants "the egg model". It defines the relationship between local stakeholders and national and regional institutions, including central Government agencies. Within in the centre or 'yolk' of the 'egg' model are the local stakeholders. Agency and authority members responsible for managing aspects of the coastal marine area play a support role and they appear in the outer ring or 'white' of the egg. In this approach the usual power relationship is reversed, the local stakeholders holding decision making authority and the agency members acting in an advisory role. After seven years of monthly meeting by a core stakeholder group, public meetings, public submissions and analysis, Te Korowai produced a comprehensive strategy for the care of its coast. This strategy was presented to Government in 2012 which passed special legislation to implement it in July 2014, representing the success of a process of strong collaboration between the stakeholder groups in the region.

Te Korowai is a useful example to introduce the sociometric conditions necessary for these processes to succeed and the elements of the facilitation process that need to be available. Figure 4 shows the relationships that existed amongst core parties at the point Te Korowai was formed. The symbols+ and −express the nature of the relationship against a criterion that the link "has a productive working relationship". Lines, or

[9] Māori terms were included in the English version because their unique meaning could not be fully translated. The following is a simple explanation of their use:

- *Mauri* is the life-force of the living system, and *wairua* its spirit. These can be enhanced or diminished by human actions, but continue to exist in their own right whatever we do.
- In this context, *kaitiaki* are the guardians who recognise the need to care and take responsibility for the natural environment.
- *Tangaroa*, the Māori sea god, embodies the sea in its entirety – both its seen and unseen elements.
- *Taonga* are the treasures of Tangaroa – all those wonderful facets that make the sea a dynamic living system.

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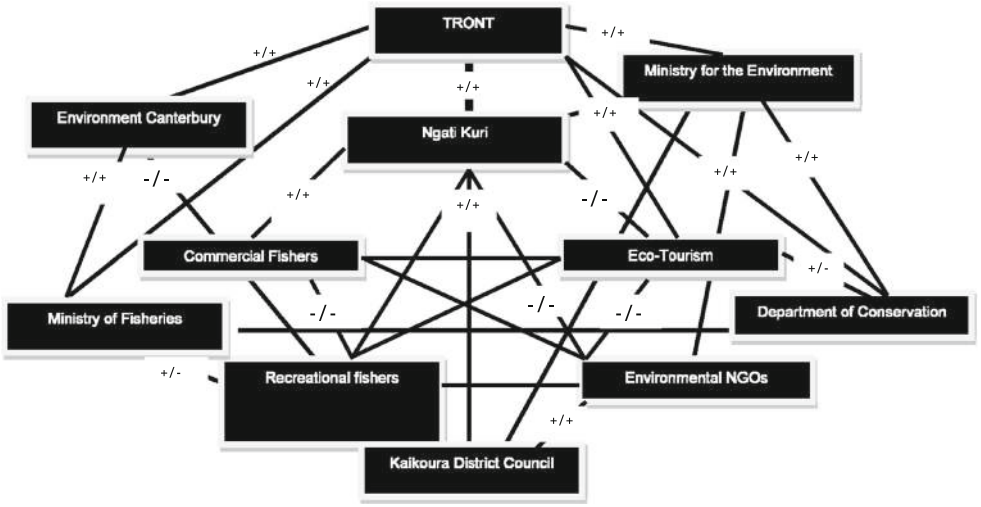

Fig. 4 Sociometric model of Te Korowai

valencies, that are unlabelled are low-key relationships with little force. The assessment of these relationships can be made by a trained analyst embedded in the group or by the parties using interactive processes in a group context. The judgements are necessarily subjective, but it is also possible to use a metric such as a score of one (low) to 10 which shows a high degree of correlation amongst diverse observers.

In some cases one party may be positive toward the other and trying to establish a productive relationship while the other resists. This can be seen by the "+" valency of the Ministry of Fisheries reaching out to recreational fishers while the recreational fishers remain "–" toward the Ministry which was seen to be aligned with the interests of commercial fishers. Relationships amongst the core parties were conflicted and at that point they could not work productively together. The process can be used to assist in resolving these conflicts by building relational capacity and deeper gaol alignment before dealing with the substantive issues of conflict.

