Community leadership in coastal management

Short Report on Winston Churchill Fellowship Travel

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CONTENTS

1 SUMMARY

This short report summarises the learning, conclusions, and recommendations from Winston Churchill Fellowship travel in 2016. A full report (94pages) can be found on the Winston Churchill Trust and the following websites associated with the work of the author at:

- www.phoenixfacilitation.co.nz/
- www.thelawlessedge.co.nz/
- www.teamkorowai.org.nz/
- www.marinebiosecurity.co.nz/
- www.marlmarinefutures.co.nz/

The core hypothesis of this study was that, by comparing experiences of involving communities in protecting and restoring areas of the marine environment, generally applicable lessons could be found that could enhance New Zealand's capacity to be effective in marine protection.

Four well established models were selected:

- Australia's Great Barrier Reef, the" grandfather" of large marine parks around the world;
- Nova Scotia's The Gully Marine Reserve, the longest established marine reserve over a continental submarine canyon;
- East Coast USA's Chesapeake Bay, the largest and oldest restoration of an enclosed area of the sea;
- Monterey Bay Marine Park, a multi-zoned marine park that includes near-shore to submarine canyon depths.

British Columbia's co-governance of the marine environment with the indigenous people was added after the initial itinerary was set.

The Great Barrier Reef Marine Park displays world best practice in creating and refining a very large, multiple use marine protected area. Despite this it is failing to achieve its core purpose due to factors beyond its boundaries. The principal threats are climate change and nutrient input from the land. This shows that it is critical to understand and include the full context that affects the formation and management of marine protected areas if the objectives for which they were formed are to be achieved with any degree of certainty. This means going beyond what we think we can tackle to what we really need to tackle.

The Gully Marine Reserve shows the importance of sustaining processes of influence to capitalise on initial success and the change in mode required when the general political environment changes. Policy, networking, methodology for Marine Protected Areas formation are all weak because of the Harper Government's cutting of programmes for marine protection over the previous decade[1]. The targets set by the Liberal Government[2], of 10% of the marine area in MPAs by 2020, are impractical without a brutal top down approach that would offend against its other principles of collaboration.

Conversely, the British Columbia experience is quite different. Here a Provincial leadership cut across the Federal *neo-colonial style conservatism* to make what progress it

[1] http://o.canada.com/news/harper-government-cutting-more-than-100-million-related-to-protection-of-water

[2] https://www.liberal.ca/realchange/trudeau-announces-plan-to-protect-canadas-oceans/

could in integrated marine management under its own authority. This now leaves British Columbia in a much better position to respond to the window that has opened. The issue will be the capacity of the federal administration to be responsive to the policy shift, and change its own culture quickly enough to capitalize on the opportunity.

Everyone interviewed in the USA, on both seaboards, was talking about political polarisation, and the effect on their work and what could be achieved. The sheer scale of the human impacts on the sea, both positive and negative, and political complexity were defining aspects of marine protection on both coasts. It is very hard for any participant to comprehend the whole. There are strong homeostatic forces at play, meaning that any action draws compensating responses that tend to lead to outcomes of delay, or of cosmetic protection that appears to satisfy the wishes of environmental stakeholders while achieving little in practice.

Processes of collaboration can only be successful when the unifying forces exceed the divisive forces. Therefore, we see small gains, like those described by Paul Michel for the Sanctuary programme, where division is avoided by leaving out the key area of conflict, in this case fishing. Equally, in enormous programmes like the Chesapeake Bay restoration, there is slow headway despite the resources and skills applied.

Large, diffuse, highly conflicted systems with long time delays require great unifying forces and highly effective catalyst processes that reduce transactional costs to the parties. These catalyst processes are the technologies of dialogue, synthesis, and collaboration. Chesapeake at $5B a year is at the top end of subnational processes of this type.

Smaller, localised, less conflicted systems with shorter feedback loops can produce enduring solutions with modest efforts, BUT the solutions are vulnerable to being overwhelmed by signals from larger systems. The Californian marine reserves at a state level is at the top end of such approaches with a cost of $14M.

2 METHODS

The approach was an iterative exploration through semi-structured interviews, each of which was immediately analysed in a process that developed as insights were gained. Text relevant to each informant was copied to them so corrections and additions could be made, and thus the text in the report is agreed by the informants as a true and correct record. The respondents were offering personal opinions and insights which were not necessarily representative of the views of the agencies or organizations with which they were affiliated. Respondents emphasized that the opinions that they expressed were solely their own, and should not be construed as some sort of statement of agency policy.