In examining a sociometric diagram it is useful to look for a "sociometric star". This is a body or person that is positively connected to a large number of other parties, and therefore, can be essential in driving collaboration amongst a group. In Fig. 4 this resolves to one individual who was the kaiwhakahaere (chairperson) of Te Rūnanga o Ngāi Tahu (TRONT) who was also in a unique position of influence through his dual role as recognised rangatira (chief) of Ngati Kuri. The sociometric diagram shows that this individual was also in positive connection, or at least respected by, all the other parties involved. He also had the leadership functioning to translate those positive valencies into agreement of key positional leaders for a commitment of resources.

This collaborative approach among stakeholders contrasts with the experience of the environmental Non-Government Organisation (NGO) the Royal Forest and Bird Protection Society that in 1992 completed an extensive process of consultation and submitted an application for a marine reserve at the Kaikoura Peninsula. By the time Te Korowai was formed the application had been stalled so long that it was deemed "legally stale" and could not proceed.[10] At the same time the relationships around Forest and Bird with the indigenous people and commercial fishers had degraded to such an extent that meant that they had no capacity remaining to resolve a solution with the support of other parties.

In a practical sense we look in these situations for a key triangle of relationships where intervention can change valencies in a way that influences the wider web of connections. Initially there were progressive relationships between Forest and Bird and Ngati Kuri and the Department of Conservation. Ngati Kuri was, however, part of the larger Ngai Tahu confederation and the wider interests of the tribe implied resisting marine reserve formation. This was done to allow their aspirations for fishing reserves and customary fishing to be played out with the Ministry of Fisheries. The key triangle moved from the local scene into a wider context involving the Government as a whole and Ngai Tahu as a whole. At the same time national NGOs including the national Forest and Bird organisation were involved with the Department of Conservation in developing a national process for the formation of marine reserves based on biogeographic principles. In this context it was not possible for the local entities to reach a mutually tenable position and stalemate resulted where no party could substantially progress its interests. Under these pressures local relationships degraded, but were not abandoned. Positive engagement by local Forest and Bird sustained a sufficient relationship with all parties that progress was possible when wider leadership became present.

[10] See Forest and Bird's account at http://www.forestandbird.org.nz/what-we-do/campaigns/we-love-marine-reserves/marine-protection-around-kaikoura

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When the chief of the local tribe exercised the power of his role as sociometric star it took the form of directly approaching the Minister of Conservation with a request for a process modelled on that used to create the Fiordland Guardians (Teirney 2003). Elevating the conversation to a higher level released a whole of Government response as the Minister had the leadership functioning to override difficulties amongst Government officials.

This then introduces the role of skilled facilitation as a necessary element in the process. Once Te Korowai was formed, sufficient relational capacity had to be developed for the work to begin. At the outset levels of trust were low and alignment of the parties to a common goal was weak. Initial issues identification took place in this context and in a situation without an agreed body of objective information. The facilitation processes adopted initially included both structural and post-structural elements. Structural approaches to facilitation approach a group from the idea that effective collaboration will result from the structure of each meeting and explicit agreements about how to work together. Viewed structurally, for example, the culture of the group is something to be defined and documented by the group. This was done with Te Korowai as part of the process of agreement, and to a degree it worked. Five years later as the facilitation practice matured a post-structural approach was adopted. In this culture is recognised as a lived experience of the individuals in the group.

The group defined their overall vision in a series of meetings over six months. The need for a bicultural approach that melded views founded in Maori culture and views founded in a scientific rationalist approach was particularly challenging. Maturing relationships and shared information, however, allowed the group to proceed in the face of apparent ambiguity and create a common mental model. The stability of the group was an important factor in its success. Twelve out of 20 of the stakeholders were closely involved for eight years and as the work intensified the group resisted changes in membership, preferring to shrink in size rather than having to induct new people into a complex web of relationships (Te Korowai 2012 p14). Four stakeholders left the process over this period and one was replaced. Over the same time 12 staff from the four agencies were replaced while only two remained in place for the whole period. This generated uncertainty in the process and inconsistency in agency positions.

Three key process elements were important:

1. The gifts and gains concept (initially developed in the Fiordland process) which established that *in agreeing stakeholder groups relinquished benefits in the interests of ensuring the quality and sustainable management of the Fiordland marine environment and fisheries*.[11];
2. Commitment to consensus on all matters of substance; and
3. Development of agreed information both about the environment and the history of the area and documenting that in a formal publication – the Characterisation Report, to act as a 'benchmark' of the state of the marine area.

With developing trust came powerful problem solving capacity. This was applied in a matrix of solutions – some defined geographically and some thematically. Geographic elements allowed spatial separation where goals were incompatible – for example the activity of fishing is not compatible with no-take marine reserves. Two areas stood out as deserving marine reserve status for their biological richness – the Kaikoura Peninsula and the Kaikoura Canyon. As information and understanding developed the two areas took quite different trajectories.

The Kaikoura Peninsula has a diversity of intertidal and near shore habitats replicated nowhere else along this coast, it provides the only sheltered environment for boat harbours and mooring, with the highest concentration of recreational and commercial (lobster and abalone) fishing (Ministry of Fisheries 2006; Blackwell 2006). The Peninsula is also vital for Ngati Kuri and it became clear over time that regaining authority over the shores of the Peninsula was a critical factor for Ngati Kuri in sustaining its cultural identity. They saw a marine reserve there as further alienation compounding historic injustices. At the same time the Royal Forest and Bird Protection Society was passionately committed to a marine reserve on the Kaikoura Peninsula – a position we refer to as a "goal trap".

The Kaikoura Canyon is one kilometre deep canyon one kilometre from the shore at Goose Bay just south of the Kaikoura Peninsula. This deep water close to shore is very unusual in New Zealand with its huge continental shelf. The Canyon has been documented by the National Institute of Water and Atmospheric Research as one of the most productive deep water environments in the world outside areas with hydrothermal vents (De Leo et al. 2010). This productivity is what supports a huge population of marine mammals including a resident group of sperm whales that allows this area to be the focus of a very successful ecotourism industry catering to a visiting population in excess of one million people annually. Just like the Peninsula, the Canyon is scientifically and socially enormously important. It differs from the Peninsula, however, in that its great depth has so far limited access for commercial and recreational fishing. New technology is pushing those barriers back, with nets being set commercially to 800 m and recreational fishers with power fishing reels on their rods reaching 1000 m. Formation of a marine reserve over the Canyon, however, faced much lower barriers in the form of vested interested than did the Peninsula.

[11] http://www.fmg.org.nz/content/story-guardians

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Applying the gifts and gains approach the Guardians were able to reach an agreed position where:

1. The Peninsula would become a taiapure – a Maori fishing reserve, but one where governance would be shared with the wider community, recreational and commercial fishing could continue and some significant areas would be set aside from fishing in processes to be led by Ngati Kuri; and
2. The Canyon and a portion of the adjacent coast would be protected in a no-take marine reserve.

It was also agreed through facilitated dialogue within the Guardians that all of this would be part of a bigger integrated package that included:

1. A large marine mammal sanctuary to exclude petroleum and mineral exploration and exploitation;
2. Exploration of World Heritage status;
3. Changes to recreational fishing limits;
4. Voluntary agreements and codes with commercial and charter fishers;
5. Four other Maori fishing reserves;
6. Integrated coastal planning; and
7. A package of education, research and governance provisions.

These proposals were publicly notified (initially in 2011) in a comprehensive Strategy developed through a consensus processes that involved both the Guardians and key stakeholders. After a rigorous process of analysis and revision Government agreed to introduce special legislation in March 2014 as the *Kaikoura (Te Tai o Marokura) Marine Management Bill*.

The facilitation processes included both structural and post-structural elements. Viewed structurally, for example, the culture of the group is something to be defined and documented by the group. The documented "culture" of the group as a set of agreed process rules fell out of currency and a more organic "post structural" approach to culture built the greater relational capacity required to deal with difficult issues.

Regaining authority over the shores of the Kaikoura Peninsula was a critical factor for Ngati Kuri in sustaining its cultural identity. They saw a marine reserve there as further alienation compounding historic injustices. At the same time the Royal Forest and Bird Protection Society was passionately committed to a marine reserve on the Peninsula.