While the principal focus was the social process, the biophysical context was also important, and was documented in relation to place. Published and unpublished materials were gathered and analysed both during the study tour, and subsequently, to inform the overall conclusions.

The results are to be applied in marine protection initiatives in New Zealand (particularly the 7,250 square kilometre Marlborough marine area), in training facilitators and in contribution to law and administrative reform.

The frames of reference applied in analysis included: Senge's system theory, Scharmer's Theory U, Moreno derived sociodrama as interpreted by Hamish Brown for application to

analysis of social forces, realist analysis, organisational analysis for stratified systems based on the Requisite Organisation of Jacques and the seven S McKinsey model. Inherent in the approach was comparison to experience gained through thirty years of practice in environmental protection, particularly with marine spatial project including: Te Korowai o te Tai o Marokura, Marlborough Marine Futures, Hauraki Sea Change, and Nelson Biodiversity Strategy and Partnership.

This work has been done from my frame of reference as a "facilitator". This is an emerging professional role with a wide range practice and theory. To facilitate is to "make easy" and the focus of my work is enabling collaboration (literally, to labour together). References to "facilitation" in the report include all activities purposefully assisting groups to achieve a purpose.

3 ANALYSIS

The key insight from this study, was the implication of the systemic linkages between the science, stakeholder, and political/administrative processes in determining whether marine areas will become protected, or timely action taken to restore them. Understanding these systemic dynamics and identifying effective ways of reducing the time and increasing the effectiveness of interventions and actions is the critical work to emerge from this study. The application of three analytical frameworks is proposed – realist evaluation, sociometric analysis of social forces and systemic analysis as proposed by Senge using archetypes. It is suggested that, using insights from these analyses, skilled interventions can be proposed to enable windows of opportunity to be identified, created if necessary, and exploited.

3.1 GREAT BARRIER REEF

The Great Barrier Reef experience shows that even world best practice in marine protected area formation and management is not on its own sufficient to ensure that the values of outstanding areas will be sustained. Based on the Great Barrier Reef, the necessary elements would appear to be:

- Identify the values.
- Understand the conditions necessary for their continued existence.
- Assess the contribution of each of the suite of anthropogenic stressors now and in the future.
- Set limits for each stressor in the context of the whole including synergistic effects.
- Explore options for containing each stressor.
- Select policy mix for stressor limitation.
- Implement.
- Monitor.
- Adapt management based on observations.

Because marine protected areas are social, rather than biophysical phenomena, the keys to their success lie in the elements of the social realm. In New Zealand, we label these predominantly as political, economic, social, and cultural processes, and these are linked within a full social fabric. Australian marine protected areas are predominantly legally defined, and thus are a product of formal political processes. It was evident that there

was a time delay of one or more decades from recognition that something should be done to protect the Reef from particular threats and the emergence of effective action.

Political decisions create legal instruments and allocate public resources. In the context of politics, the health of the marine environment, even an icon like the Great Barrier Reef, is a small feature in the political landscape. In politics, natural environments do not matter for their own sake, but only because some influential group with political influence cares about them.

Within social processes, people's actions are mediated by their belief systems, their knowledge and what they experience. This is as true of those with political power as anyone else. It is the belief system that is the central driver. When new data arrives, it is processed in the light of the prevailing mental model. This means that most of the incoming information is rejected if it conflicts with the belief system of the recipient. Therefore, the environmental administration in Queensland has turned to social marketing as its mode of activity to effect social change for the good of the Reef. Experience has shown that adding more information on its own changes the behaviour of few people.

Taken together with the huge raft of competing political priorities, it is thus not surprising that political action on dealing with environmental stressors facing the Reef has lagged far behind the realisation by knowledgeable stakeholders that action is needed.

In Australia, the dominant political groups over recent years have held a mental model that gave primacy to economic development. This mental model led decision makers to reject a huge amount of credible science advice on matters like climate change. In such a context, science advice itself generally takes on a more limited role in all political decision making. Stakeholders that value political action on environmental issues turned to social marketing of their own, but turned it onto the political process. This successfully moved the political process against the dumping of port capital dredging inside the Reef.

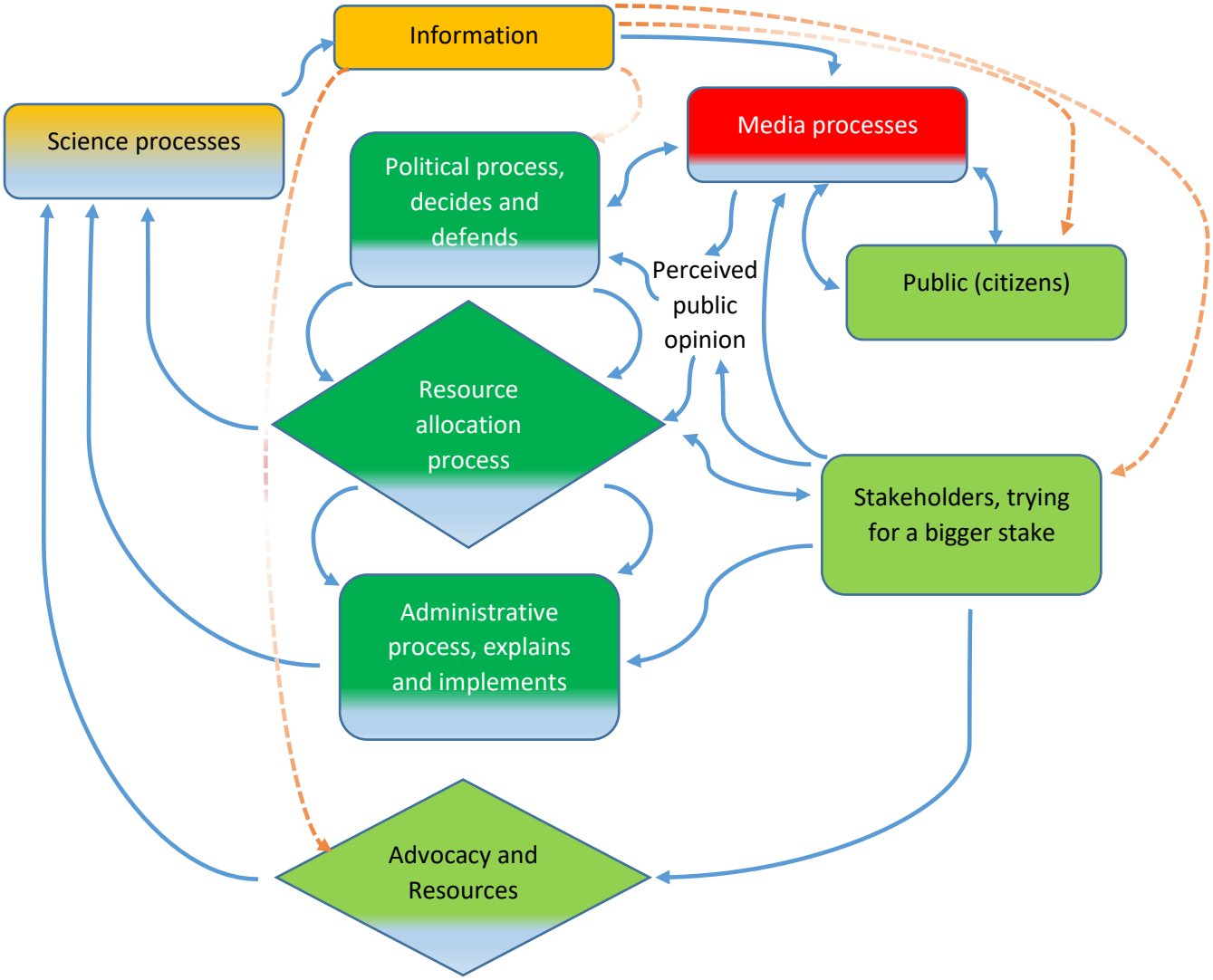
Uncertainty plays an important role in these processes. When the incoming information conflicts with the prevailing mental models there is a call for greater certainty. Science itself is comfortable with uncertainty, even as it works to reduce it. Scientists are trained to be rigorous in identifying uncertainty and seeking data that would disprove their current hypotheses as they seek for more general explanatory power. In the political process, however, this works against action being taken and resources being allocated. Uncertainty is a reason not to act on this issue, or at this time, freeing resources and favours for other competing interests.