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As can be seen from the completed Strategy, Te Korowai o te Tai o Marokura (2012), applying the gifts and gains approach the Guardians were able to reach an agreed position where:

1. The Peninsula would become a taiapure – a Maori fishing reserve, but one where governance would be shared with the wider community, recreational and commercial fishing could continue, and some significant areas would be set aside from fishing in processes to be led by Ngati Kuri; and
2. The Canyon and a portion of the adjacent coast would be protected in a no-take marine reserve.

While no formal post project evaluation or survey of stakeholder satisfaction as undertaken, most of the twenty five submissions made to Parliament on the Bill to implement the Strategy were in favour of full implementation.[12] The notable exceptions were the submissions of the New Zealand Marine Sciences Society and the Royal Forest and Bird Protection Society. These two bodies were not satisfied with the size and shape of the marine reserve, particularly in the inshore area. This reflects a view that science was weak in the process and that social pressures were allowed to dominate. By contrast the Hauraki Gulf process detailed in the case study below has a much more strongly defined science element with a formal Expert Advisory Group synthesising science advice from many sources. The Te Korowai process relied on the expertise of Government scientists and policy advisors. While this was strong for marine mammals and marine protected areas, the periodic lack of presence by fisheries scientists weakened this stream of advice.

From this case study the core elements of the facilitation support required can be distinguished:

1. Alignment – where the core participants uncover a powerful common purpose;
2. Relational capacity – developing the sense of connection and trust required to stay working together on emotionally charged issues;
3. Information – assembling an agreed body of information and evidence about the resource and the issues;
4. Sense making – engaging together to gain a felt understanding of the information while preserving individual perspectives;
5. Collective understanding – developing a collective idea about what the information means;
6. Purposeful dialogue – moving beyond debate to deep listening;

[12] http://www.parliament.nz/en-nz/pb/sc/documents/evidence?custom=00dbhoh_bill13031_1

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7. Creative problem solving – finding fresh ways to resolve the issues in the context of the shared understanding;
8. Collaborative decision making – agreeing on what is to be done is ways that honour the needs or all stakeholders and the differences in power relationships;
9. Synthesis, strategy formation and documentation – turning the agreements reached into a supported package of integrated strategy and explanation;
10. Whole of community/stakeholder/governance conversation – broadening the discussion to include all affected parties including those in formal governance roles;
11. Refining – engaging with the views of stakeholders to refine the strategic approach and details of solutions in a transparent way; and
12. Authority to implement solutions – using the mandate created by the integrity of the process to gain formal authority to take action to implement the solutions.

Skilled facilitation is however not the only support a community based group needs to be successful. Four other activities are also required, and if any one of these four elements is missing the process fails:

1. Documentation – meeting minutes, reports, publications, website;
2. Analysis – the technical task of turning data into information and dialogue into synthesised solutions;
3. Engagement – processes to connect the group beyond its boundaries to the wider stakeholder community, to agencies and to decision makers; and
4. Fund raising – getting the financial resources to support all of the above.

Now we can examine two other case studies to see the generality of these conclusions, the role of complexity and why some processes succeed while others fail.

Case study 2 Top of the South Marine Biosecurity

Begun in March 2008, this was joint agency process rather than a community based one. The four core agencies were the three regional councils in the Top of the Island of New Zealand (TOS) and the then MAF Biosecurity NZ, a national agency responsible for the country's biosecurity. Together they agreed to produce a strategic plan to provide for better coordination of marine biosecurity actions in the region. This identified priority actions and provided a framework for determining who was best placed to undertake each of those actions. The strategic plan was drafted by May 2008 and finalised by August 2008 and agreed funding for implementation was agreed by the four agencies in the following financial year. Compared with the processes described above this was much more rapid progress – perhaps an order of magnitude faster. It is interesting to consider the conditions that allowed for this success.