This leads in turn to changes in the behaviour of the science community. There was noticeable tension between battle-hardened older scientists who had modified the way they expressed things to speak with more certainty to influence decision making, and younger scientists who held more strongly to science conventions as they sought to build their credibility with their peers.

The biophysical world is also full of surprises and apparent discontinuities. These include the outbreaks of Crown of Thorns Starfish, bleaching events, and cyclones. Where prevailing wisdom has been built on linear models, these events can lead to insights that management actions have been grappling with wrong or insufficient things. This has been seen in a sequence for the Great Barrier Reef – oil and gas, tourism, fishing, sediment and nutrient and most recently global warming and sea acidification. These events can also be dramatic opening windows of opportunity in the social/political process. Such openings

are called Overton windows[3]. Applying this to the Great Barrier Reef experience we get the system below:

Figure 1 Great Barrier Reef political and information processes



Note that the weak (red dashed) flows are the results of the science process, while the strong flows (blue solid) are strongly influenced by stakeholders trying to grow their valued stake in the system. The media mediates the interaction with the wider public, but the stakeholders endeavour to directly insert themselves to change perceived public opinion and influence the political process. In the case of the Great Barrier Reef, the Worldwide Fund for Nature with its letter writing campaign was particularly effective.

In speaking of "stakeholders", I am distinguishing sectors with interests greater than the public generally. These include both the organized, such WWF and the farmer lobbies, and the unorganized such as recreational fishers. High levels of organization and/or sophistication cause some stakeholder groups to exercise high levels of influence on the

[3] https://www.mackinac.org/7504

political process, while others exercise far less influence than objective measures of effect would militate. The indigenous people of the Great Barrier Reef exemplify the latter category.

3.2 The Gully and British Columbia

The Gully Marine Reserve is another good example of the interaction of a sophisticated stakeholder, again the WWF, with a political administrative process at a point ripe for demonstration of the effectiveness of new policy. In this case, however, the stakeholder became distracted, and the administrative machinery encountered a political move to the right that disabled further progress.

This shows the importance of:

- Sustaining processes of influence to capitalise on initial success;
- The change in mode required when the general political environment changes.

In this case the WWF moved its attention to a representative Marine Protected Areas system, just at the time the political process became unreceptive to initiatives that might adversely affect the interests of the productive industry stakeholder sector. How then could the administrative part of the system respond productively?

Given the role of Overton windows the best response is two-fold:

First, limit the damage of the adverse political process on valued outcomes by slowing policy processes and arguing for better policy.

Second, prepare for the opening of the next window.

The less the public service is politicised the more possible are these approaches. Canada has been experiencing strong political pressure on the public administration and is looking to the New Zealand model for a remedy[4].

Now, with a change in Government a window has opened. However, the Department of Fisheries and Oceans in Nova Scotia does not appear well placed to implement these policies. It has spent so long resisting, or responding to, environmentally adverse policies it is not well positioned to respond to the opportunities being offered. Policy, networking, methodology for Marine Protected Areas formation are all weak, and the targets set by the Liberal Government are, in any case, impractical without a brutal top down approach that would offend against its other principles of collaboration.

Conversely, the British Columbia experience is quite different. Here a Provincial leadership cut across the Federal *neo-colonial style conservatism* to make what progress it could in integrated marine management under its own authority. This now leaves British Columbia in a much better position to respond to the window that has opened. The issue will be the capacity of the federal administration to be responsive to the policy shift and change its own culture quickly enough to capitalize on the opportunity.

3.3 Chesapeake Bay and Monterey

Everyone interviewed in the USA, on both seaboards, was talking about political polarisation and the effect on their work and what could be achieved. The sheer scale of

[4] http://www.cbc.ca/news/politics/top-bureaucrats-met-to-resist-partisanship-imposed-on-public-service-1.3294972

the human impacts on the sea, both positive and negative, and political complexity, were defining aspects of marine protection on both coasts. Figure 2 attempts to capture the system of political complexity, and reduce its role in marine protection to something understandable. It is very hard for any participant to comprehend the whole and there are strong homeostatic forces at play, meaning that any action draws compensating responses that tend to lead to outcomes of delay or cosmetic protection that appears to satisfy the wishes of environmental stakeholders while achieving little in practice.

4 CONCLUSIONS

4.1 KEY INSIGHTS

4.1.1 Indigenous people

The societal gap between indigenous culture and settler culture in Australia and Canada is larger than in New Zealand. There is a lot of good will at an organisational level, but little idea about what good practice would look like.

Beginning with the Treaty relationship (if it exists), or recognition of sovereignty, is fundamental to enduring solutions for marine management and protection.

The indigenous people's world view needs to be understood as a gift needed by the world to live in harmony with its environment. This should cause decision makers to go beyond seeking *buy-in*, beyond *consultation*, and beyond *engagement* to true *collaboration*.

4.1.2 Catalysing marine protection

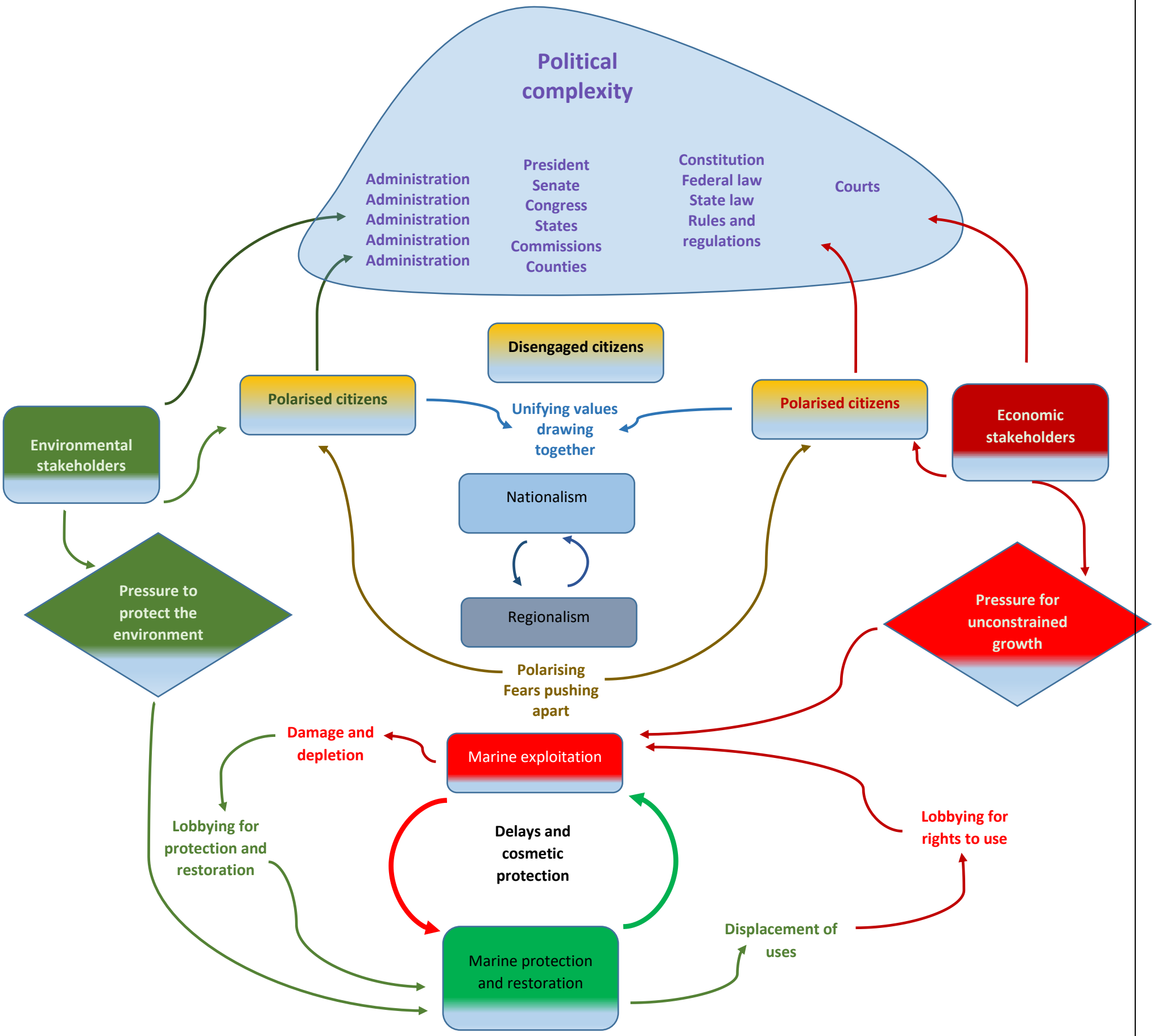
The process of constructing the thing is the thing. There is no magical end point to be reached. Strategies, plans and lines on maps are artefacts, marking phases in a community coming to care for its place.