Figure 5 shows that the sociometric scene was structurally complex. Multiple agencies had overlapping and unclear responsibilities, research and information was inadequate, and not only were several industries involved there were eight Maori tribes in the area with overlapping areas of interests and historic conflicts. On the surface these were conditions for stalemate rather than progress. Four factors, however, were favourable:

1. The social situation had matured where there was a predominance of goodwill amongst the parties in relation to marine biosecurity. This can be seen in the frequency of "+" valencies in Fig. 5;
2. MAF BNZ (later the Ministry for Primary Industries) was highly connected with all parties; and
3. High leadership functioning existed at an officer level in all four core agencies; and
4. The overall level of complexity was diminished by a focus on biosecurity as compared with Fiordland and Kaikoura where holistic and fully integrated solutions were sought across the full range of environmental management.

Although there were eight Maori tribes there was a pan-tribal structure in place for customary fisheries management in a committee called the "Iwi 8" with the authority and respect to speak for Maori interests in total. This further reduced complexity to a more manageable level. Overall this leads to a conclusion that reducing complexity is a key factor in predisposing situations to success in facilitated multi-stakeholder process in the marine environment. Strong leadership functioning and positive relationship valency across multiple organisations can also relieve the need for a sociometric star for effective action to be initiated and sustained.

Case study 3 – Hauraki Gulf spatial planning

This case study demonstrates the practical application of sociometric methods to creating collaboration in integrated coastal management.

The Hauraki Gulf is a large (1.2 million ha) body of water that includes the Waitemata Harbour, New Zealand's busiest port and the home of its largest city, Auckland. Almost half the population of New Zealand live in the catchment of the Gulf and it experiences the highest levels of competing use for a water body in the country.

The two regional councils and the Ministry for Primary Industries initiated Sea Change in August 2013 in response to initiatives by the Hauraki Gulf Forum. An elaborate project structure was developed to integrate political, social, technical and legal factors. This included:

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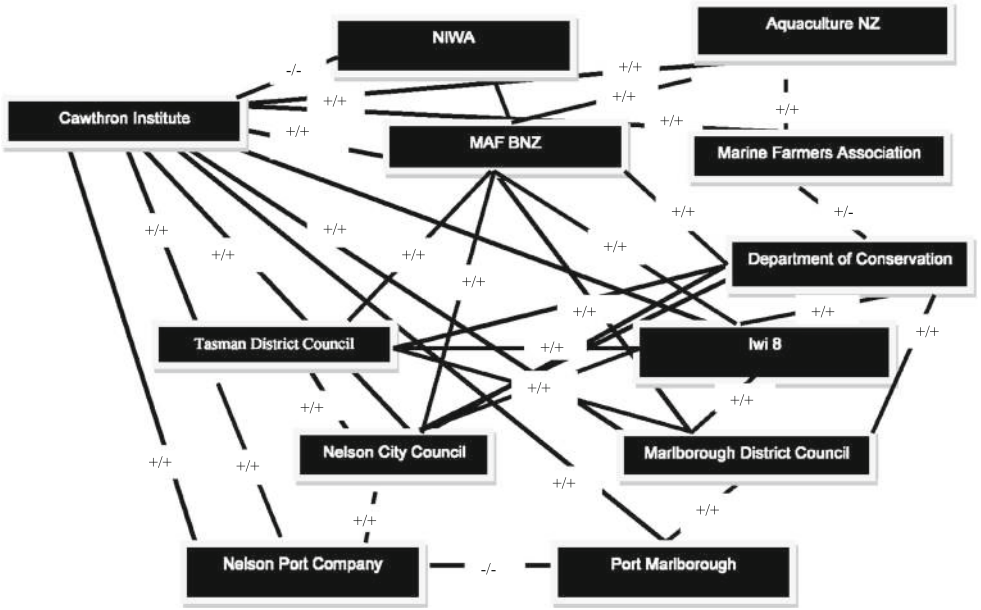

Fig. 5 Top of the South Marine Biosecurity partnership sociometric relationships

1. A Project Board;
2. A Project Steering Group;
3. An Expert Advisory Group;
4. A Project Team; and
5. A Stakeholder Working Group.