Working with the emergent is the only way to go. Processes developed in one place and time cannot be blindly applied to another with any strong likelihood of success. Only by sensing into the field can a practitioner find the catalyst actions that will move whole communities to a new level.

In dealing with large dispersed issues, a productive approach is to deconstruct them into short term not-dispersed things. At the same time, only whole system solutions will be robust, even when the whole system is the whole planet.

We tackle what we can tackle based on current knowledge and social conditions, even when we know this to be insufficient in the long run. This yields short term gains, but, as seen with the Great Barrier Reef, even something as big as fixing the land run-off may be overwhelmed by climate change.

Figure 2 USA political complexity



Taking readouts of the trust level in a long-term group could provide useful information on the efficacy of interventions.

Recruiting allies bears fruit in the long run. These large complex problems have long times frames and working to increase the net friendliness in the system makes collaboration possible.

Being rigorous with yourself as a facilitator builds recognition of integrity. People are used to being disappointed, and crave trust. Taking responsibility earns authority.

The realist analysis process asks the question *what works for whom and how*, rather than proceeding from a pre-set idea of what "works" looks like. This frees the analysis to encompass the full range of perspectives.

It takes time to refine objectives, build trust, develop governance mechanisms and secure commitment and resourcing. Good facilitation, creating relational capacity, and commitment to a common direction is critical. This means that it is vital to be realistic with people at the outset that this is a marathon, not a sprint.

Leadership is an emergent property of the collaboration, rather than a role attaching to a person. Consequently, requisite leadership is built rather than discovered, and may emerge at a range of places and times as the process unfolds.

Collaboration requires the parties to be prepared to modify their goals to achieve a shared purpose. Cooperation merely requires them to find common ground for agreement. Some parties may become full collaborators in the core process while others may just need to cooperate sufficiently for an enduring solution to be found.

Direct engagement with stakeholders by individuals with a deep understanding of their realities is a key part of creating effective collaboration in marine protection. This means involving individuals with a wide range of experience, expertise and perspectives.

Even though conflict peaks in the formation process, so does engagement. When undertaking a process, you should be prepared for the way that apparent conflict increases as the enduring solution is approached. This is because parties are trying to secure maximum gains before the system moves from a labile to a meta-stable condition.

Boundaries can be set for marine protected areas and values recognised before issues identification and solutions generation commences. The Great Barrier Reef model, for example, succeeded. However, it is important that the founding legislation and administration contains the seeds and powers necessary for an adequate solution to emerge.

4.1.3 Socio-political processes

More locally based initiatives have a higher rate of success than federal processes in federated polities. This is seen in all three countries in the study tour. A rich appreciation of the local system of relationships, perspectives and natural and social systems are required to construct a sufficiently nuanced solution to gain acceptance by all critical stakeholders and to endure over time.

Creating funding streams enables a strategic approach without building a large administrative superstructure. The Foundations for Chesapeake Bay leverage influence through strategic analysis and investment. This leverages at multiple points: with the donor, the recipients and those involved in the projects.

At present, the simplicity of the New Zealand approach in focusing just on no-take marine reserves may be more effective in getting such areas than large marine parks with

cumbersome legal processes that lead to zoning. Focus really matters. This is pertinent to the current discussion in New Zealand about new legislation for marine protected areas.

Sophisticated social marketing may prove to be an effective tool for behaviour change in a dispersed and conservative stakeholder community. Creating a set of strategies based on stakeholder perceptions is a powerful approach, and the use of piloting allows things to be tested and refined before full scale implementation. Conversely, the emergent properties of systems at different levels of scale may render piloting approaches ineffective in some systems.

Micro-segmentation and careful selection and targeting of opinion leaders can be highly effective avenue for influencing bipartisan political outcomes. This can be particularly important in foundation stages when wide support needs to be garnered, or in implementation stages when behaviour change is needed from many stakeholders.

The people who get out in the marine environment are the ones who truly know it. It is easy to be seduced by sophisticated stakeholders skilled in dealing with political or administrative "realities". The people who get out into the environment are the ones with a felt sense of the place and its dynamics. They are also likely to have generational commitment to the place. Getting their voices heard is a critical task for catalyst practitioners.

4.1.4 The role of science

Lack of science is not the problem in developed societies. Calls for more science are usually driven by stakeholders who want to slow processes down, or by scientists touting for business. The "problem" is closing the gap between what is known and doing something about it. That said, well presented good science is vital. Evidence-based, soundly analysed information allows an agreed and robust set of facts to emerge on which action can be based with some probability that the results of the action might have something to do with the aligned goals of the participants.

Independence in science advice can counter embedded vested-interest game playing. People, rightly, have come to distrust science sourced from vested interests. The lack of ability of scientists to create a firm ethical base for their advice means that new structures and processes are needed for science to play its most useful roles.

An engaging academic can be a major force in driving protection if allies are available in the administrative and political spheres. Academics have more independence than other "experts", and through their work with students must develop skills in communication. This gives them a place to stand, resources, and capability to move hearts and minds. Bill Ballantine is the exemplar of this in New Zealand marine protected areas.

Monitoring is key to assessing the effectiveness of management. Marine protected areas seldom do what their founders thought they would do. Temptation to set outcome targets should be resisted, as the results can bring marine protected areas into disrepute when they fail to "deliver". However, because of this difficulty in prediction, it is normal that management needs to be adapted over time to achieve foundational and emergent goals. Adaptive management works best when based on data. Monitoring is one way, but not the only way, of getting such data. Monitoring works better when harnessed to research, survey, and integrative processes. It should be noted that developing systems of sharing observatory/monitoring information that resource managers will use is a complex task. New technologies mean that automated data collection vastly increases information available on systems. Citizen science can be effective with adequate systems and training.

This increases the pool of information and the people who will appreciate the meaning of the data at the same time.

Information on its own does nothing. "State of the Environment" reporting in the form of simply presented report cards and indices can unlock action by agencies and communities.

4.1.5 Administering marine protected areas

Marine protected Areas are only as good as their implementation. The more people using the marine protected areas, the more implementation that is required to be effective. Many marine protected areas investigated in the study tour were so poorly managed they risked putting the whole concept into disrepute.

Sustained management solutions are needed. Often more effort is put into establishment that into implementation.

Doing something profoundly new in a country takes more time and energy and has more hurdles than any of the practitioners or the players realise when they set out. Every time you set a precedent it will impinge on someone's territory and they spring from the background when you might least expect it. The actual work of creating a marine protected area is thus far more complex than lobbyists realise. Conversely, in a place with experience of establishing marine protected areas in a particular form, the learning permeates the system and can make subsequent efforts go more easily. Models of success matter.

Single focus entities have more chance of making a real difference. Regularly reviewing management actions and adapting to new information is essential. Critical success factors are the skills and commitment of the agency leaders in leadership, political processes, and committing resources. The Great Barrier Reef provides a model of all the necessary elements.

A statutory advocacy role is a key activity for a marine protected area to be able to deal with impacts that relate to offsite activities. Every marine protected area has boundaries, and the flows from land to sea and within marine environments means that capacity to influence activity beyond the borders is essential to maintain the health of any marine protected area. Equally within the marine protected area boundary effective regulation and enforcement are key elements of success. The need for legal enforceability comes because, in many cases, effective protection action can have a material and adverse effects on the interests of a set of stakeholders.

Visitor services are best embedded in a system for which the role is core business, but excellent staff will create excellence regardless. Providing infrastructure and interpretation have become highly skilled and professionalised areas of activity. Agencies and organisations that do a lot of this work will do it better than those for whom it is a one-off project.

Trained volunteers can vastly increase the outreach of administrative agencies. This was a major feature in the USA and is much less evident in New Zealand.

4.1.6 Biosecurity

New Zealand is way ahead of other jurisdictions in taking practical steps to reduce marine biosecurity risks. Most jurisdictions are either unconscious of the need for action, or are contemplating it rather than doing it. At the same time the scientists around the globe are on the ball and well networked. The gap between knowledge and active risk reduction is a critical factor in achieving effective action on marine invasives around the world.

Global warming is opening new vector routes through the Artic in a complex international political environment that will make management difficult. This phenomenon may have parallels in other parts of the world.