The following rules of collaboration for the Sea Change process were distinguished by the leader of the New Zealand Land and Water Forum (A. Bisely pers. comm.):

1. Talk to the people you don't agree with, again and again in a structured fashion;
2. Create incentives for cooperation;
3. Use consensus processes where participants are encouraged to understand "why" and to "stop believing in their own propaganda";
4. Ensure that you have a truly representative group, and that it includes all that have the power to veto outcomes;
5. Gain mandate from positional power holders and ensure that they are clear to all that they cannot "come and see them round the back";
6. Use knowledge to avoid "some queasy middle ground" and move to a good solid place;
7. Load the front end to enable collaboration to be an efficient process;
8. Build social capital, creating trust and confidence.

The Sea Change process had the positional mandate. A Stakeholder Working Group then had to meet Bisely's criteria of a truly representative group composed of people who were not positionally fixed. Such a group could have been selected by those with positional power such as elected political representatives. Their mandate though would be limited by the trust that the stakeholders had in the politicians, and this was known to be low.

Sociometric processes were used to form the representative Stakeholder Working Group to lead the process. In this step the challenge was to create an entity with sufficient social mandate. The approach involved:

1. Creating clusters of like interests;
2. Requiring those clusters to select from amongst their number individuals that would be good people to lead the process;
3. Subjecting those individuals to a voting process by competing interests;
4. Allowing each cluster to select from top two favoured by the competing interests.

Identified "clusters" of interests such as "commercial fishers" or "tourism interests" were invited to send representatives to participate in the process of forming a Stakeholder Working Group that was to be given mandated authority to create a marine spatial plan that would resolve competing interests in the Gulf. A two stage process was adopted. The first stage allowed stakeholders to:

1. Understand the process and the power being offered by positional authority holders;
2. Form relational connections with others in the process;
3. Identify people who would be potential members of the Stakeholder Working Group.

The second stage of the process brought all those (70 individuals) identified as potential members of the Stakeholder Working Group for a day. The challenge given to them was

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to identify a group of not more than 12 who would have the trust of the diverse range of interests to make good consensus choices on their behalf. In this one day the stakeholders were required to form clusters of like interests, make positive choices about who might represent them and subject those choices to critical scrutiny by those representing competing interests. The process required successful candidates to be highly chosen by those with like interests *and* by those with competing interests. This conjunction allowed stakeholders to agree on a group with a high probability of effectively collaborating and of producing decisions with strong social mandate. The resulting group was highly affirmed by the participants (100 %) consensus with one conflicted choice highly favoured by one sector but highly opposed by others. Resolution of this representation was left to the forming Stakeholder Working Group which has accepted responsibility for guiding the public process and completing a spatial plan over the next two years.

The overall success of this process will not be known for some years. It is probable that the overall effectiveness of the spatial planning process will be inhibited by the high degree of social complexity. The elaborate structures put in place in the project to deal with this may be effective, or, the transactional costs they impose may themselves become confounding factors.

Conclusions

The overall conclusion is that integrated coastal management in the New Zealand context can be community initiated and led. The number of cases that reach a successful conclusion is however far fewer than those that start. However, the social mandate that is created in successful cases is far more powerful than in top down driven processes.

Structural, systemic and sociometric analyses can all be helpful in understanding dynamics and drivers and determining effective interventions. Of these, sociometric analyses are the most revealing of key points of intervention as confirmed in the case studies reported in this paper. In addition, sociometric techniques can be actively used in interventions to create key processes and structural elements with high degrees of social mandate.

Three factors are critical for the process to be successful (see also Lawless 2013):

1. The level of complexity in terms of stakeholders and issues needs to be below a certain threshold; and
2. A sociometric star or several stars emerge and have within them sufficient leadership functioning and the capacity to sustain effort and engagement over time; and
3. Facilitation of a sufficient standard, technical support and resources are available to lead a process of stakeholder consensus over a period of one to ten years.

To this can be added Bisley's criteria of mandate, representivity, knowledge liberation, front end loading and active building of social capital.

This gives rise to areas for further investigation and research:

1. How do we describe the boundary level of complexity for such processes above which smaller management units in geographic space or in subject matter need to be defined?
2. How do we describe and nurture requisite leadership functioning in the multi-stakeholder environment common in coastal management?
3. How do define the type and level of facilitation capability to support and enable these processes?
4. How is social capital created and sustained.

Addressing these questions will assist in progressing successful sociometric processes in similar situations of natural resource management in other locations around the world.

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