4.2 General conclusions

Processes of collaboration can only be successful when the unifying forces exceed the divisive forces. Therefore, we see small gains, like those described by Paul Michel for the Sanctuary programme, where division is avoided by leaving out the key area of conflict, in this case, fishing. Equally, in enormous programmes like the Chesapeake Bay restoration, there is slow headway despite the resources and skills applied.

Large, diffuse highly conflicted systems with long time delays require great unifying forces and highly effective catalyst processes that reduce transactional costs to the parties. These catalyst processes are the technologies of dialogue, synthesis, and collaboration. Chesapeake at $5B a year is at the top end of subnational processes of this type.

Smaller, localised, less conflicted systems with shorter feedback loops can produce enduring solutions with modest efforts, BUT the solutions are vulnerable to being overwhelmed by signals from larger systems. The Californian marine reserves at a state level is at the top end of such approaches with a cost of $14M.

5 Application

5.1 Contribution to facilitation in New Zealand

The learning from this Fellowship advances the practice of facilitation of community leadership in caring for the marine environment. It has enabled the development of insights and tools that can be applied to large scale collaborations currently being applied to environments such as the Hauraki Gulf, Waikato River, Marlborough Sounds, and the south-eastern coastline of the South Island. These tools can also form the basis of training facilitators active in these fields.

5.2 Contribution to maintenance of the Commonwealth as a beneficial influence in world affairs

In the course of this Fellowship travel, well attended presentations were given at the Bedford Institute in Nova Scotia, the Smithsonian Institute in Annapolis, and the Monterey Sanctuary in California. These allowed case studies and learning from New Zealand to be shared with leading researchers and interest groups in these locations. The New Zealand approach to working with indigenous people was of interest and has led to requests for further contributions, including from aboriginal people.

5.3 Application of learnings

Learning from the Fellowship has already been applied to integrated management in the Marlborough Sounds, resolving coastal access issues around Nelson, advising on priorities for the Kaikoura Coastal Guardians and developing links between indigenous groups in different countries. The outline of a book has been developed and key insights will be shared with policy makers in central and local Government. Further steps will involve publication and integration of learning into training facilitators.

The learnings from this Fellowship are directly applicable to:

- The marine protected areas legislation review.
- The work of a wide range of organisations engaged in marine protection.
- Facilitation professionals.

Steps are underway to contribute to all of these.

5.4 SHARING LEARNINGS

- All 50 contributors to this study were provided with the full report in draft and many contributed responses to the insights provided.
- A half day workshop on collaboration was run at the Environmental Defence Society conference on wild places and one of the contributors came from Australia as the key note speaker.
- Presentations have been made to: the Nelson Biodiversity Forum, Forest and Bird, Kaikoura Guardians, Marlborough Sounds Integrated Management Trust, and TOS Marine Biosecurity Partnership.

6 RECOMMENDATIONS

The key recommendations from this study are addressed to the Minsters of Conservation, Environment, Fisheries, and Biosecurity. They are that:

1. Collaborative processes being embedded in policy and legislative instruments need to be more carefully set out to enable the full value to be realised by communities and by the country as a whole;
2. Large scale, multiple-use, zoned marine parks of the form adopted for the Great Barrier Reef should be provided for in any new marine protected areas legislation;
3. The historic underinvestment in marine biosecurity needs to be corrected as a matter of urgency, and the new provisions for pathways management implemented nationally as soon as possible.

7 ACKNOWLEDGEMENTS

I would like to sincerely thank all those that made this study tour possible. First, the Winston Churchill Fellowship for its generous funding. Second, all those that provided information, resources, their time, and passion for the marine environment. Third, people that organised meetings, talks and itineraries including Janie Waterhouse in Brisbane and Townsville, Maxine Westhead in Nova Scotia, and Lisa Wooninck in Monterey. Fourth, all the wonderful new and old friends who provided accommodation, vehicles, local knowledge and opportunities for rest and recovery in a frenetic programme: Janie Waterhouse in Brisbane, Jon Brodie in Townsville, Beth Guerrera in Boston, Lucy Barber in Washington DC, Cathryn Jones in Vancouver, and David Bomberger in California. Fifth to institutions that hosted me for extended visits including the Bedford Institute, NOAA Monterey Marine Sanctuary, and Maryland University. And finally, those that got me out and about in their unique environments including Yongalla Dive on the Great Barrier Reef, Paul McNab in Nova Scotia, Cathryn Jones in British Columbia, and Phil Sammet in Monterey Bay.